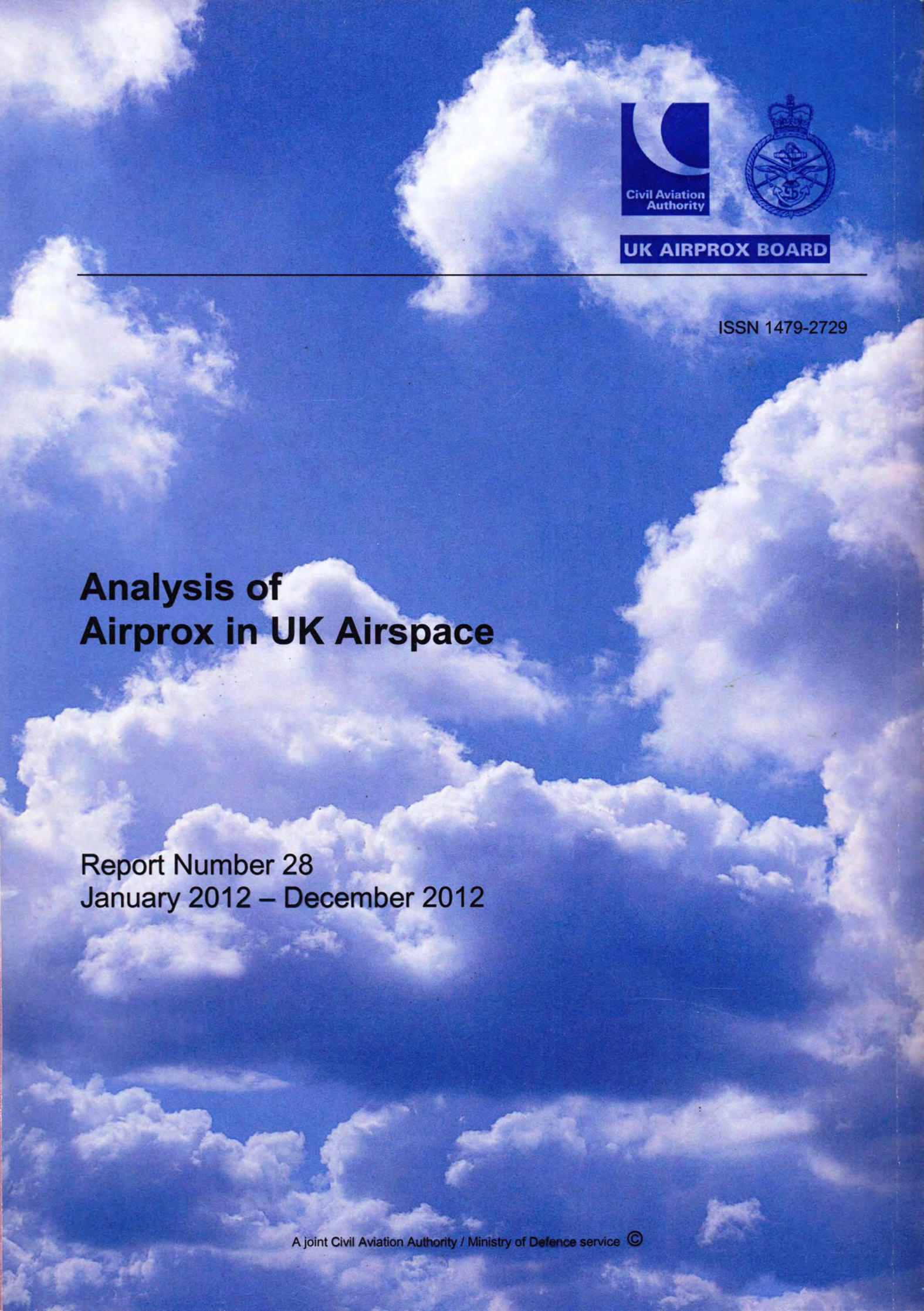

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Analysis of Airprox in UK Airspace

Report Number 28
January 2012 – December 2012

Twenty-Eighth Report by the UK Airprox Board:

‘Analysis of Airprox in UK Airspace’

(January 2012 to December 2012)

produced jointly for

The Chairman
Civil Aviation Authority

and

The Director General
Military Aviation Authority

CONTENTS

UK AIRPROX BOARD ANNUAL REPORT 2012

Executive Summary

The UK Airprox Board investigated 161 Airprox in 2012 of which 28% were assessed as risk –bearing (Risk Categories A & B). In Table 1, showing the trends over the preceding 5 years, it should be noted that Risk Category E was introduced in 2011; prior to this date these Airprox would have been included in the Risk Category C totals.

	2007	2008	2009	2010	2011	2012	2007-11 Average
Risk Cat A (Collision Risk)	9	13	11	12	23	18	14
Risk Cat B (Safety Not Assured)	39	38	36	33	36	27	36
Risk Cat C (No Collision Risk)	106	100	97	116	88	97	101
Risk Cat D (Insufficient Information)	0	4	3	6	2	5	3
Risk Cat E (Normal Safety Standards)	0	0	0	0	12	14	2
Annual Totals:	154	155	147	167	161	161	157
Risk Bearing %	31%	33%	32%	27%	37%	28%	32%

Table 1. Airprox Trends by Year.

As usual, caution is required in identifying trends with the small number of Airprox each year. There was, for example, no obvious explanation for what now appears to have been the spike in risk-bearing Airprox in 2011; the spike comprised a small increase in the number of risk-bearing military Airprox and a larger increase in General Aviation (GA) risk-bearing events.

Overall, there are no significant deviations in 2012 from established Airprox trends for Commercial Air Transport (CAT), GA or Military flying. Rather each year there are the same types of events in similar places and airspace to previous years. From a statistical perspective the period of the Olympic & Paralympic games had little discernable effect; only 3 Airprox could be directly attributed to the temporary airspace restrictions.

The number of CAT Airprox in 2012 (35 events) was higher than 2011 but the trend over 10 years is downward. However, 2012 saw the first Risk Category A Airprox involving CAT since 2005. This occurred in an encounter with a GA aircraft in Class G airspace below 3000ft, which is the airspace in which a third of all Airprox occur. GA-GA Airprox and GA-Military Airprox are the first and second most frequent occurrences respectively; that said, there was a marked reduction in numbers of GA-Military Airprox in 2012 compared with the previous 2 years.

One aspect of GA that is changing is the increased aircraft performance that sees the 'bottom end' of the group (light aircraft, gliders, microlights, para-gliders etc) operating in places and at altitudes and speeds that were previously beyond them. This increased performance appears to be testing the ability of all airspace users to anticipate where these, frequently small, aircraft may operate and to see and avoid them.

The third anniversary of the introduction of revised Air Traffic Services Outside Controlled Airspace (ATSOCAS) occurred in Mar 2012. A comparison with the previous Air Traffic Services shows mixed results. There has been a reduction in the number of Airprox occurring when pilots operate under a Deconfliction Service compared with the old Radar Advisory Service, but for the lower levels of service there have been significant increases in Airprox numbers under the new ATSOCAS.

Eight formal safety recommendations were made as a result of the 2012 Airprox; 5 have been auctioned and closed with the remaining 3in progress. In addition all of the data, trends and factors referred to in this report have been communicated to relevant CAA and MoD staffs.

The traditional UKAB Blue Book report is no longer produced in hard-copy but will be available on-line and on CD with this report. The first edition of the new Airprox magazine will be published by September 2013 and distributed to the UKAB Blue Book address list in addition to all GA pilots with current UK licences.

Ian Dugmore
Director UK Airprox Board

Analysis of Airprox in UK Airspace - 2012

Number of Airprox

Figure 1 shows the breakdown of Airprox occurrences throughout the year and the 5-year rolling average for each of the months. The increased number in August was not related to the Olympics as only 3 Airprox over the entire Olympic/Paralympic period occurred in the temporarily restricted airspace or under the ATLAS air traffic control arrangements. Weather has far more influence on the rate of Airprox occurrences as it directly affects the amount of GA activity and military training conducted in Class G (uncontrolled) airspace. A spell of good weather after a long period of poor weather appears to exacerbate the effect, possibly as a result of pilots being somewhat rusty after a lean spell. These 2 categories (GA and military) accounted for the spike in Airprox in February and March 2012 and the dip in October.

Figure 1. 2012: MONTHLY DISTRIBUTION

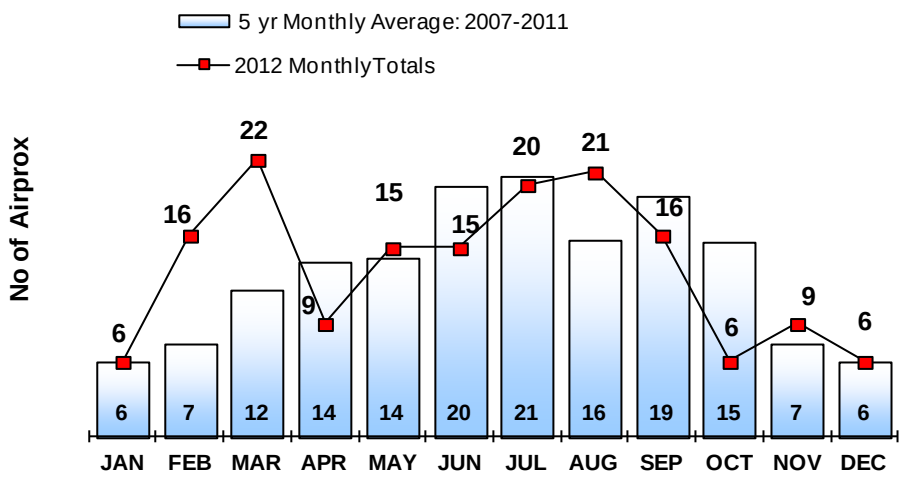
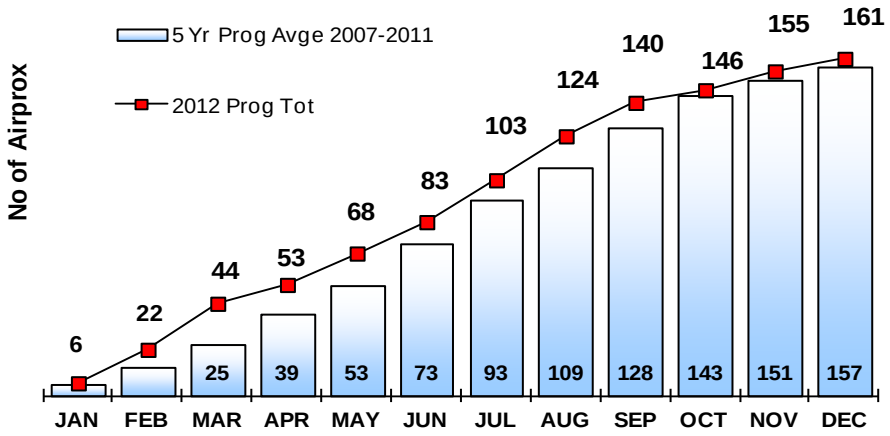


Figure 2 shows the progressive totals for the year compared with the 5-year average. The total for 2011 was also 161. Eleven Airprox were withdrawn prior to their being assessed compared with 6 in 2011. Counter-intuitively, the increase in the number withdrawn may be good news since we encourage pilots to report their Airprox over the RT immediately it happens in order to alert all pilots and controllers on the frequency. Far better to report

immediately and subsequently withdraw than to report later when others involved will need to be prompted to search their memories for where they were and what they can recall.

Figure 2. 2012: PROGRESSIVE TOTALS



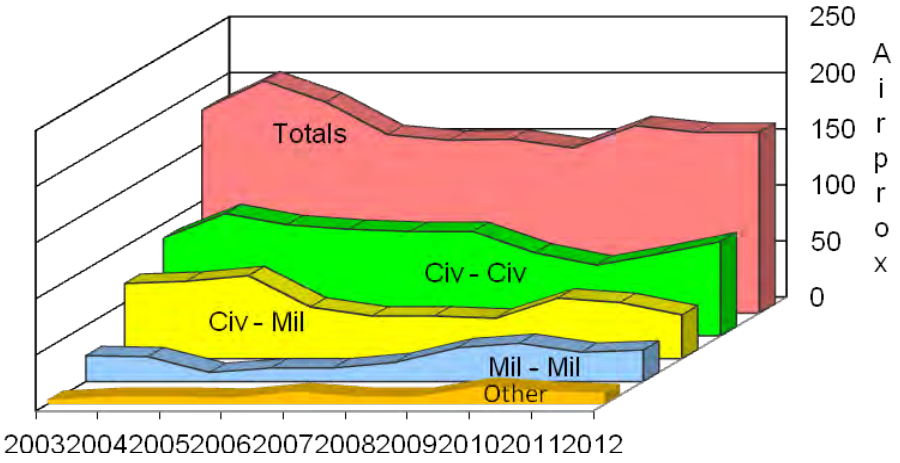
Trends by user Groups

Table 2 and Figure 3 show the trends in civilian and military Airprox over 10 years. The reduction in Airprox involving military aircraft has been offset by an increase in civilian Airprox.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Civil~Civil	87	109	99	95	93	93	74	63	73	84
Civil~Mil	67	69	74	46	38	38	36	54	50	39
Mil~Mil	23	22	8	12	12	17	30	34	26	28
Other	4	7	7	6	11	7	7	16	12	10
Totals:	181	207	188	159	154	155	147	167	161	161

Table 2. Trends by User Groups.

Figure 3. Trends by User Groups.

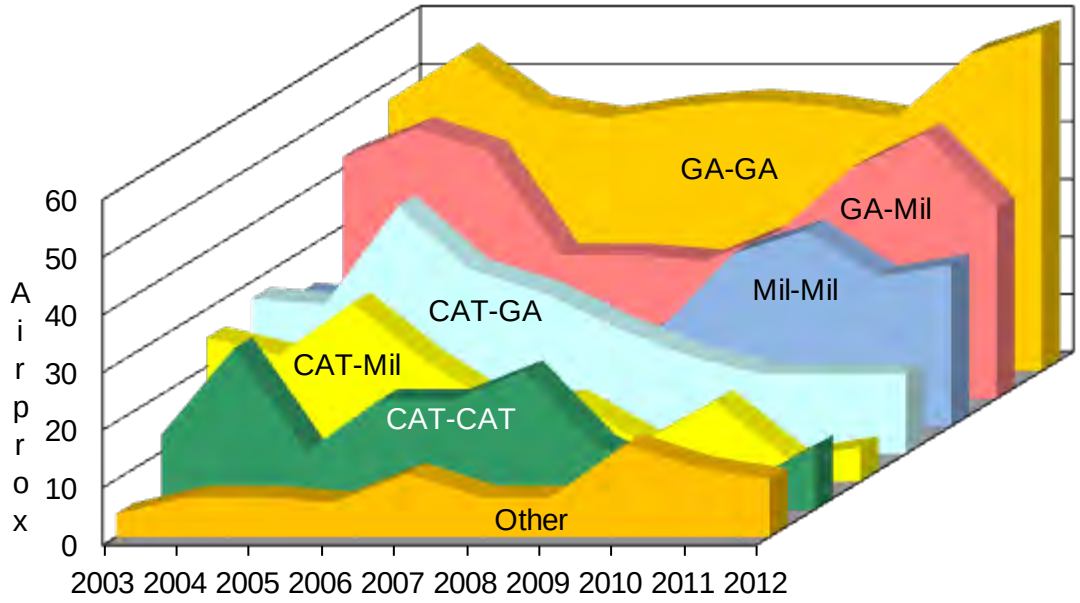


Separating CAT from GA in Table 3 and Figure 4 reveals that the number of GA-GA Airprox rose to the highest level in 10 years.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
GA~Mil	42	47	43	25	25	24	29	40	46	33
GA~GA	47	55	46	44	46	47	46	44	55	59
CAT~CAT	13	28	10	19	19	24	11	5	4	11
CAT~GA	27	26	43	32	28	22	17	14	14	14
CAT~Mil	25	22	31	21	13	14	7	14	4	6
Mil~Mil	23	22	8	12	12	17	30	34	26	28
Other	4	7	7	6	11	7	7	16	12	10
Total	181	207	188	159	154	155	147	167	161	161

Table 3. Trends by Flight Classification.

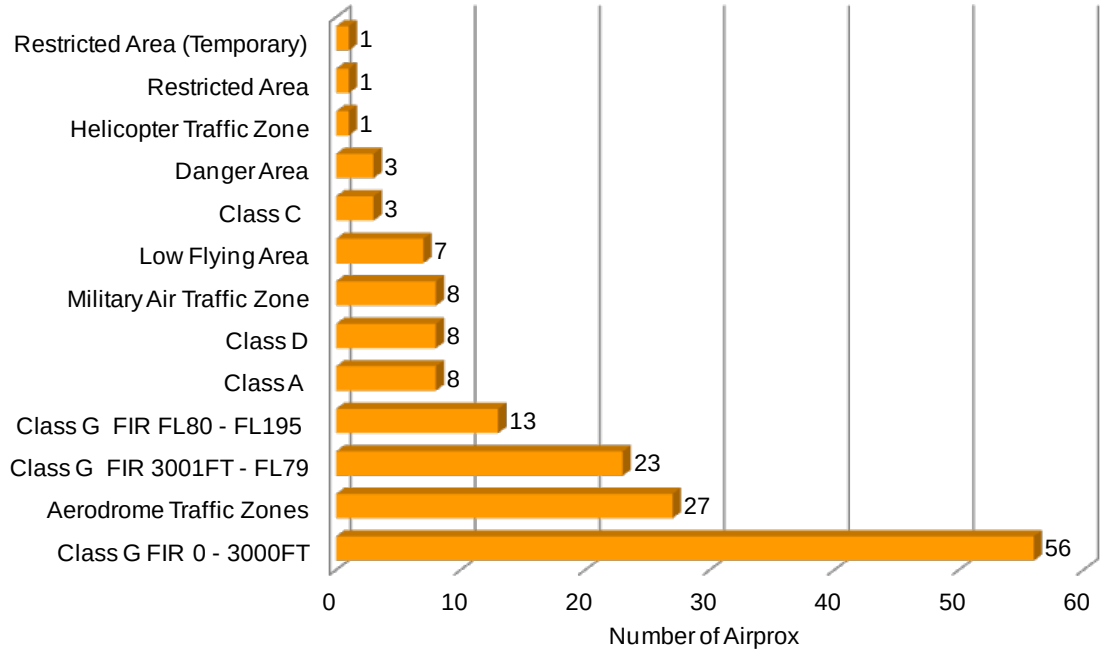
Figure 4. Trends by Flight Classification



Airspace

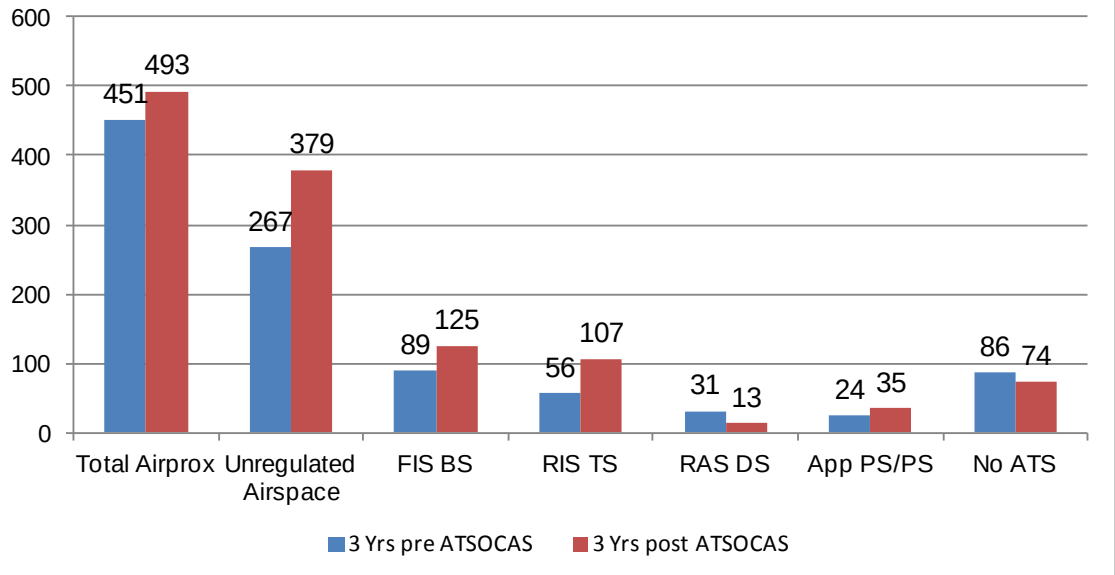
In common with previous years, Class G airspace is where most Airprox occur because this is where the greatest variety of aircraft can be found, where pilots are ultimately responsible for avoiding collisions through ‘see and avoid’ and where a great deal of training takes place. Advice to all pilots is to minimise flight time below 3000ft wherever and whenever possible. The issues contributing to Airprox in Aerodrome Traffic Zones (ATZs) are being addressed through the CAA Visual Circuit Working Group.

Figure 5. Airprox by Airspace



March 2012 was the 3rd anniversary of the introduction of revised Air traffic Services Outside Controlled Airspace (ATSOCAS) in 2009. A comparison of Airprox occurring in the 3 years pre- and post- the revision shows mixed results: see Figure 6 below. The number of Airprox occurring to aircraft in receipt of the new Deconfliction Service (DS) shows a marked reduction compared with the number under the previous Radar Advisory Service. Since most CAT operators require their crews to utilise a DS whenever it is available, a reduction in Airprox for aircraft under this service can be associated with a reduction in Airprox for CAT. However, comparing the previous Flight Information Service (FIS) with a the new Basic Service (BS) and comparing the old Radar information Service with the new Traffic Service (TS) shows increases of 40% and 91% respectively. (The other columns represent a comparison between the old Approach Procedural Service (PS) and the new PS, and Airprox reported by aircraft that were not in receipt of any ATS).

Figure 6. Airprox Pre and Post ATSOCAS Change - No of reports

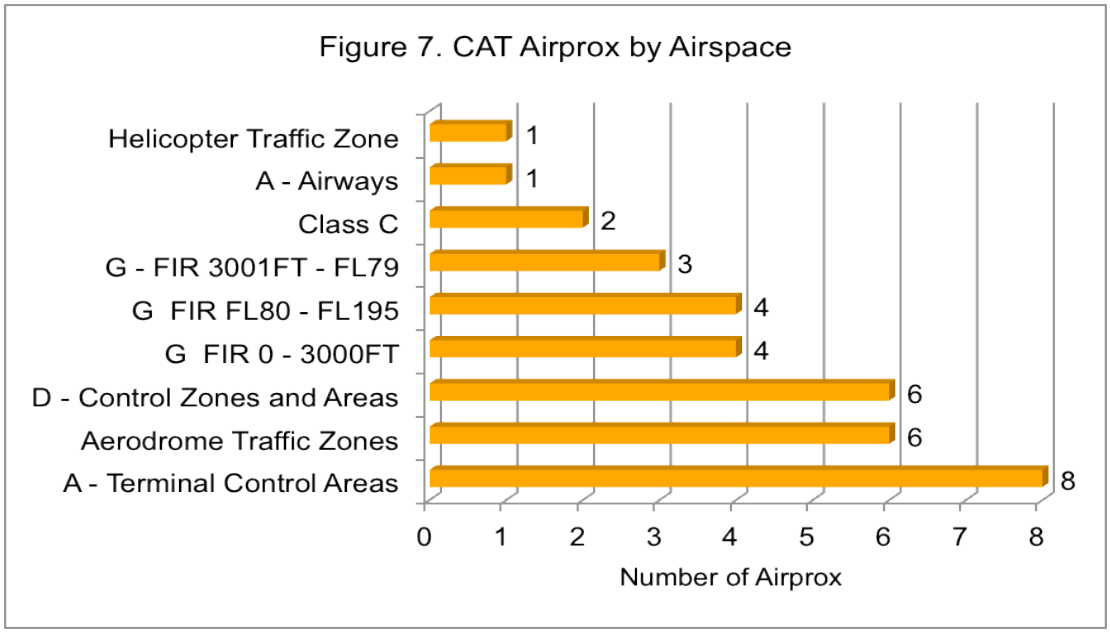


The reasons behind these increases are unclear and it is intended that the current work being commissioned under the auspices of the Airspace Safety Initiative Coordination Group will provide some answers. The results above have also been briefed to the Airborne Conflict Action Group.

CAT Section

CAT Airspace

Figure 7 shows the breakdown of CAT Airprox by airspace. Eleven out of 35 CAT Airprox occurred in Class G airspace; of note one of these was a CAT helicopter flight.



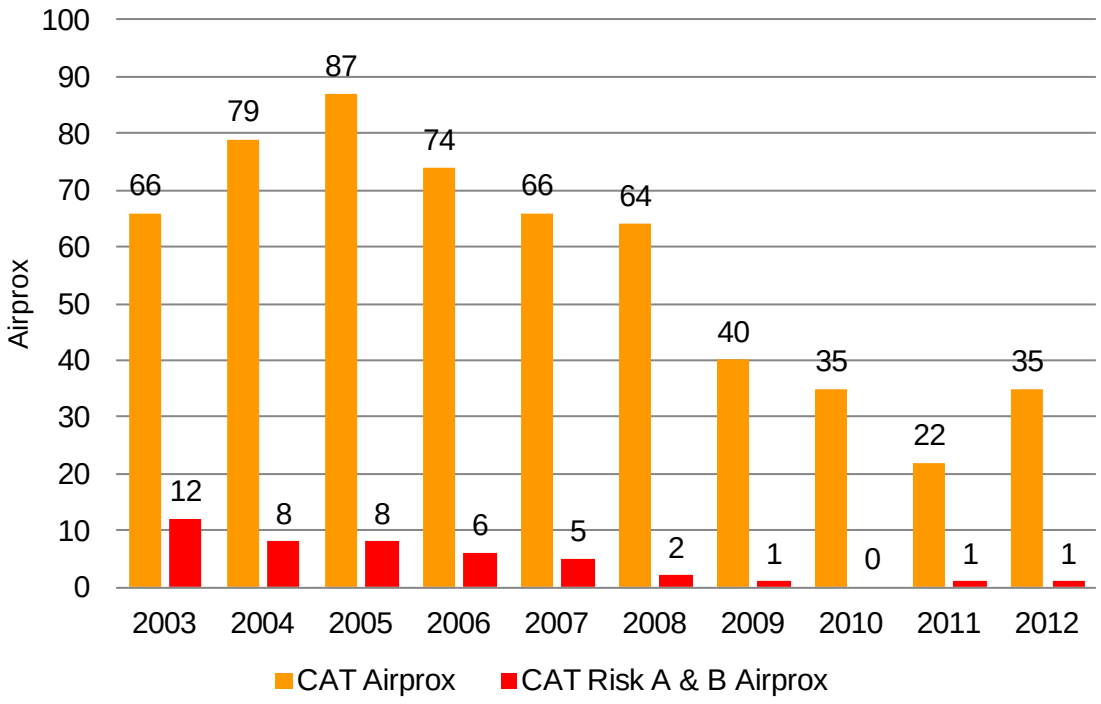
CAT Risk

Table 4 and Figure 8 show that after a fall in 2011, the number of CAT Airprox in 2012 was back to the same level as 2010 and 2009. (Note that prior to the introduction of Risk Category E in 2011, even the most benign encounters were assessed as Risk Category C). The CAT Risk Category A event in 2012 (Airprox 2012156), which occurred against a GA aircraft in Class G airspace below 3000ft, was the first CAT Category A Airprox since 2005 and only the third in 10 years.

CAT Risk	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CAT Risk A	0	1	1	0	0	0	0	0	0	1
CAT Risk B	12	7	7	6	5	2	1	0	1	0
CAT Risk C	54	67	78	68	60	58	33	33	18	23
CAT Risk D	0	4	1	0	0	1	1	2	0	4
CAT Risk E	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	7
CAT Total	66	79	87	74	65	61	35	35	22	35

Table 4. CAT Risk Data 2003-2012.

Figure 8. CAT Risk Distribution



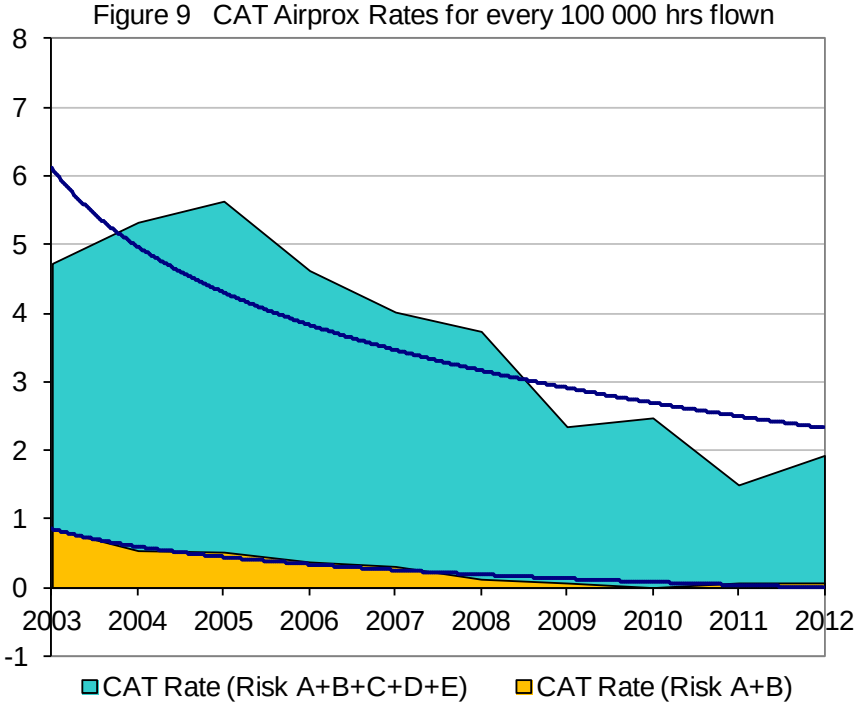
CAT Airprox Rates

Table 5 and Figure 9 show the rate of Airprox occurrences broken down by risk factor.

CAT Rates	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CAT Rate (Risk A+B)	0.86	0.54	0.52	0.37	0.31	0.12	0.07	0.00	0.07	0.07
CAT Rate (Risk A+B+C+D+E)	4.72	5.32	5.63	4.62	4.01	3.73	2.34	2.47	1.50	1.93
Hours x K	1,398	1,485	1,546	1,603	1,620	1,635	1,494	1,416	1,471	1,454

Table 5. CAT Airprox Rates

Figure 9 CAT Airprox Rates for every 100 000 hrs flown



CAT Causal Factors

Several causal factors are usually assigned to each Airprox and the list in Table 6 represents the 10 most commonly assigned for CAT in 2012. Sighting Reports/TCAS Reports are commonly indicative of benign encounters in Class G or D airspace where CAT crews have been concerned by the proximity of another aircraft or have responded to a TCAS RA but the pilot of the other aircraft has had them in sight.

Ser.	Cause	Totals
1	Sighting/TCAS Report	8
2	ATC did not Separate Ac	8
3	Level Bust	5
4	Did not Obey ATC	3
5	Misinterpretation of ATC Message	3
6	Poor Avoiding Action/Flew Too Close	2
7	CAS Conflict in VMC	2
8	FIR Conflict	2
9	Undetected Readback Error	2
10	Airspace Infringement	2

Table 6. CAT Causal Factors

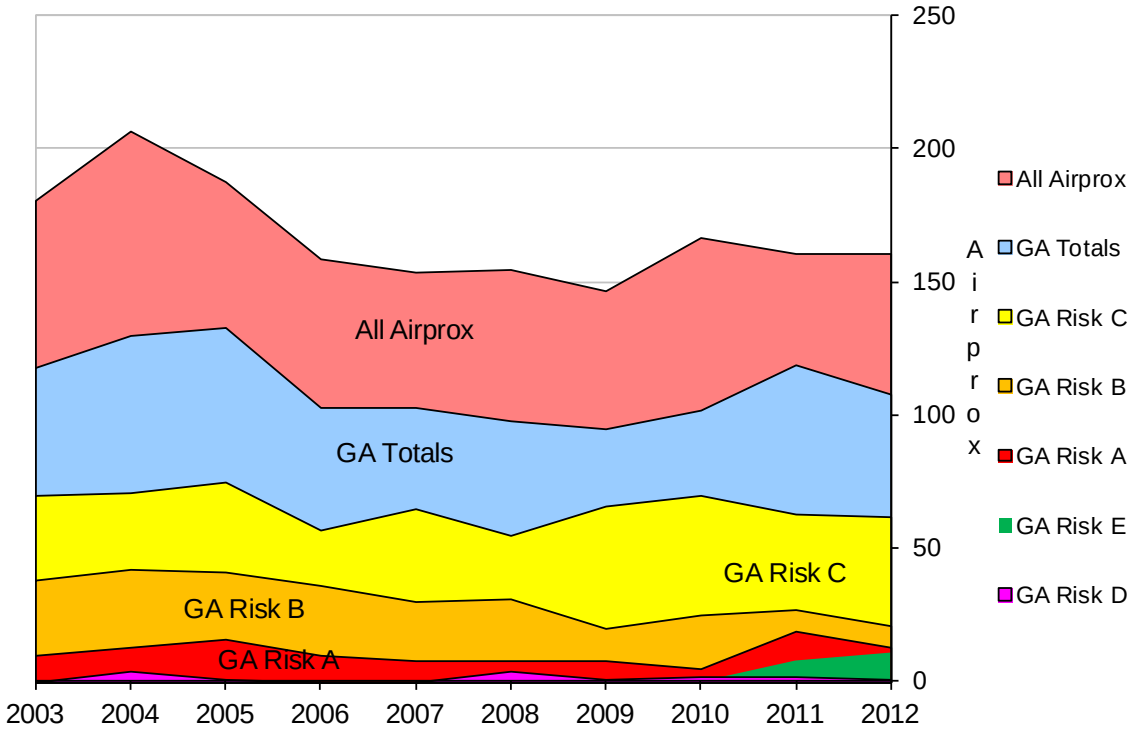
GA Section

The percentage of Airprox involving at least one GA aircraft has remained broadly constant (67% in 2012) for the last 10 years but the percentage of those Airprox assessed to be risk-bearing (31% in 2012) has shown an erratic but downward trend (Table 7 & Figure 10). There are several possible explanations for the reduced percentage of risk-bearing Airprox including an improvement in pilots' willingness to submit reports on relatively benign incidents that might previously have gone unreported i.e. an improvement in reporting culture. However, there is no hard evidence to support any particular explanation.

GA Risk	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
GA Risk A	10	13	16	10	8	8	8	5	19	13
GA Risk B	38	42	41	36	30	31	20	25	27	21
GA Risk C	70	71	75	57	65	55	66	70	63	62
GA Risk D	0	4	1	0	0	4	1	2	2	1
GA Risk E	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8	11
GA Totals	118	130	133	103	103	98	95	102	119	108
All Airprox	181	207	188	159	154	155	147	167	161	161
GA/All Airprox	65%	63%	71%	65%	67%	63%	65%	61%	74%	67%
Risk A&B/GA Total	41%	42%	43%	45%	37%	40%	29%	29%	39%	31%

Table 7. GA Risk Data 2003-2012.

Figure10. GA Risk Distribution 2003-2012



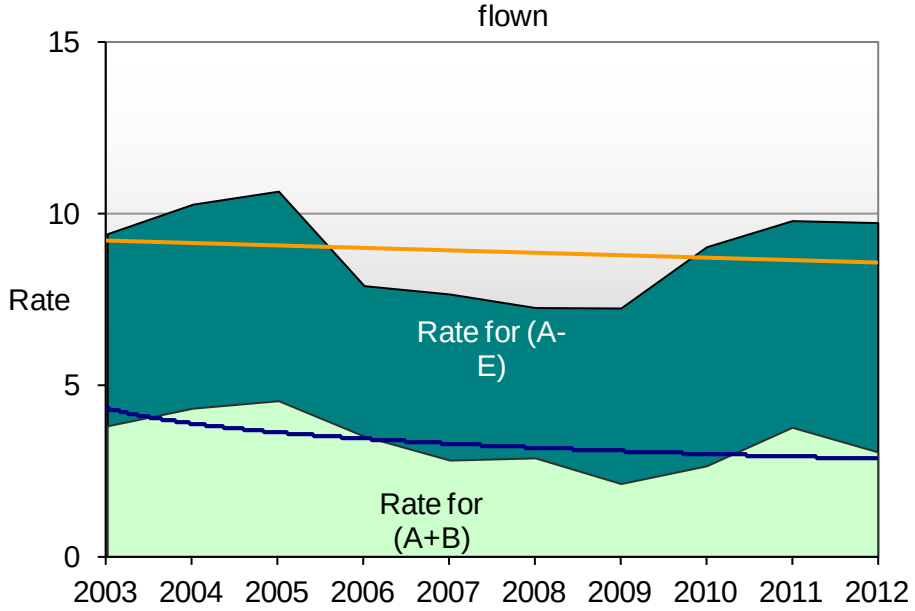
GA Airprox Rates

GA annual flying hours comprise estimates from various sources that are revised as more accurate figures become available. Therefore, although the figures allow a reasonably reliable comparison over a long period, comparing 2012 with the previous year is unwise. Table 8 and Figure 11 show that the overall rates for GA Airprox

GA Rates	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Rate for (A+B)	3.83	4.35	4.56	3.53	2.82	2.89	2.13	2.66	3.78	3.06
Rate for (A-E)	9.41	10.27	10.65	7.89	7.65	7.26	7.24	9.03	9.79	9.73
Hours flown x 1000	1,254	1,266	1,249	1,305	1,346	1,351	1,312	1,130	1,215	1,110

Table 8. GA Airprox Rates per 100 000 Flying Hours.

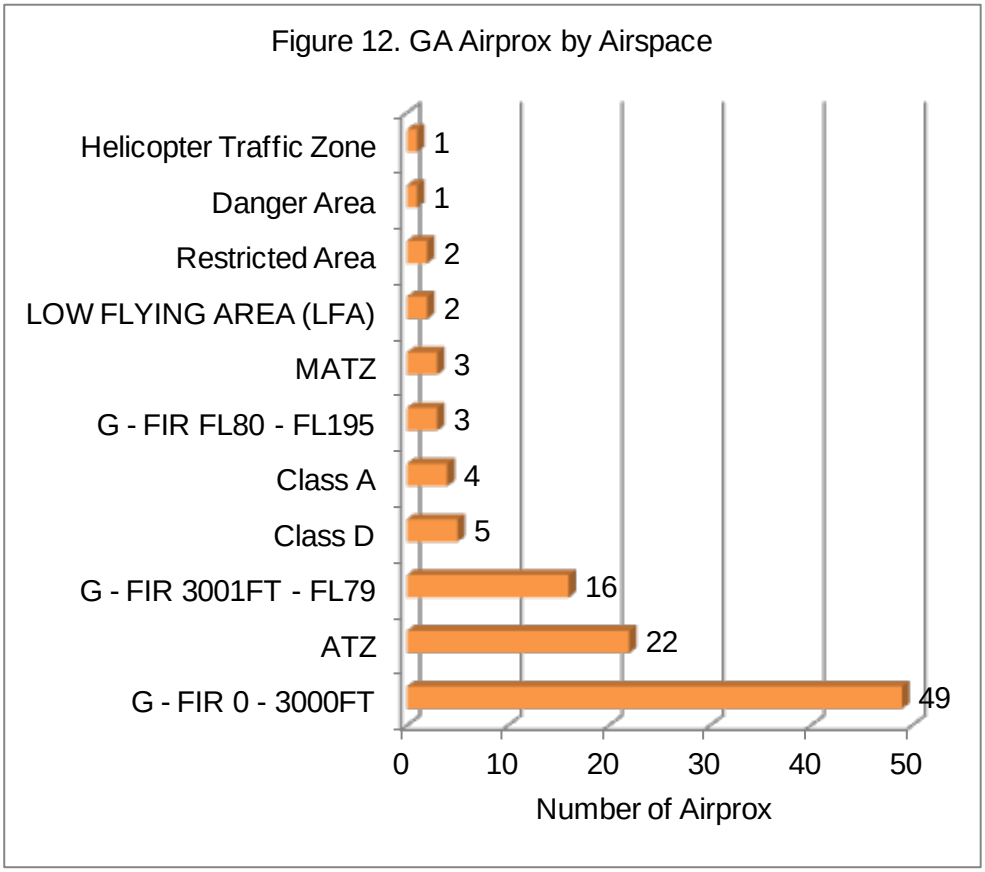
Figure 11. GA Airprox Rate and Trend per 100 000 hrs flown



GA Airspace

Half of GA Airprox occur in Class G airspace below 3000ft (Figure 12). The high number of Airprox occurring in ATZs is a concern being addressed by the Visual Circuit Working Group.

Figure 12. GA Airprox by Airspace



GA Causal Factors

A total of 160 causal factors were assigned to GA Airprox. Table 9 shows the 12 most common causes; non-sighting remains the most common cause, as it has been in every previous year. Also, non-sightings and late sightings account for the majority of risk-bearing Airprox. FIR conflicts are commonly those events where one pilot sees an aircraft late and files a report but the other pilot had gained an earlier sighting and taken avoiding action; FIR conflicts are frequently assessed as Risk Category C.

Ser.	Cause	Totals
1	DID NOT SEE TRAFFIC	48
2	FIR CONFLICT	26
3	FLEW TOO CLOSE	20
4	LATE SIGHTING OF TRAFFIC	17
5	LATE OR NO TRAFFIC INFO	9
6	NO CLEARANCE TO ENTER CAS/ATZ	8
7	PILOT DID NOT ADHERE TO PROCEDURES	7
8	SIGHTING REPORT	6
9	FLIGHT OVER GLIDER OR PARA SITE	6
10	CONFLICT IN OTHER AIRSPACE	5
11	DID NOT OBEY ATC INSTRUCTIONS	4
12	POOR AIRMANSHIP	4

Table 9. Top 12 GA Airprox Causal Factors 2012

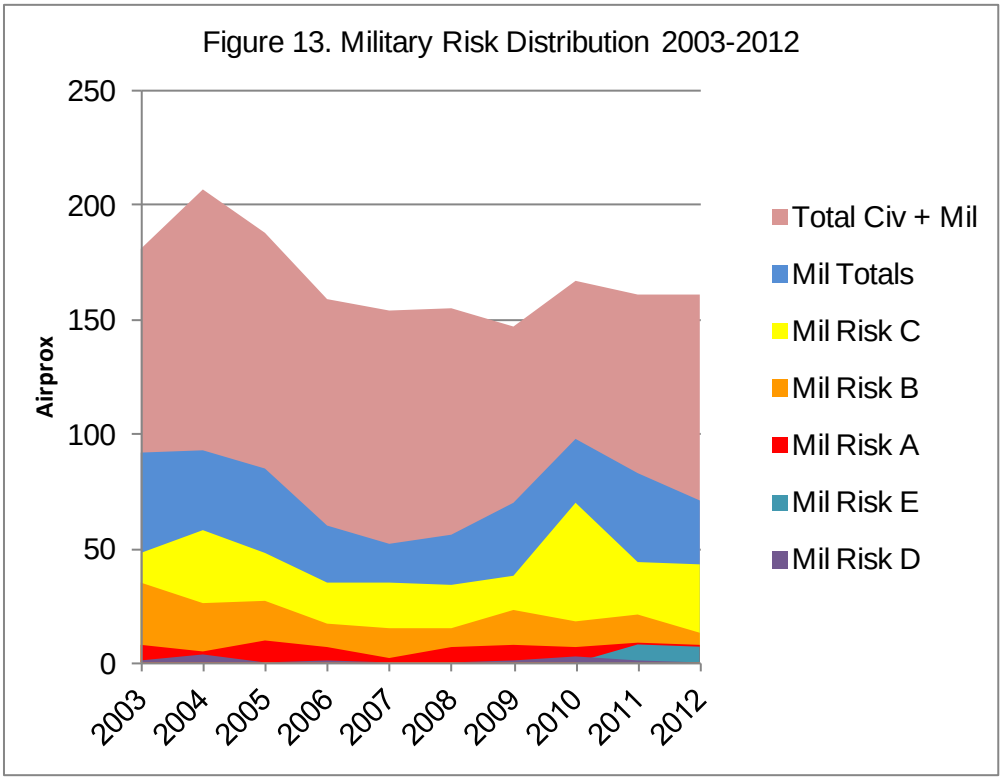
Military Section

Table 10 and Figure 13 show a continued reduction in the number of military Airprox from the peak in 2010 with the second lowest percentage of risk-bearing Airprox (30%) over the 10-year period. The reducing percentage of risk-bearing Airprox and the proportion of Mil-Civ Airprox in which the military pilot is report**ing** rather than report**ed** suggest there is an improved reporting culture.

Mil Risk	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mil Risk A	8	5	10	7	2	7	8	7	9	8
Mil Risk B	35	26	27	17	15	15	23	18	21	13
Mil Risk C	48	58	48	35	35	34	38	70	44	43
Mil Risk D	1	4	0	1	0	0	1	3	1	0
Mil Risk E	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8	7
Mil Totals	92	93	85	60	52	56	70	98	83	71
All Civ & Mil Airprox	181	207	188	159	154	155	147	167	161	161
Mil as % of Total	51%	45%	45%	38%	34%	36%	48%	59%	52%	44%
RB as % of Mil	47%	33%	44%	40%	33%	39%	44%	26%	36%	30%

Table 10. Military Airprox Risk Data 2003-2012.

It is too early to discern the impact of fitting of TAS to Tutors or TCAS II to the Hawk Mk 2. Of all Airprox involving military aircraft, these 2 aircraft types are the first and second, respectively, most frequently involved. However, we are beginning to see Hawk pilots reporting Airprox that they would previously have been unaware of without TCAS. Therefore we might anticipate that the introduction of TCAS and TAS will result in a change in the nature and possibly an increase in the number of reports submitted in future. A key measure will be the level of risk associated with each incident.



Military Airprox Distribution by Airspace

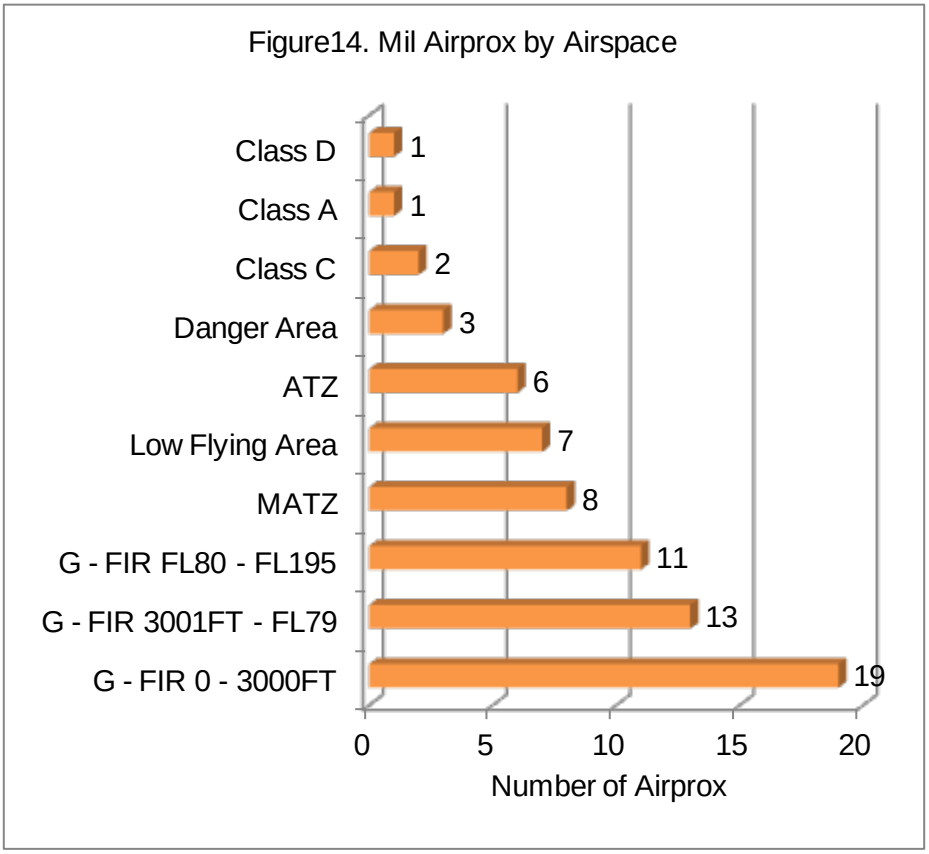


Figure 14 shows the breakdown of military Airprox by airspace in 2012 to be similar to previous years.

Military Airprox Causal Factors

A total of 131 causal factors were assigned to military Airprox occuring in 2012; the 10 most frequently assigned are shown in Table 11. As in previous years, sighting issues predominate. In common with GA, military Airprox contributory factors regularly include the selection of an Air Traffic Serivice that is inappropriate for the weather or task, or pilots not reacting positively to Traffic Information.

Ser.	Cause	Totals:
1	LATE SIGHTING OF TRAFFIC	23
2	DID NOT SEE TRAFFIC	18
3	FIR CONFLICT	13
4	FLEW TOO CLOSE	12
5	LATE OR NO TRAFFIC INFO	10
6	CONFLICT IN OTHER TYPE OF AIRSPACE	7
7	CONTROLLER DID NOT SEPARATE/POOR JUDGEMENT	6
8	POOR AIRMANSHIP	4
9	INAPPROPRIATE ATC INSTRUCTIONS, USE OF INVALID FL	3
10	LACK/BREACH OF CO-ORDINATION BETWEEN CONTROLLERS	3

Table 11. Mil Airprox Causal Factors

FORMAL SAFETY RECOMMENDATIONS 2012

AIRPROX 2012002 C150 v Model ac 8 Jan 2012

Recommendation:

The North Weald Aerodrome Operator is recommended to update the Aerodrome Operating Manual and ensure the relevant Flight Guides reflect the update.

Action: North Weald aerodrome operator/manager

Update:

1. The North Weald Aerodrome manual has been reviewed and updated so that it more accurately reflects the model flying club's operations**.**

2. Relevant Flight Guides i.e. Pooleys have also been updated to reflect these updates.

3. Ground markers to be placed on the aerodrome to demarcate the model flying club's area of operations.

4. The distance between the model flying area and the edge of the runway 02/20 has been increased from 78m to 100m.

Status: CLOSED

AIRPROX 2012020 A340 v A321 25 Feb 2012

Recommendation:

The CAA is recommended to review the 5-letter name-code designators in this area to avoid potential confusion between BASET, BADSI and BAKUR.

Action: CAA/DAP

Update: The CAA provides NATS with a list of available 5-LetterName Codes (5LNCs) from the ICARD database. NATS review the list and can reject codes that may cause difficulty. As a stakeholder, it is for NATS to change the 5LNC if required. DAP requested NATS to investigate whether there was a history of incidents associated with BADSI and BASET reporting points; the only incident is Airprox 2012020. Nevertheless, as a result of their own internal analysis of the incident, NATS have initiated a change to the 5LNC in this area.

Status: CLOSED

AIRPROX 2012060 KC-135R v TYPHOON T Mk3 27 APR 2012

Recommendation:

i. The MoD reviews the SSR requirements for stream formations.

ii. The CAA should arrange, under the auspices of the ASI, a workshop of ATC stakeholders to review the arrangements and ATC provision for Northolt 'C' arrivals via BARKWAY.

Action: i. MoD – MAA Capt Bowker RN
ii. CAA – Colin Gill

Update:

i. The current rules for formation flights in receipt of an ATS are laid down in Chapter 11 of the Military Manual of Air Traffic Management (MMATM). It was determined that to balance the effect on flying/controlling operations with providing greater visibility of aircraft that are squawking, the following amendments **(in bold)** will be made to the existing MMATM guidance and invoked forthwith:

MMATM Chap 11, para 43a:

The formation elements are contained within 1 nm laterally and longitudinally, and at the same level or altitude. Within Class F and G airspace only, at the controller's discretion, these limitations may be increased to 3 nm and/or up to 1000 ft. vertically. ***Controllers are to consider the impact on other airspace users when exercising their discretion to allow formations to increase the prescribed limitations and, when the situation demands, should ensure all elements of the formation are squawking Mode 3A & C or S.***

MMATM Chap 11, para 45

The lead aircraft ***should*** *squawk Mode 3A and C. If the stream extends for 3nm or more, the last aircraft* ***should*** *also squawk. For longer streams, intermediate aircraft* ***should*** *squawk as appropriate.* ***Controllers are to consider the impact on other airspace users when ac are operating in stream formations and, when the situation demands, should ensure all elements of the formation are squawking Mode 3A & C or S, even if within 3 nm/1000ft of the lead aircraft.***

ii. Workshop completed action in hand to enhance ATS to inbound traffic with ATS provisioned thru Lakenheath.

Status: Closed

AIRPROX 2012067 EC155 v CHINOOK 21 MAY 2012

Recommendation:

The EC155 operating company is recommended to review its procedures
Action: EC155 Operator Company

Update: The Operator has confirmed its intention to revise its risk assessment procedure to consider the possibility and consequences of poor communications with ATC on the ground. Also to revise its SOPs to emphasise the need to make radio contact or telephone ATC in controlled airspace at all times of day or night before starting the aircraft.

Status: Closed

AIRPROX 2012096 EC135 v YAK50 FORMATION 7 JUL 2012

Recommendations:

1. The Silverstone operator is recommended to review the AIC, in concert with CAA AUS, to provide additional guidance to pilots flying in the vicinity of the RA (T) and to review the briefing requirements for display crews.

2. The YAK50 formation display team is recommended to review its operating procedures.

Action: i. Silverstone Heliport Manager & CAA (Hd of ORA & AUS)
ii. CFI Aerostars Aerobatic Team

Update:

Status: Open

AIRPROX 2012144 HAWK T2 v TORNADO GR4 13 SEP 2012

Recommendation:

HQ Air Cmd is recommended to expedite measures to improve situational awareness and deconfliction planning in order to mitigate the risk of collisions in the LFS.

Action: DCOM Ops HQ Air Cmd

Update: Recommendation Accepted. The MoD is progressing with plans for a Defence Aviation Collision Avoidance System (DACAS), which aims to address the concerns highlighted by this particular incident. Responsibility for DACAS has recently been transferred to HQ Air Cmd where it will receive continued support. Such technology-based solutions are complex and take time to develop; therefore, an interim system, Centralised Aviation Data Service (CADS), is currently being trialled and is a development of the system currently in use by Joint Helicopter Command for night time deconfliction. Once in service, it is anticipated that CADS/DACAS will allow users of the LFS to enter their routes and be notified of potential conflicts resulting from other aircraft utilising the LFS. With an increased awareness of sorties that are geographically similar, it is anticipated that pre-flight coordination and deconfliction will be more effectively facilitated, or at the very least, lookout focussed towards areas of potential conflict.

It must be recognised that the effectiveness of such pre-flight systems is dependent on active participation, and is limited by the degree to which planned routes are adhered to both in geography and time; therefore, it will not be a panacea. Perhaps more effective will be the increased use of Airborne Collision Avoidance Systems by RAF aircraft, particularly following the authority granted to embody a Collision Warning System on Tornado GR4. This should have the added benefit of increasing crews' awareness of transponding non-military users of the LFS airspace.

HQ Air Cmd has also re-examined the use of the LFS UHF Common Frequency. Valley Hawks are limited by their radio fit, and as a result, formations of Hawk T1s are unable to monitor the UHF Common Frequency. A note has been added to the UK Low Flying Handbook to that effect and provides users with the VHF frequency used by the Valley Hawks. In this event, had the Tornado crew been monitoring this VHF frequency, their awareness of the Hawks' position may have been improved.

In summary, DCOM Ops HQ Air Cmd intends to take a particular interest in the progress of CADS and DACAS and will attempt to expedite progress where the tightly regulated procurement process allows.

Status: Closed

AIRPROX 2012156 ATR42 v AW109 6 OCT 2012

Recommendation:

The CAA is recommended to review the regulations, processes and approvals encompassing the provision and use of ATSs employing SSR-only during periods of temporary loss of primary radar.

Action: CAA

Update: The CAA accepts this recommendation and anticipates completing this work by the end of summer 2013. However, the CAA feels that there are other factors which may have contributed to the root cause of the incident. Therefore the CAA will, as a matter of priority, conduct further work to establish the total system causal factors and chain of events, so that potential actions can be identified and considered. This will be initiated in Aril 2013 and will result in a report to GDSR in May 2013 identifying the causal factors with mitigation options.

Status: Open

AIRPROX 2012164 AW139 v C150 15 Nov 2012

Recommendation:

The current RDP design for the Anglia Radar sector highlights the coastline in white, which is the same colour as radar tracks. NATS Ltd is recommended to amend the RDP to provide greater clarity between radar tracks and map features.

Action: NATS

Update: Following further investigation, NATS Ltd report that the media used for the AIRPROX investigation shows the radar map and the ac returns to be coloured white; this is not the case with radar display that the controller actually sees. The coastline, as displayed to the controller, is shown in beige but there is also a cyan coloured line along this section of the coast, which denotes the boundary of the Anglia Offshore Safety Area (OSA); this combination of colours created the impression of white on the media used for the Board. NATS Ltd have concluded that the removal of the cyan line from the coastal boundary (whilst retaining it in the offshore areas) would not reduce the ATCOs' knowledge of the extent of the OSA, and may increase the possibility of the ATCO identifying a slow moving aircraft following the coastline. Consequently, NATS Ltd has accepted the recommendation and will take appropriate action to amend the way the maps are presented on the radar displays.

Action: Expected to be complete by end Jul 13

Status: Open

UKAB Abbreviations

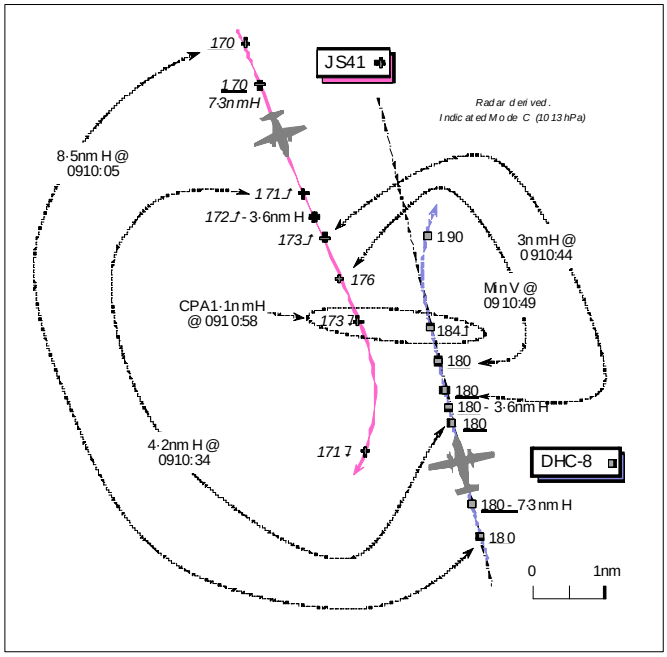
aal	above aerodrome level
ac	aircraft
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACN	Airspace Co-ordination Notice
ACR	Approach Control Room
A/D	aerodrome
ADC	Aerodrome Control(ler)
ADR	Advisory Route
AEF	Air Experience Flight
AEW	Airborne Early Warning
AFIS(O)	Aerodrome Flight Information Service (Officer)
A/F	Airfield
agl	above ground level
AIAA	Area of Intense Aerial Activity
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
alt	altitude
amsl	above mean sea level
ANSP	Air Navigation Service Provider
AOB	Angle of Bank
A/P	Autopilot
APP	Approach Control(ler)
APR	Approach Radar Control(ler)
ARP	Aerodrome Reference Point
ASR	Airfield Surveillance Radar
ATC	Air Traffic Control
ATCC	Air Traffic Control Centre
ATCO	Air Traffic Control Officer
ATCRU	Air Traffic Control Radar Unit
ATIS	Automatic Terminal Information Service
ATM	Aerodrome Traffic Monitor
ATS	Air Traffic Service
ATSA	Air Traffic Service Assistant
ATSOCAS	ATSs Outside Controlled Airspace
ATSI	Air Traffic Services Investigations
ATSU	Air Traffic Service Unit
ATZ	Aerodrome Traffic Zone
AWACS	Airborne Warning and Control System
AWR	Air Weapons Range
AWY	Airway
BGA	British Gliding Association
BHPA	British Hang Gliding and Paragliding Association
BMAA	British Microlight Aircraft Association
BMFA	British Model Flying Association
BS	Basic Service
CANP	Civil Air Notification Procedure
CAS	Controlled Airspace
CAT	Commercial Air Transport
CAVOK	Visibility, cloud and present weather better than prescribed values or conditions
CC	Colour Code - Aerodrome Weather State
cct	Circuit
CFI	Chief Flying Instructor
CLAC	Clear Above Cloud
CLAH	Clear Above Haze
CLBC	Clear Below Cloud
CLBL	Clear Between Layers
CLNC	Clear No Cloud
CLOC	Clear of Cloud
CMATZ	Combined MATZ
CPA	Closest Point of Approach
C/S	Callsign
CTA	Control Area
CTR/CTZ	Control Zone
CWS	Collision Warning System
DA	Decision Altitude
DAP	Directorate of Airspace Policy CAA
DF	Direction Finding (Finder)
DH	Decision Height
DME	Distance Measuring Equipment
DS	Deconfliction Service
DW	Downwind
E	East
EAT	Expected Approach Time
elev	elevation
ERS	En Route Supplement
est	estimated
FAT	Final Approach Track
FIR	Flight Information Region
FISO	Flight Information Service Officer
FMS	Flight Management System
FO	First Officer
FOB	Flying Order Book
FPL	Filed Flight Plan
fpm	Feet per Minute
FPS	Flight Progress Strip
FW	Fixed Wing
GAT	General Air Traffic
GCA	Ground Controlled Approach
GH	General Handling
GMC	Ground Movement Controller
GP	Glide Path
GS	Groundspeed
G/S	Glider Site
H	Horizontal
hdg	Heading
HISL	High Intensity Strobe Light
HLS	Helicopter Landing Site
HMR	Helicopter Main Route
hPa	Hecto Pascals
HPZ	Helicopter Protected Zone
HQ Air	HQ Air Command
HUD	Head Up Display
IAS	Indicated Air Speed
iaw	In accordance with
ICF	Initial Contact Frequency
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
ivo	In the vicinity of
JSP	Joint Services Publication
KHz	Kilohertz
km	Kilometres
kt	Knots
L	Left
LACC	London Area Control Centre (Swanwick)
LARS	Lower Airspace Radar Service
LATCC(Mil)	London Air Traffic Control Centre (Military)
LFA	Low Flying Area
LFC	Low Flying Chart
LH	Left Hand
LJAO	London Joint Area Organisation
LoA	Letter of Agreement
LOC	Localizer
LTMA	London TMA
MATS	Manual of Air Traffic Services
MATZ	Military Aerodrome Traffic Zone
METAR	Aviation routine weather report
MHz	Megahertz
M/L	Microlight
MOD	Ministry of Defence
MRP	Military Regulatory Publication
MSD	Minimum Separation Distance
N	North
NATS	National Air Traffic Services

NDB	Non-Directional Beacon
NK	Not Known
nm	Nautical Miles
NMC	No Mode C
NR	Not Recorded
NVD	Night Vision Devices
NVG	Night Vision Goggles
OACC	Oceanic Area Control Centre
OAT	Operational Air Traffic
O/H	Overhead
OJTI	On-the-Job Training Instructor
Oo	Out of
OOS	Out of Service
PAR	Precision Approach Radar
PCAS	Portable Collision Avoidance System
PD	Practice Diversion
PF	Pilot Flying
PFL	Practice Forced Landing
PI	Practice Interception
PIC	Pilot-in-Command
PINS	Pipeline Inspection Notification System
PNF	Pilot Non-flying
PS	Procedural Service
QFE	Atmospheric pressure at aerodrome elevation
QFI	Qualified Flying Instructor
QHI	Qualified Helicopter Instructor
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
R	Right
RA	Resolution Advisory (TCAS)
RAT	Restricted Area (Temporary)
RCO	Range Control Officer
RCS	Radar Control Service
RH	Right Hand
ROC	Rate of Climb
ROD	Rate of Descent
RP	Reporting Point
RPAR	Replacement PAR
RPS	Regional Pressure Setting
RT	Radio Telephony
RTB	Return to base
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minimum
RW	Rotary Wing
RWxx	Runway xx, e.g. RW09
S	South
SA	Situational Awareness
SAP	Simulated Attack Profile
SAS	Standard Altimeter Setting
ScACC	Scottish Area Control Centre (Prestwick)
ScATCC(Mil)	Scottish Air Traffic Control Centre (Military)
SFL	Selected Flight Level [Mode S]
SID	Standard Instrument Departure
SMF	Separation Monitoring Function
SOPs	Standard Operating Procedures
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
STAR	Standard Instrument Arrival Route
STCA	Short Term Conflict Alert
SUP	Supervisor
SVFR	Special VFR
TA	Traffic Advisory (TCAS)
TAS	True Air Speed
TC	Terminal Control
TCAS	Traffic Alert & Collision Avoidance System
TDN	Talkdown Control(ler)
TFR	Terrain Following Radar
TI	Traffic Information
TMA	Terminal Control Area
TP	Turn Point
TRA	Temporary Restricted Area
TRUCE	Training in Unusual Circumstances and Emergencies
TS	Traffic Service
TWR	ATC Tower
UAR	Upper Air Route
UHF	Ultra High Frequency
UIR	Upper Flight Information Region
UKDLFS	United Kingdom Day Low Flying System
UKNLFS	United Kingdom Night Low Flying System
unltd	unlimited
USAF(E)	United States Air Force (Europe)
U/S	Unserviceable
UT	Under Training
UTC	Co-ordinated Universal Time
UW	Upwind
V	Vertical
VCR	Visual Control Room
VDF	Very High Frequency Direction Finder
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	Very High Frequency Omni Range
VRP	Visual Reporting Point
W	West
Wx	Weather

AIRPROX REPORT No 2012001

AIRPROX REPORT NO 2012001

Date/Time:	4 Jan 2012 0910Z	
Position:	5606N 00150W (6½nm S of NEXUS [17nm NE of ST ABBS VOR])	
Airspace:	Scottish FIR	(Class: G)
Reporter:	Prestwick Centre - TAY Sector	
	1st Ac	*2nd Ac*
Type:	DHC-8	JS41
Operator:	CAT	CAT
Alt/FL:	FL180	↑FL210
	SAS	SAS
Weather:	VMC NK	VMC CLAC
Visibility:	'Good	'CAVOK
Reported Separation:		
	600ft V	1000ft V/1nm H
Recorded Separation:		
	1·1nm Min H @ 1100ft V	
	400ft Min V @ 1.9nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PRESTWICK CENTRE TAY SECTOR COMBINED TACTICAL & PLANNER CONTROLLER (TAY SC) reports that he was working with a trainee on the combined Sector, which was busy with GAT inside CAS and multiple ac in Class G airspace between NATEB and Aberdeen. PAPA18 had just closed for the morning, so they pre-noted Scottish MILITARY about the 3ac southbound from Aberdeen and kept the single northbound DHC-8 inbound to Aberdeen. The southbound JS41 was co-ordinated not above FL170 against the northbound DHC-8 not below FL180. At 0910, when the two ac were head-on to each other, the DHC-8 crew reported a TCAS RA and climbed. STCA was triggered and an avoiding action turn onto a heading of E was immediately given to the DHC-8 crew to avoid the JS41. As there was further traffic affecting the DHC-8 when it began to climb, when 'clear of conflict' was reported the DHC-8 crew was told to maintain FL190. Horizontal separation was eroded to 3nm and vertical separation reduced to 700ft.

UKAB Note (1): PAPA18 is a Class D Category 1 Conditional Lower ATS route (CDR) active between 0530 and 0900 UTC, which then reverts to Class G outwith notified hours.

THE DHC-8 300 PILOT-IN-COMMAND reports she was the PF under a RCS, she thought, from Scottish CONTROL [actually a DS], IFR, in a level cruise at FL180, whilst inbound to Aberdeen from Leeds/Bradford. Approaching a point about 22nm NE of ST ABBS VOR, heading 355° at 210kt, they were advised of traffic they might see 1000ft below them. Flying out of the sun, the crew were visual with the other ac – a JS41 –some 1000ft below their ac, but then their TCAS display indicated the JS41 was climbing. A TA was enunciated by TCAS - TRAFFIC TRAFFIC - and with the JS41 about 600ft below them a CLIMB RA was demanded, which was complied with after disconnecting the AP. The PNF advised ATC of the TCAS RA, who then issued a new heading of 090° and told them to maintain a new level of FL190. When the CLEAR OF CONFLICT was enunciated by TCAS they advised ATC and resumed their course to Aberdeen. Minimum vertical separation was about 600ft below them and the Risk assessed as 'medium'.

THE BAe JS41 PILOT-IN-COMMAND reports that he was in transit from Aberdeen to Humberside under IFR and in receipt of a DS from Scottish MILITARY in VMC, some 5000ft above cloud, with unlimited visibility and the sun on the beam. Heading 165° at 290kt at about 85nm S of Aberdeen, he instructed his 1st Officer to request a climb from FL170 to FL210 to make better use of the tailwind at higher level. This was done and they were cleared by

Scottish MILITARY to climb to FL210, with opposite traffic ahead co-ordinated. Commencing the climb they received a TCAS TA on traffic at 11 o'clock, which he and his 1st Officer started to look for. On sighting the other ac they then received a TCAS DESCEND RA demanding a descent at 500ft/min, which they complied with. The other ac – the DHC-8 - was sighted during the TCAS TA and they were visual with it throughout the descent with very little chance of collision. He assessed the Risk as 'low'.

THE ScATCC (MIL) PRIMARY TACTICAL NORTH (TAC N) CONTROLLER [ScATCC (Mil)] reports that she was controlling her first controlling session following the Christmas break. She took a pre-note from TAY Sector on 2 south bound CAT ac, the JS41 routeing to Humberside and another in transit to Norwich. At the same time she co-ordinated with the TAY controller against one of their ac that was routeing northbound - the DHC-8 - that would be maintaining FL180 against the JS41 not above FL170 and another company ac not below FL190. Both flights called on frequency and were identified. As the JS41 and DHC-8 approached each other she passed TI on the co-ordinated DHC-8 to the JS41 crew; this was the only ac under her control that would now affect it. The JS41 crew was then given own navigation towards OTR. As the JS41 turned she realised the new track would take the ac too close to the D323 complex, which was active, so the crew was placed under their own navigation towards UMBEL. The JS41 crew then requested a climb to FL210 and so she instructed them to climb to FL210 before correcting this to a climb to FL215, the correct quadrantal. Realising immediately that this instruction would breach the co-ordination agreement, she instructed the JS41 crew to stop climb and then issued an avoiding action turn onto 270° to try and get lateral separation. The SUPERVISOR was immediately informed of the incident.

THE ScATCC (Mil) SUPERVISOR (SUP) reports that during the period of the Airprox the Unit was operating at close to capacity because two controllers had called in sick and one other was on an approved absence. Whilst capacity was momentarily reached, it was never exceeded and traffic did not have to be refused. They were aware that the USAF had requested the activation of the Vale of York Spider towline from 0830Z-1030Z for up to 16 F15s, and had been monitoring the tanker's location in ARA8 and a number of F15s that were general-handling in TRA3. Once it became clear that the tanker intended to route into the Vale of York to establish the Spider towline, and that a number of F15s would follow, the Northern ICFs were removed from the Southern Primary Planner (PLN) (who was bandboxing N and S) and the Northern PRI-TAC position was opened. A TAC controller and PLN had also been established on Console 2, which was to become the tanker console. In all, this meant 3 consoles were open (PRI TAC and PLN S, Console 2 TAC and PLN, and TAC N). As per the Local Order Book, capacity would be up to 5 ac working console 2, and up to 2 being able to be worked by the PRI-TAC S (more at the SUP's discretion). TAC N had no traffic before the prenotes from TAY at about 0905L for the two southbound CAT ac; these tracks would be within the capacity guidelines laid out in the LOB.

He did not witness the incident as he was dealing with the details of a Spider Towline - as stated, this had required the opening of Console 2 TAC and PLN to augment the controllers already in position. As PRI-PLN S was busy taking prenotes and Console 2 was already working 4 speaking units with more to come, his attention was taken away from the Northern AOR. He deemed the subject TAC N controller sufficiently experienced not to require close attention or monitoring but he was not aware that she had taken two ac from TAY Sector following the routine closure of P18 at 0900L. The first he knew of the incident was when the PRI-TAC N informed him that she had just broken co-ordination with TAY. After receiving a quick brief from her the controller, she was relieved from the console, he spoke to the SAC Local Area Supervisor and reviewed the radar replays and frequency recordings with the Civil Watch Supervisor, whereupon he was informed that the civil controller intended to classify the incident as an Airprox.

NATS EN-ROUTE LTD - PRESTWICK CENTRE reports that this report was written with the full co-operation of ScATCC (Mil) as part of a drive towards joint investigations. ScATCC (Mil) and Prestwick Centre have fully consulted and agreed the outcomes.

The two flights had been on Temporary Airway P18 receiving a Radar Control Service from Scottish CONTROL. P18 reverts to Class G airspace at 0900 local whereupon Scottish MILITARY provide ATSOCAS to these flights subject to workload and task priority. Both the DHC-8 and the JS41 crews were being provided with a DS from TAY Sector prior to the JS41 being transferred to Scottish MILITARY.

At 0902:41, P18 had been closed for just over 2min when TAY Sector called Scottish MILITARY to enquire about them providing an ATSOCAS service to 3 flights. Scottish MILITARY agreed to provide a service to the JS41 cruising at FL170. A Scottish MILITARY squawk A6111 was allocated and the Scottish MILITARY controller requested that the ac be climbed to FL175 the correct quadrantal level. This was agreed at first by the TAY

controller who then corrected herself, co-coordinating the JS41 to remain at FL170 stating, "*can you see opposite direction to him the* [DHC-8 C/S]?" The response from Scottish MILITARY was, "*Yea, are you going to keep him?*" Following this there were a few moments of discussion as to who would work the DHC-8 but it was agreed that TAY Sector would retain the DHC-8. The agreed co-ordination was then re-iterated and a transfer frequency to Scottish MILITARY was given for the JS41. Further co-ordination then ensued relating to another company ac that was following behind the JS41. At 0906:33, the telephone call ended with both co-ordination agreements being emphasised again. The TAY controller stating "[JS41 C/S] *not above FL170"* to which the Scottish MILITARY controller responds, "*Affirm*". It should be noted at this stage however, that despite the co-ordinations being re-iterated and apparently being clearly understood by both controllers the actual level of the DHC-8 - FL180 - was not mentioned.

At 0907:42, the JS41 was transferred from TAY Sector to Scottish MILITARY. At 0907:52, the DHC-8 crew was given TI on the opposite direction JS41 that had just been transferred to Scottish MILITARY. At 0908:10, the JS41 crew called Scottish MILITARY and requested a DS, which was provided.

The Scottish MILITARY controller provided the JS41 crew with TI on the DHC-8 at 0908:58, "*…..traffic 12 o'clock 1-5 miles opposite direction co-ordinated above*" that the JS41 crew acknowledged. At 0909:22, Scottish MILITARY advises the JS41 crew to route direct OTR. Later at 0909:49, Scottish MILITARY apologises to the JS41 crew stating that Danger Area D323 is active and that they can route towards UMBEL. This is acknowledged by the JS41 crew who then request a climb to FL210 to cruise. The Scottish MILITARY controller responded saying, "*…roger. Climb FL210*".

A few seconds later at 0910:12 the Scottish MILITARY controller changes that instruction and states "[JS41 C/S] *can you make it flight level 2-1-5 for the correct quadrantal*?*",* which is accepted by the JS41 crew.

The following RT exchanges then occurred between the JS41 crew and ScATCC (Mil) controller from 0910:38: ScATCC (Mil) to JS41 – "[JS41 C/S] *apologies stop climb immediately for co-ordination".* JS41 to ScATCC (Mil) - "[garbled/unclear] *standby* [JS41 C/S]". A few seconds later the ScATCC (Mil) controller instructed the JS41 crew "…*avoiding action turn right heading 2-7-0 degrees",* which was acknowledged. The JS41 crew advised at 0911:08, "*clear of traffic*" and that they would like to proceed direct UMBEL at FL215. Whereupon the Scottish MILITARY controller instructed the JS41 crew to maintain FL170.

During this same period the following exchanges were made between the DHC-8 crew and the TAY SC from 0910:45: DHC-8 crew to TAY SC - "[DHC-8 C/S] *TCAS R-A".* Some 4sec later TAY SC responded, - "[DHC-8 C/S] *Scottish…amm…avoiding action turn right immediately heading 0-9-0 degrees",* which was acknowledged by the DHC-8 crew. At 0911:04, the TAY SC advised the DHC-8 crew that they are clear of traffic and explain who the conflict was with.

STCA activated red at 0910:43, 5sec after the Scottish MILITARY controller initiated the stop climb instruction and 2sec before the DHC-8 crew reported the TCAS RA.

Analysis

The TAY Sector was manned with a trainee monitored by an OJTI. The trainee had already been valid on TAY Sector for about 6 years but after an extended period of absence from duty (due to non operational reasons causing validations to lapse) was being retrained, with approximately 20 hours on the Sector since August.

The trainee was aware that the workload was beginning to increase and had called for the assistance of a Planning controller. When the Planning controller arrived she began to brief him on the Sector and was 'heads down' in the fps bay highlighting to the Planning controller what was needed to be done with certain ac.

The trainee recalls hearing the DHC-8 crew call a TCAS RA and looked up at the radar. She immediately saw the conflict with the STCA flashing red. Although she had heard 'TCAS RA' her reaction to seeing the STCA red alert was instinctive. Since this event was so sudden she had not – cognitively - fully absorbed the implications of the RA and reacted to seeing the STCA. Following a momentary pause/hesitation an avoiding action turn to the R was issued. Although the ac were almost abeam each other at the time of the avoiding action the radar display was selected to 60nm range, which would have made the assessment of conflict distance more difficult.

Regarding the turn issued when the TCAS RA was called, the trainee realised that there should have been a 'hands off' approach although there was some debate about taking action in the horizontal plane following a TCAS RA.

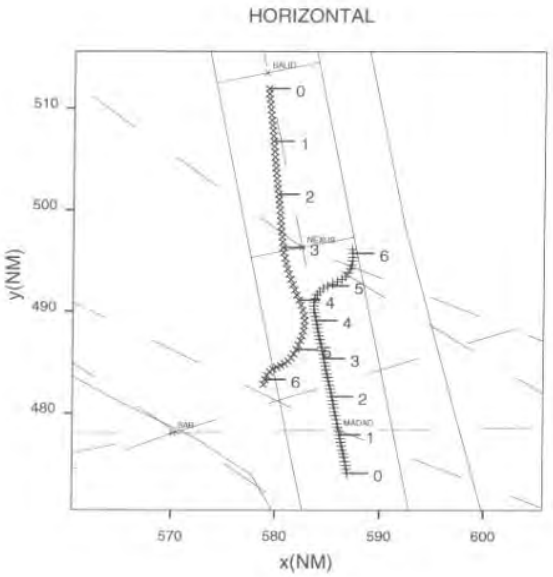
Both the trainee and the OJTI were asked what factors in the event could have prevented it from occurring then or in the future. They both made the following points:

P18 could be made a permanent airway or the hours extended beyond the 0900 local closure.

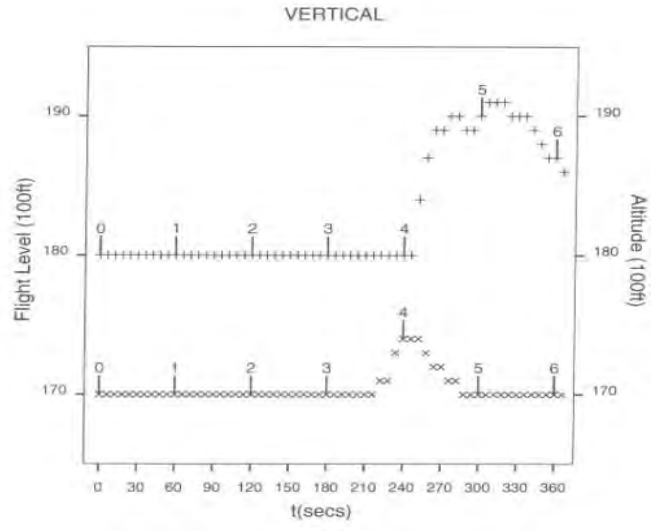
With hindsight one controller (either civil or military) keeping all relevant traffic may have prevented the incident.

SMF data

The following data was produced by SMF (Separation Monitoring Function) which supports the minimum separation already assessed.



SMF data 1



SMF data 2

Radar and RT replay

It was also confirmed during RT playback that despite there being clear co-ordination between both controllers which was re-iterated and that both controllers appeared to have a full situational awareness, there was never a specific mention of the level that the DHC-8 was at i.e. the words "FL180" were never actually spoken. See "Extract from MATS Part 1" section.

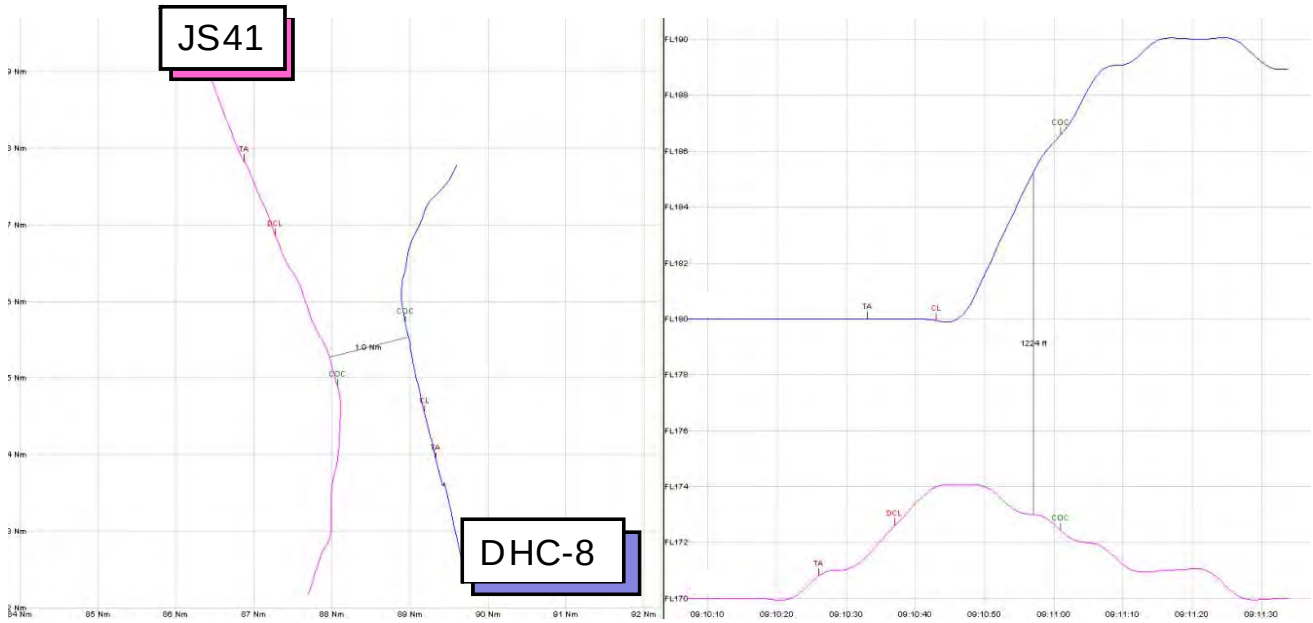
STCA/TCAS Simulation Report

Following data is sourced from both TCAS simulations and STCA.

Table 1 below relates to the TCAS Simulation data.

CODE	***DESCRIPTION***		***CODE***	***DESCRIPTION***
TA	Traffic Alert		AVS	Adjust Vertical Speed
RA	Resolution Advisory		CL	Climb
COC	Clear of Conflict		DCL	Don't Climb

Table 1



TCAS Simulation Data

This gives the closest lateral and vertical points as follows:-

Minimum Lateral Separation

Min. Latsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
09:10:57	1.05	1224

Minimum Vertical Separation

Min. Vertsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
09:10:45	2.29	581

Assessment of TCAS Performance

EUROCONTROL's automatic safety monitoring tool (ASMT) recorded three resolution advisory (RA) messages, one from the downlinked Mode S data of the JS41, the other two from the DHC-8. The JS41 received an *adjust vertical speed* within one second prior to 0910:38. The DHC-8 then received a *climb* within four seconds of 0910:42 followed by an *adjust vertical speed* within one second of 0910:53.

Simulation of this encounter suggests that both aircraft received a traffic alert (TA); the JS41 at approximately 0910:26, followed by the DHC-8 about 7sec later. The JS41 then received the first RA at 0910:37. The RA was a *don't climb* (enunciated "Adjust vertical speed, adjust") and the ac levelled off 8sec later. The DHC-8 then received its first RA which was a *climb* ("climb, climb") at 0910:43 and started to climb 4sec later.

Information regarding the flight path of an aircraft is available in roughly 4-second intervals based on radar data, whilst TCAS uses a 1-second update cycle based on SSR interrogations. Hence, for simulation purposes, the period of time between consecutive radar points is interpolated to give a reasonable estimate of the flight path of the ac. The time of the initial *adjust vertical speed* and the *climb* RA messages in simulation is in good agreement with the downlinked times based on Mode S data. The ASMT recorded an *adjust vertical speed* RA for the DHC-8 at 0910:42 which was not generated in the simulation - this is probably due to the interpolation between radar points. The *clear of conflict* message was issued at a simulated time of 0911:01.

TimeTime	***Cycle***	***L(Nm)***	***dZ(Ft)***	***Alert***
09:09:59	18	9.92	1000	
09:10:03	19	9.32	1000	
09:10:07	20	8.69	1000	
09:10:11	21	8.09	1000	
09:10:15	22	7.48	1000	
09:10:19	23	6.86	1000	
09:10:23	24	6.25	975	
09:10:27	25	5.64	975	
09:10:31	26	5.02	950	
09:10:35	27	4.41	875	
09:10:39	28	3.83	800	
09:10:43	29	3.21	707	Y
09:10:47	30	2.67	590	Y
09:10:51	31	2.10	471	Y
09:10:55	**32**	**1.60**	**601**	**Y CCPA**
09:10:59	33	1.19	987	Y
09:11:03	34	0.94	1190	
09:11:07	35	1.20	1401	
09:11:11	36	1.60	1630	
09:11:15	37	2.15	1755	
09:11:19	38	2.67	1862	

STCA Cycle

The above data shows the STCA cycle with the alert beginning at 0910:43 and confirms the radar observations.

CCPA (Cycle of Closest Point of Approach) is given as 1.6nm and 601ft where controllers were seeking to achieve 5nm or 1000ft.

Extracts from CAP493 MATS Part 1

Appendix E Paragraph 3.1

"Readback of ATS Co-ordination Messages

Controllers must ensure they obtain a read-back of any operationally significant

information contained in telephone and intercom co-ordination messages, including:

- Levels;
- Headings;
- Speed Restrictions;
- Airways or route instructions;
- Runway in use;
- SSR Codes;
- Pressure Settings;
- Frequencies;
- Release and contact points"

This is the only reference to mentioning level during co-ordination and relates more to read-back of levels rather than a requirement to specifically state the level during all co-ordinations.

It could be argued that paragraph 3.1 above is sufficient instruction to make it clear that levels must always be mentioned but in this incident the act of co-ordination centred around the levels that the two flights controlled by ScATCC (Mil) were to operate below and above. This was the executive co-ordination and those readbacks were all made by both the ScATCC (Mil) and TAY controllers. The implication was that the DHC-8 would stay at FL180 but since there was no mention of that level there was no need for a readback.

So while the military MAA MATM states that both controllers are to refer to level of their ac there is no such laid down criteria for civil controllers.

However, the ScATCC (Mil) report states that 'Had FL180 been stated on the landline conversation, it may have been reinforced in the controller's thoughts…." This may be worthy of consideration in the civil world.

Conclusions

This investigation has concluded that a number of events that were factors in this incident. It has also raised a high number of situational factors (compared to causal or aggravating) that may or may not have contributed. A situational factor is defined as a factor that was present during the incident but its effects cannot be determined or proven to have contributed.

It is clear that the main causal factor (CF) was the ScATCC (Mil) TAC N controller's decision to allow the climb of the JS41 (CF1) to FL210 (then FL215) and break the co-ordination agreement with TAY Sector for that aircraft to remain at FL170.

While the ScATCC (Mil) controller is uncertain as to why exactly she gave the climb, there is evidence from the ScATCC (Mil) report that the controller mis-perceived the call from the JS41 as being from another company ac on frequency (CF2).

Aggravating factors included the ScATCC (Mil) controller being under loaded (CF3). The level of concentration provided in her decision to climb the JS41 clearly did not set any "alarm bells" ringing when the request for a climb was made.

It could be argued that CF4 is Causal, Aggravating or Situational. However it has been listed as aggravating in that it made the situation worse. If control of both ac had been with the ScATCC (Mil) controller CF2 may have occurred anyway but she may have reacted to the error more quickly. It should be noted that there is in element of conjecture in the assessment of the severity of this causal factor but no doubt remains that it has a degree of significance.

There is also evidence from other incidents in Class G airspace that point clearly to co-ordination/ misunderstandings/awareness etc issues that arise from different agencies working different ac in the same piece of airspace.

The following six causal factors are all situational i.e. they are factors that were present in the event but their impact cannot be determined or proven.

Military

Procedures clearly state that during co-ordination the level of traffic must be verbalised. While civil procedures do not state that explicitly it is deemed to be 'Good Practice' and the level of the DHC-8 was never actually mentioned by the TAY or ScATCC (Mil) controllers (CF5). So although both controllers had full situational awareness (evidence is from the traffic information that both controllers gave to both aircraft and that the co-ordination was emphasised twice) there remains the lack of re-enforcement to the ScATCC (Mil) controller of the DHC-8's level.

Airway P18 is described as CDR Category One (CDR 1) between ADN and NATEB, Mon-Fri 0530-0900, and from 1700 Fri or the day preceding a PH to 0900 Mon or the day following a PH Winter (Summer 1hr earlier). The Airway is not available for use during these periods when MoD requires access to the airspace. This limited availability (CF6) will obviously mean that the route (which is regularly used by civil passenger flights) is generally Class G airspace and will subsequently involve flights being operated by different agencies in that airspace.

It is possible that the ScATCC (Mil) controller was at least partially distracted when the track of direct OTR she had given to the JS41 crew was going to infringe upon D323 (CF7). It is not uncommon for a minor error such as this, whether it is corrected or not, to cause a controller to become unsettled and unfocused. The fact that this 'distraction' occurred immediately before the JS41 crew requested FL210 would seem to support that possibility.

The ScATCC (Mil) report states 'The controller stated that it was the first day back after the Christmas period therefore *lack of currency* (CF8) may have been an issue. Although this is the same for other controllers coming back from leave or extended absence, this may have been a contributory factor as to why a lapse in concentration had been suffered in this instance.'

Civil

The TAY trainee offered lateral avoiding action after the DHC-8 crew had reported a TCAS RA (CF9). While this factor had no impact on the incident it does require to be noted.

It should also be noted that the JS41 crew did not clearly state to the ScATCC (Mil) controller that they were receiving a TCAS RA (CF10). This lack of correct or clear information to the ScATCC (Mil) controller resulted in her also providing avoiding action when none should have been given.

Both controllers mitigated the event to some degree by passing TI to both crews well in advance (CF11 & CF12) and therefore providing them with good situational awareness. However, this raises the question of why the JS41 crew requested a climb to FL210 when they were aware of the company traffic. Did they check on TCAS?

Prestwick Centre Recommendations

It has been noted from previous incidents that there are signs of a trend where controllers (on civil side and in this case the military side) have made significant safety errors where there should have been enough cognitive and skills capacity to avoid such mistakes. The trend, albeit statistically minor, has often involved being under loaded and demonstrating a lack of concentration leading to surprisingly uncharacteristic but significant errors.

Prestwick Centre conducted a highly successful 'Watch out for Gorillas' campaign in 2007/08, where controllers were alerted to looking out for the obvious that we sometimes do not see.

It is recommended that Unit Management, in conjunction with Scottish MILITARY, conduct a campaign highlighting and emphasising to both civil and military controllers at Prestwick, the vulnerability of the human to not seeing the obvious and then putting this lesson into an ATC context. This recommendation will be satisfied when all PC

controlling staff (and Ops Room support staff if considered necessary) have been exposed to this campaign and that Unit Management are satisfied the message has been successfully delivered.

This Recommendation was accepted by General Manager Prestwick Centre.

While not having any impact on this incident the avoiding action given by the TAY trainee controller requires to be addressed. MATS Part 1 states:

'When a pilot reports a TCAS RA, controllers shall not attempt to modify the aircraft's flight path'.

Although the TAY trainee controller appears to have instinctively reacted to observing STCA following her discussion with the new planner and hearing the DHC-8 *"..TCAS RA"* the fact remains that an avoiding action was given when controllers should have been 'hands off'. The military controller also gave avoiding action but the TCAS RA call from the JS41 crew was either not given or was unclear.

It is recommended that Unit Management ensure that all controllers are reminded of the MATS Part 1, Section 1, Chapter 9, and Paragraph 5.2 through Safety Co-ordination Team actions such as TRUCE, ART or Watch Briefings.

This Recommendation was accepted by General Manager Prestwick Centre.

ATSI endorsed the NATS Ltd joint civil/military report. It was noted that two recommendations were accepted by the civil ATS provider, and importantly, the final recommendation, which will remind Scottish Area civil controllers of their roles and responsibilities when a TCAS RA is reported, is scheduled to be completed by 31 July 2012. [ATSI Note: the CAA's AATSD En Route Inspectorate has sight of these reports through the internal MOR distribution process and they are therefore available for follow-up at the regulatory oversight level).

As a further step, ATSI shall be highlighting the report to the Editor MATS Part 1/Chair ATC Procedures Working Group.

BM SAFETY MANAGEMENT reports that both ac were operating IFR in VMC: the JS41 in receipt of a DS from ScATCC (Mil) TAC N and the DHC-8 in receipt of a DS from SAC TAY Sector.

Taskload and complexity for TAC N were low, with the incident ac and an un-related Saab 2000 on the frequency flying about 11nm astern of the JS41 throughout the Airprox. Significantly, the incident occurred approximately 10min after TAC N took over the control position at the start of her shift, her first shift back after the Christmas 2011 break. Whilst TAC N was rostered for a number of shifts over the Christmas period, they completed little controlling due to low traffic levels. Moreover, their shift times in the 2-months prior to the incident were as follows:

Date	Activity
31 Oct – 4 Nov	Mon – Thur, mentoring on simulator, Fri PM Supervisor
7 – 11 Nov	Annual leave
14 – 18 Nov	PM Supervisor
21 Nov – 9 Dec	Detached – non controlling
12 – 16 Dec	PM Supervisor
19 Dec – 3 Jan	Christmas Leave, night shift 24 & 25 Dec, low traffic levels, minimal controlling

RAF ATM Force Order 300.125.3b states that:

'In order to maintain currency, controllers are to, as a minimum, achieve on console an operating currency of 8 hours per month in each discipline for which an endorsement is held. When a controller fails to meet this minimum requirement over 3 consecutive months, they will be required to undergo a standards check comprising a practical examination and a working knowledge check. Notwithstanding the 8-hour requirement, any controller/assistant who does not consider themselves to be current in a particular discipline should inform the supervisor/ATCO IC who is to arrange remedial action.'

The incident sequence commenced at 0904:06 as TAC N liaised on the landline with TAY Sector over the transfer of control of the JS41 and the unrelated Saab 2000 from TAY Sector to TAC N. Although the landline call continued

until 0906:13, from the perspective of the investigation the critical element was the co-ordination that was agreed and re-iterated between 0905:49 and 0906:05. TAC N confirmed with TAY Sector that they would, *"not be below flight level 1-9-0 with the* [un-related Saab 2000 C/S] *when he comes to me against your* [DHC-8 C/S]." TAY then re-iterated, *"not below flight level 1-9-0 and not above flight level 1-7-0 with the* [JS 41 C/S]" to which TAC N replied, *"affirm."* At this point, the DHC-8 was 46.7nm S of the JS41, with the ac maintaining FL180 and FL170 respectively.

At 0908:07 the JS41 crew made initial contact with TAC N and at 0908:58, was passed TI on the DHC-8 as, *"traffic 12 o'clock, 1-5 miles* [radar replay confirms 18.6nm] *opposite direction co-ordinated above."*

At 0909:23 TAC N authorised the JS41 crew to route under their own-navigation to OTR; however, the controller realised at 0909:51 that this route would take the JS41 through EG D323 which was active and amended the JS41's route via UMBEL.

At 0910:05, with the DHC-8 8.5nm SE of the JS41, the latter's crew requested a climb to FL210 that was approved and then amended at 0910:14 to accommodate the correct quadrantal level. At this latter point 7.3nm lateral separation existed.

At 0910:34 with 4.2nm lateral separation between the 2 ac, the JS41's SSR Mode C indicates a climb to FL171. At 0910:38, with 3.6nm separation, TAC N transmitted to the JS41 *"apologies, stop climb immediately for coordination";* however, the JS41 crew's reply was initially garbled and then advised TAC N to standby. During this, at 0910:44, STCA activated high-severity Red. TAC N immediately instructed the JS41 crew, *"..avoiding action, turn right heading 2-7-0 degrees"* which was readback by the JS41 crew. At this point, the JS41 was passing FL174, 2.5nm NW of the DHC-8.

The CPA occurred at 0910:58 as the JS41 passed 1.1nm W of the DHC-8, with the JS41 descending through FL173 and the DHC-8 climbing through FL184, both in accordance with their respective TCAS RAs. [Minimum vertical separation of 400ft is shown for one sweep at 0910:49, with horizontal separation of 1·9nm.]

Although the unit investigation concluded that the improper format of the coordination that occurred between TAC N and TAY Sector may have caused TAC N's cognitive error in issuing the climb instructions, BM SM contends that this is not likely. TAC N demonstrated their understanding of the agreement in both their report narrative and their use of language in the TI passed to the JS41 at 0908:58, describing the DHC-8 as "coordinated above." Moreover, subsequent to completing her report, the controller has commented that she may have been distracted by the unrelated Saab 2000 from the same company, thinking that it was the ac requiring the climb. However, the flow of the conversation when the climb instruction was issued makes this unlikely, given that the JS41 linked their request to climb to FL210 to the conversation begun by TAC N in amending the JS41's routeing.

For TAC N to have issued effectively 2 separate climb instructions (FL210 at 0910:05 and FL215 at 0910:14) without having perceived the confliction posed by the DHC-8 when it was 7.9nm and 7.3nm away respectively, suggests that either TAC N was not looking at their surveillance display when she issued the instruction or, more likely, had mentally discounted the DHC-8 as a conflict as it was coordinated. This is suggestive of low levels of situational awareness, alertness and/or cognitive arousal, which it is reasonable to argue, were caused by the individual's shift pattern history over the preceding weeks.

TAC N's climb instruction to the JS41 placed the flight in confliction with the DHC-8, breaking the coordination agreement with Tay Sector.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved together with a joint unit report that included TCAS analysis and comment from the appropriate ATC authorities.

The DHC-8 crew was evidently aware of the JS41 from the TI issued by TAY and had spotted it on their TCAS display. Moreover, they had also seen the JS41 below them before it commenced its climb so they had good SA even before the TA was enunciated. The TCAS analysis indicates the DHC-8 crew complied with the TCAS RA promptly and it was clear to Members that the crew's part in this Airprox was limited to following the instructions

issued to them. Whilst the trainee on TAY had incorrectly issued an avoiding action turn instruction after the DHC-8 crew announced their RA, Members agreed that it had no effect on the outcome.

Evidently, this Airprox stemmed from the instruction issued by TAC N to the JS41 crew to climb to FL210/FL215, following their request for a higher cruising level. Whilst the JS41 crew had been informed of the DHC-8 15nm ahead that was *"…co-ordinated above.."* when they first called TAC N, they had not been informed of its level. A Member postulated that if TAC N had told the JS41 crew that the DHC-8 was only 1000ft above them at FL180, they might not have asked for the en-route climb at that point; however, once the crew made the request, it remained TAC N's responsibility to prevent any conflict with the co-ordinated traffic so the JS41 crew was also just following TAC N's instructions. Although the Unit report highlights that specific levels were not mentioned, the DHC-8's Mode C was plainly displayed to the controller and if TAC N had been looking at the radar when she instructed the JS41 crew to climb the potential for conflict would have been readily apparent. A civil area Member questioned the efficacy of two ATC units providing a transit middle airspace radar service in the same vicinity. However, the Board recognised this was commonplace throughout UK airspace and the NATS Advisor added that there was no evidence to suggest that if the same unit had been working both flights the Airprox would not have occurred.

The BM SM Advisor reaffirmed that there was no doubt that TAC N was aware of the DHC-8's level beforehand, but it was the controller's inappropriate reaction to the JS41 crew's request, approving a climb through the DHC-8's level in breach of the agreement with TAY, that had resulted in this conflict. The Advisor believed that this was a momentary error by the TAC N controller, who had quickly realised her mistake. A military controller Member opined that TAC N's work rate had not been able to match the demands of the traffic situation, which, in his view, was indicative of a lack of currency; Members discussed this issue and the difficulties confronting more experienced controllers who are understandably employed more frequently in supervisory roles. Nevertheless, the rules seemed plain enough so the issue of controller currency was a matter for the individual and the unit concerned. After a wide ranging debate, Members agreed unanimously that the Cause of this Airprox was that TAC N climbed the JS41 into conflict with the DHC-8.

TAC N had plainly been distracted in correcting the JS41's projected track clear of D323 and altering the JS41 crew's requested level to the appropriate quadrantal cruising level rather than focusing on the potential for conflict, despite the co-ordination beforehand. Nevertheless, only 24sec elapsed between the instruction to climb to FL215 and TAC N issuing the *"..stop climb immediately.."* instruction, when it was evident she had realised her mistake. The Board noted that shortly after the STCA 'red' warning the controller incorrectly issued an avoiding action turn while the JS41 crew was reacting to a TCAS RA; however, Members recognised that the controller would not have been aware of the TCAS event because the relevant RT call was garbled. The TCAS analysis confirms that the JS41 crew complied with the RA promptly. Moreover, with both ac on a steady course they were set to pass abeam with 1·1nm horizontal separation even before any avoiding action turns could begin to take effect. Vertical separation had also been restored by that point with 1100ft evident on Mode C. The Board concluded, therefore, that the foregoing coupled with the sound appreciation and swift response of all concerned had effectively removed any Risk of a collision in the circumstances conscientiously reported here.

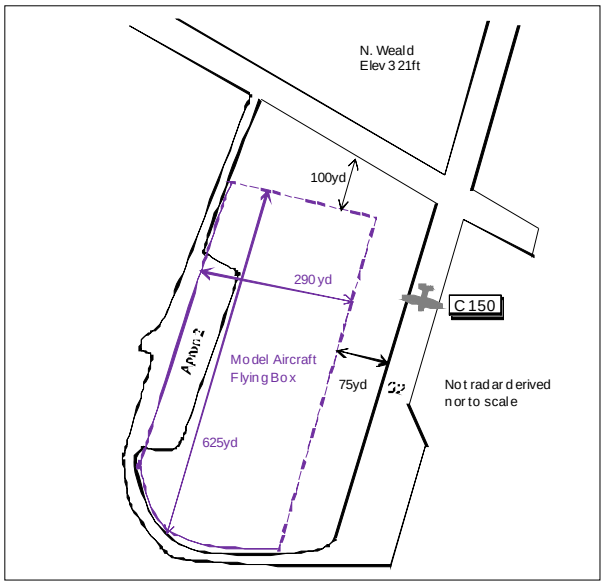
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: TAC N climbed the JS41 into conflict with the DHC-8.

Degree of Risk: C.

AIRPROX REPORT NO 2012002

Date/Time:	8 Jan 2012 1403Z	(Sunday)
Position:	5143N 00009E (RW20 North Weald - elev 321ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C150	Model a/c
Operator:	Civ Pte	Civ Pte
Alt/FL:	50ft↑ aal	NR agl
Weather:	VMC CLBC	VMC NR
Visibility:	>10km	NR
Reported Separation:	4m V/30m H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C150 PILOT reports on departure from N Weald RW20 and in receipt of an A/G service from N Weald Radio on 123·525MHz, squawking 7010 with Mode C. The visibility was >10km flying clear below cloud in VMC and the ac was coloured white/red; lighting was not reported. Heading 200° at 70kt climbing straight ahead through 50ft aal he saw a model ac moving fast towards his flightpath in his 1-2 o'clock range 50m at roughly the same height. The model then turned sharply to port 180° and flew away from the RW. Although he didn't have time to react he believed that it was about 30m at its closest point. He did not declare an Airprox at the time and he assessed the risk of collision as none.

The model involved was a low-wing single-engine type with about 4-5ft wingspan. He opined that model ac should not be flying so close to an active RW, believing that had the operator lost control then he may not be here today. A colleague of his also commented on how close model ac were being flown to an active RW when there is a lot more space available that would not cause a problem. A published Flight Guide shows the area for model ac [apron W of RW02 threshold] though there is nothing which shows the limits that they should stay within or that model ac will be flying when ac are arriving or departing. He felt that model flying should not carry on at its present location when the RW is active.

UKAB Note (1): The AIDU Minor Aerodromes and Microlight Sites publication also shows that model ac fly from an apron to the W of RW02 threshold. Local Hazards include model flying on the A/D during daylight hours.

THE MODEL A/C OPERATOR reports flying an 88in wingspan model YAK54 between 1400 and 1515hr but did not recall at any point being in conflict with a C150. Throughout his flights he had adhered to the 'model flying box' at N Weald; the 'box' is limited airspace that is strictly policed by both his own club members and the ground control at the airfield. He was not made aware that rules on this or any other matter had been breached. To offer a safe system of operations, the Model Flying Club (MFC), airfield ATC and Operations use a ground to ground radio system that is manned at all times during their flying sessions. An aerial photo of N Weald with the Flying Box superimposed was provided as well as the flight pattern flown.

THE MODEL FLYING CLUB COMMITTEE reports the model ac operator was believed to be identified correctly from the timing and description of the model given by the C150 pilot. What the committee believes has happened is a mis-sighting due to perspective. The model in question has a wingspan of 2·23m (>7ft) and what the C150 pilot saw was not a 4ft wingspan model at 50yd converging to approximately 30yd but the larger 7ft wingspan model further away converging but within the RW02/20 airspace box allocated to model flying. The C150 pilot may have been a visitor and not familiar with model flying on Apron 2. Local pilots are aware of their presence and are invariably told by 'ATC' when they are active whilst ac are taking-off or are on short final on RW20/02. If full size

ac need to enter the airspace box in an emergency, model flyers are advised by ATC and stand down. The flying members are situated on Apron 2 in the centre to the W side, adjacent to but not on the perimeter track. All models are flown looking E, irrespective of wind direction. The maximum height allowed is 400ft QFE. They also maintain a full-time member who monitors the height and location of models within the boundaries and approaching full size ac, at or below 400ft, who may not have been advised by ATC that models are active. On this occasion the spotter did not see any conflict with a C150. The committee could not understand why the C150 pilot did not radio ATC at the time of the alleged Airprox and left the reporting until the end of his flight. Had he done so, ATC would have contacted the model flyers immediately on the ground radio and it would have been possible to get a more accurate fix on the model alleged to have been involved. They received no advice whatsoever nor were they advised that one of their models had encroached outside the 'box'. Following a discussion with the Aerodrome Manager it was found that the flying box (625yd N-S and 290yd E-W, E boundary 75 yd from W edge of RW02/20) agreed with ATC Operations in June 2010 and incorporated in the MFC Licence and Lease had not been included into the Aerodrome Operation Manual (AOM). The AOM will be updated later in 2012.

THE BMFA reports the club operate under the terms of a well defined set of practices and protocols which have been agreed with the aerodrome management. A significant aspect of this arrangement is the requirement for model flyers to be in contact with Tower at all times through a handheld radio and in addition to this a 'spotter' is required at all flying sessions. In the majority of cases where model flying takes place on a full size active aerodrome it is only outside the notified hours of operation. However there are a few where the 2 activities co-exist with no problems whatsoever, North Weald is a good example of this. Modern radio equipment has become spectacularly reliable so the days of interference generated 'shootdowns' are in reality a thing of the past. In addition to this all radio controlled model ac are legally required to be fitted with a failsafe that upon loss or corruption of the signal brings the throttle to closed or idle. Also, as with the club based at North Weald, clubs that operate in close proximity to full size aviation activity generally set a minimum standard of pilot certification along with the implementation of additional measures such as the requirement for a 'spotter' at all flying sessions. Acting as second pair of eyes, the 'spotter' would obtain the most accurate view of the flying area 'infringements' from a location in line with the edge of the box however by the nature of the role the 'spotter' needs to be located with the pilot in order that communication takes place throughout the flight. At the distances involved it would be apparent from the pilot's box (by the spotter) when an ac was flying on close proximity to the edge of the defined flying area. This of course relies on a degree of competency and experience on the part of both the spotter and the pilot, hence the certification requirements specified in the club rules.

UKAB Note (1): The N Weald Aerodrome Manager provided a copy of the AOM which included detailed procedures to be followed by the MFC and 2 graphics; the first depicting 3 areas set aside on the aerodrome for model flying and the second showing prohibited areas i.e. 'no-fly' zones to models. However, neither of these graphics correlated with the graphic provided by the MFC Committee. The Aerodrome Manager met with the MFC Committee and agreed the 'Flying Box' portrayed in the graphic provided by the MFC was correct and that he will ensure that the information available to pilots contained within relevant flight guides and the AOM regarding model flying will be amended accordingly.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and reports from the appropriate operating authorities.

It was clear that the C150 pilot was surprised by the proximity of the model ac while on departure. Without accurate information as to the dimensions and position of the 'flying box', the C150 pilot was unaware that model ac could be flying to within 75yd of the RW edge during normal operations. The model was seen an estimated 50m away and to have turned sharply away at a distance of 30m. Members agreed with the suggestion in the Model Flying Club Committee's report that the model ac's large size - a 7ft wingspan and not 4-5ft - may have created the impression that it was closer than it appeared and the actual separation distances would have been greater than those estimated. A Member questioned whether flying a model towards an active RW with an ac climbing out was best practice. The Flt Ops Advisor confirmed that from his perspective nothing illegal had occurred with the model ac flying in accordance with BMFA procedures; however, he agreed that any manoeuvre towards an active RW could give rise for concern from pilots arriving or departing. Members believed that this incident 'boiled down' to a perception issue, with the C150 pilot unaware of the model flying box, concerned with the model ac's proximity and perceiving a conflict. From the information available, the Board believed that in the end this had been a benign event where normal procedures, safety standards and parameters were not breached.

Given that normal ac and model flying operations routinely occur concurrently but there had been lack of information available to the C150 pilot, Members agreed that the North Weald Aerodrome Operator should update the AOM and ensure the relevant Flight Guides reflect this update.

PART C: ASSESSMENT OF CAUSE AND RISK

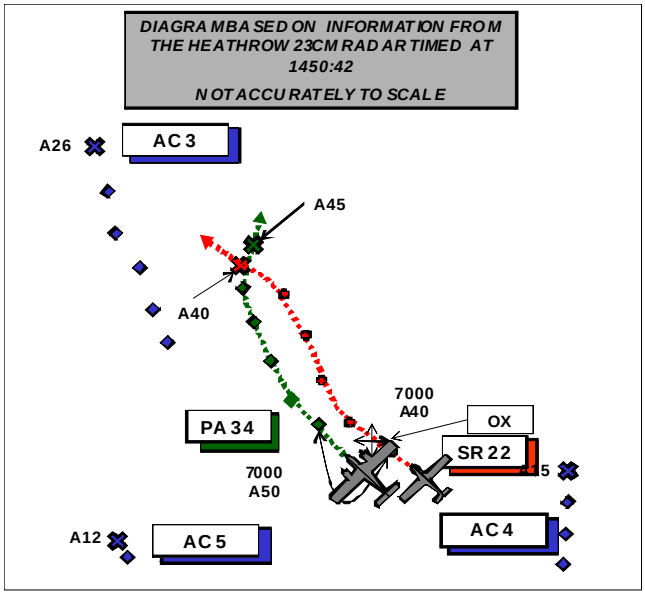
Cause: Pilot perceived conflict.

Degree of Risk: E.

Recommendation: The North Weald Aerodrome Operator is recommended to update the Aerodrome Operating Manual and ensure the relevant Flight Guides reflect the update.

AIRPROX REPORT NO 2012004

Date/Time:	9 Jan 2012 1451Z	
Position:	5149N 00118W (O/H Oxford - elev 270ft)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA34	SR22
Operator:	Civ Trg	Civ Trg
Alt/FL:	5000ft↓	4000ft
	NK	QNH (1029hPa)
Weather:	IMC CLBL	IMC CLBL
Visibility:	NR	>10km
Reported Separation:		
	500ft V/0.5nm H	200ft V/50m H
Recorded Separation:		
	500ft V/0.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA34 PILOT reports flying an IFR training flight in a blue and white ac with all external lights switched on in receipt of a PS from Oxford while squawking 7000 with Modes C and S but TCAS was not fitted. They were cleared to the 'OX367' [NDB] at FL060. Traffic called on the frequency and requested to route through from Benson direction the overhead at 4000ft. They were given descent to 3500ft which they initiated, heading 339° at 120kts and descending at 1000fpm. During the descent Oxford APP called the transiting ac and told them of their [the PA34's] intentions. The transit ac, a Cirrus type, called visual with them but still flew below them as both ac entered cloud. He stopped the descent until he lost sight of the Cirrus.

He reported the incident on Oxford APP and assessed the risk as being medium.

THE SR22 PILOT reports flying a white ac with all external lights switched on an IFR training flight; at the time they were in receipt of a BS from Oxford and were squawking 7000 with Modes C and S but TCAS was not fitted. They had turned overhead OX onto a heading of 340° at 130kt en-route to Sleap, climbing from 3500ft to 6000ft, when they were notified of an ac ahead joining the hold at OX and they sighted the ac above them briefly 0.5nm away, as there were gaps in the cloud; it was, travelling in approximately the same direction but in a R turn. As they were unable to judge whether the ac was manoeuvring in, or joining the hold, or whether they were overtaking it or not, they stopped the climb. Very shortly afterwards the ac reappeared still above them and to the right in a right turn. Once they were well clear of it they continued their climb.

He assessed the risk as being Medium.

UKAB Note (1): The recording of the Heathrow 23cm radar shows the incident clearly as depicted above.

ATSI reports that the Airprox occurred at 1450:35, in Class G airspace, 1.5nm NW of Oxford Airport between a PA34 and a Cirrus SR22.

The PA34 was operating an IFR training flight inbound to Oxford Airport from Gloucester Airport and in receipt of a PS from Oxford APP. The SR22 was on training flight operating IFR from Denham to Sleap and in receipt of a BS, also from Oxford APP.

The Oxford controller was providing an Approach Control Service together with a trainee, without the aid of surveillance equipment. The traffic levels were reported as medium with overall workload as medium-high. The

trainee was an experienced controller, new to the unit and undergoing unit training prior to a unit endorsement examination.

ATSI had access to RTF and area radar recordings together with written reports from the Oxford controller and both pilots. The controller's recollection of the precise sequence of events was unclear.

[ATSI Note (1): The controller's initial written report incorrectly included details of the SR22's earlier flight from Sleap to Denham. The correct flight progress strip (FPS) was not available.]

The RAF Brize Norton and Oxford METARs were:

METAR EGVN 091450Z 26007KT 9999 FEW014 BKN022 11/08 Q1029 WHT TEMPO SCT012 GRN=

EGTK (Met-observation) 091450Z 25010KT 9999 BKN021 11/08 Q1028 (QFE 1018)

The PA34, approaching from the W, contacted Oxford APP at 1444:38, reporting at FL060; the controller cleared it to the OX (NDB) at FL060 and instructed the pilot to report entering the hold. Information Papa was current with a QNH of 1028. This was correctly acknowledged by the PA34 pilot.

At 1445:43, the SR22 contacted Oxford APP reporting, *"….en-route from Denham to Sleap routeing via your overhead we're er four thousand feet one zero two eight this time just cleared the er Benson MATZ er ten miles to run to your overhead request a Basic Service and er er approval for your overhead (SR22) C/S*"; the controller replied, *"(SR22) C/S Basic Service report overhead".*

At 1447:02, the PA34 pilot reported entering the hold at FL060. [ATSI Note (2): The controller's flight progress strip showed the PA34 entering the hold at 1450]. The controller replied, *"(PA34) C/S descend to alt three thousand five hundred feet the QNH is one zero two eight report leaving Flight Level six zero,"* which was acknowledged by the PA34 pilot.

At 1449:01, the PA34 pilot reported leaving FL060 and the controller instructed the pilot to report reaching 3500ft.

At 1449:40, the SR22 pilot reported, *"…turning in the overhead northwest bound."* The controller instructed the SR22 pilot, *"..report when you wish to leave the frequency".*

At 1449:50, the SR22 pilot requested climb to FL060 and the Oxford controller responded, *"(SR22) C/S roger just be advised there is traffic a P A thirty four just left flight level six zero descending to alt three thousand five hundred feet inbound to the Oscar Xray hold";* the SR22 pilot replied, *"Roger we are visual with that traffic (SR22) C/S we're in his six o'clock low".* The radar recording shows both ac tracking NW, the SR22 overhead Oxford indicating 4000ft, with the PA34 indicating alt 4900ft and in the SR22 ac's 12 o'clock at a range of 0.4nm.

At 1450:07 the controller passed TI to the PA34, *"(PA34) C/S just passing through the Oxford overhead is a Cirrus S R twenty two four thousand feet climbing flight level six zero",* the PA34 pilot acknowledged, *"(PA34) C/S"* and the controller asked, "(*PA34) C/S have you entered the Oscar Xray hold",* the PA34 pilot replied, *"Standby (PA34) C/S".*

At 1450:32, radar recording shows the PA34 commencing a right turn indicating alt 4500ft with the SR22 crossing from right to left indicating 4000ft; both ac maintain their respective levels and their tracks cross at 1450:35.

At 1450:54, the PA34 pilot transmitted, *"(PA34) C/S er AIRPROX time one four five zero".* This was acknowledged by the controller and the pilot added that he would discuss when on the ground. The PA34 subsequently reported on RTF, *"…as we were descending in the hold he just flew right underneath us we both disappeared into cloud together…."*

The PA34 pilot's report indicated that he was aware of traffic on frequency asking to route via the overhead at 4000ft from the Benson direction and reported sighting the SR22 ac and stopping the descent prior to both ac entering cloud.

The SR22 pilot's report indicated flying IFR and confirmed sighting the PA34 ahead and above. The SR22 pilot stopped the climb.

The controller felt sure that TI had been passed much earlier than was the case. She indicated that the combination of medium/heavy workload together with an increased confidence in the experienced trainee, may have contributed to the passing of late TI and the incorrect time shown on the FPS. She was content that once TI had been passed, the SR22 had sighted the PA34 ahead and above.

The controller had indicated a presumption that the SR22 had been VFR, which was reflected in his report. With hindsight the controller expressed being uncomfortable knowing that the SR22 had been IFR and IMC, when a more appropriate PS would have been available to the pilot.

The controller was asked about the discrepancy regarding the PA34 ac's 'hold entry time' shown on the FPS as '50' when it should have been '47' and the confusion this had caused. She reasoned that this time had not initially been annotated, but later at '50', remembered that the ac had reported taking up the hold. At the same time the pilot was asked to confirm that he had entered the hold. The controller was not sure if this had been a factor in the late passing of TI.

The PA34 ac was IFR and in receipt of a PS from Oxford APP; the controller was therefore required to pass TI to the pilot if a confliction was considered to exist. Due to a combination of increased workload and controller training, such TI was passed later than would have been expected, but nevertheless resulted in both pilot's acquiring a visual sighting and taking appropriate action. Had TI been passed earlier, it was considered likely that this would have aided the PA34 pilot's situational awareness and may have allowed the pilot to take earlier deconfliction action. CAP774, UK Flight Information Services, Chapter 5, Page 2, Paragraph 5, states:

'The controller shall provide TI, if it is considered that a confliction may exist, on ac being provided with a Basic Service and those where TI has been passed by another ATS unit; however, there is no requirement for deconfliction advice to be passed, and the pilot is wholly responsible for collision avoidance. The controller may, subject to workload, also provide TI on other ac participating in the Procedural Service, in order to improve the pilot's situational awareness.'

The SR22 pilot operating IFR became IMC whilst in receipt of a BS. It may have been more appropriate for the pilot to have requested a PS, enabling the controller to provide the deconfliction minima between IFR flights in IMC. The controller passed a warning to the SR22 pilot as it passed overhead the airfield and resulted in the pilot acquiring a visual sighting of the PA34. CAP774, UK Flight Information Services, Chapter 2, Page 1, Paragraph 1, 3 and 5, state:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.'

'Service is available under IFR or VFR and in any meteorological conditions.

Pilots should be aware that Basic Service might not be appropriate for flights in IMC when other services are available.

Pilots should not expect any form of TI from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ), and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller/FISO may provide TI in general terms to assist with the pilot's situational awareness. This will not normally be updated by the controller/FISO unless the situation has changed markedly, or the pilot requests an update. A controller with access to surveillance-derived information shall avoid the routine provision of TI on specific ac, and a pilot who considers that he requires such a regular flow of specific TI shall request a Traffic Service. However, if a controller/ FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

CAP774, UK Flight Information Services, Chapter 1, Page 1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment. The Class F and G airspace environment is typified by the following:

- It is not mandatory for a pilot to be in receipt of an ATS; this generates an unknown traffic environment;
- Controller/FISO workload cannot be predicted;
- Pilots may make sudden manoeuvres, even when in receipt of an ATS'.

The Airprox occurred in the vicinity of the Oxford OX-NDB hold between two ac operating IFR. The PA34 was in receipt of a PS and the SR22 was in receipt of a BS. The controller passed late TI, which nevertheless resulted in the two pilots acquiring a visual sighting of each other, enabling them to take appropriate action to stop their respective descent and climb.

A number of factors were considered to have been contributory factors:

i. The late passing of TI to the PA34.

ii. The controller training and increased workload was considered to have been a contributory factor in the late passing of TI and uncertainty about the time the PA34 entered the hold.

ii. The SR22 was operating IFR/IMC and in receipt of a BS when it may have been more the appropriate for the pilot to have requested a PS.

The late passing of TI to the PA34.

The controller training and increased workload was considered to have been a contributory factor in the late passing of TI and uncertainty about the time the PA34 entered the hold.

The SR22 was operating IFR/IMC and in receipt of a BS when it may have been more the appropriate for the pilot to have requested a PS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, radar recordings, reports from the air traffic controller involved and a report from the appropriate ATC authorities.

The Board noted that this incident took place in Class G airspace where, regardless of whether they are operating under VFR or IFR and whether or not they are in a published instrument procedure, pilots are required to see and avoid other ac. That being the case, Members strongly advised pilots to make use of a radar based ATC service, preferably a DS, if they are flying in IMC. If no radar-based service is used, in IMC pilots are generally unable to fulfil their 'see and avoid' responsibility. Members observed that the PA34 pilot operating under a PS in the Oxford instrument pattern was concerned that the SR22 did not avoid him. While it could be argued that good airmanship would have been for the SR22 to either have (preferably) requested a DS or TS from the local LARS unit, Brize Norton, or if for any reason this was not available, a PS from Oxford thus allowing the respective controllers to provide a degree of co-ordination or separation. The CAA ATC Advisor, however, pointed out the CAP774 provision that:

'Controllers may, subject to workload, initiate agreements (as defined in Service Principles) with pilots of aircraft under a Basic Service to restrict their flight profile in order to co-ordinate them with aircraft in receipt of a Procedural Service. However, controllers shall limit the occasions on which they make such agreements to those where it is clear that a confliction exists, and only when controller workload permits.'

Although the SR22 pilot reported that he was flying under IFR, Members questioned whether that was actually the case since he was not climbing to a correct quadrantal flight level and did not declare that he was IFR; in any event the Oxford Controller would not have known that he was IFR unless the (SR22) pilot told her, which apparently he did not [not on the transcript] despite having the opportunity to do so; the Controller assumed therefore, that he

was VFR and she was not required to deconflict the ac. Had the SR22 been IFR the controller (most likely) would not have agreed a BS and requested the pilot to accept a PS and deconflicted the ac procedurally.

A pilot Member observed that the SR22 was on an instructional flight; in his opinion the sequence showed a poor appreciation of the situation and provided a poor example to the student.

Both pilots however stopped their respective descent/climbs as they entered cloud thus ensuring that there was significant vertical separation between the ac.

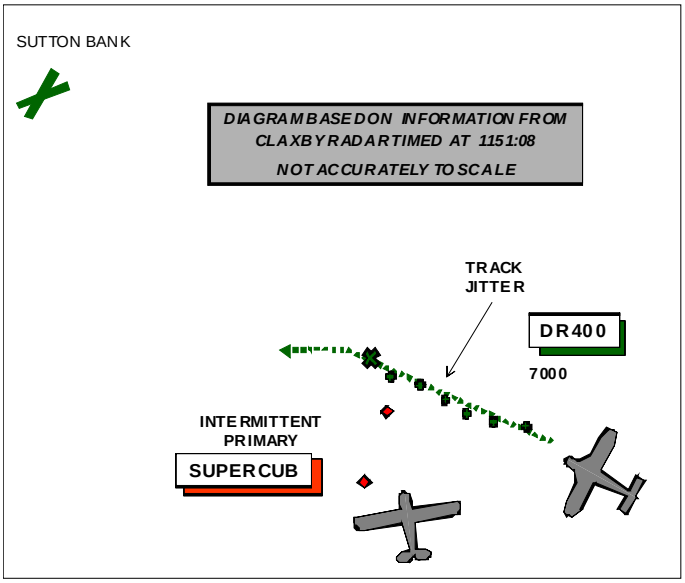
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace between IFR traffic.

Degree of Risk: C.

AIRPROX REPORT NO 2012006

Date/Time:	14 Jan 2012 1151Z	(Saturday)
Position:	5410N 00110W (3nm SE Sutton Bank)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Robin DR400	Piper Supercub
Operator:	Civ Pte	Civ Trg
Alt/FL:	NK	1300ft
	QFE (995hPa)	QFE
Weather:	VMC Haze	VMC CLBC
Visibility:	30km	10km
Reported Separation:		
	NK	15ft V/0ft H
Recorded Separation:		
	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ROBIN DR400 PILOT reports flying a white, blue and orange ac with strobes switched on, on a private flight under VFR inbound to Sutton Bank; he was squawking 7000 but Modes C and S were not fitted. He had contacted Sutton Bank by telephone to ensure that he was clear to 'fly in' as he is very familiar with the site and procedures as he is a current gliding instructor, tug pilot and competition glider pilot and partakes in a gliding competition at Sutton Bank every August. He was informed [on the telephone] that the RW in use was 24 for the aerotow/glider only operations and informed them that he would land on RW20 which the tugs and gliders would also use; he gave them an ETA of 1130-1200 and said he would call on their operating frequency of 129.975.

He left Pocklington at 1135 and climbed to 2000ft at 100kt on Pockington QFE. When passing Castle Howard he changed to Sutton Bank, calculated their QFE and climbed to 1500ft (QFE) and changed course to a W'ly heading to remain clear of Sutton Bank operations by about 3nm to the S to position to the W of the airfield for a RH cct to RW20; this enabled him to observe the operation and also to merge safely with any tug/glider traffic in cct.

At about 7nm he made a call to Sutton Bank on 129.975 to inform them that he was approaching from the SE and would join RH for RW20 but there was no response from ground or from any other ac. A short while later he increased his speed to 120kt to descend to cct height, intending to join at about 1000ft. During this time he believes that both he and his passenger were maintaining a good lookout and the visibility was good in the direction of flight and to the N (down sun) although it was misty to the S into sun with an inversion at about 600ft. He made a second call when he was 3nm S of the airfield heading 270º, again stating his intentions but he heard only a slightly garbled reply from the PA18 Supercub indicating that they had had a 'near miss'.

Neither he nor his passenger saw the PA18 and it was only after discussion with the checking instructor/examiner in the PA18 that he realised the proximity of the two ac [reported by the other pilot as 10-15ft] and that the Robin had passed directly overhead the PA18 on a converging course. Although he did not see the other ac below him as it was obscured by the fuselage and wing, he assessed the risk as being high.

THE PIPER SUPERCUB PILOT reports that he was conducting a VFR, bi-annual instruction with a gliding club tug pilot from Sutton Bank in a red and grey ac and was listening on 129.975; SSR was not fitted but FLARM was. They had just completed a practice forced-landing exercise, had climbed to 1300ft (Sutton Bank QFE) and had been cruising straight and level, heading 340° at 70kt for about 50-60sec when a Robin DR400 was seen through the roof Perspex passing from R to L about 10-15ft directly above them from their 3-4 o'clock. The Robin subsequently was seen to be heading about 280° and eventually landed at Sutton Bank on RW20. He reported

the incident on the frequency in use and assessed the risk as being high; he thought that the ac had been hidden by the Supercub's high wing.

THE SUPERCUB CLUB CFI commented that the Supercub was fitted with FLARM; had the Robin (a tug from another club) been similarly fitted, the Airprox would probably not have occurred.

UKAB NOTE (1): The Great Dun Fell Radar was under long-term maintenance but the Claxby Radar recording provided some useful information. The DR400, squawking 7000 with no Mode C showed throughout the incident tracking about 280°. Although the Supercub did not show, a primary only contact appeared twice in the vicinity of the Airprox; it was not possible, however, to determine its track or the CPA. No altitude information was available. From the information available, it was deduced that the CPA was at about 1151.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar recordings and a comment from the Gliding Club CFI.

A pilot Member familiar with both ac informed the Board that unlike the DR400 where the visibility from the cockpit is very good, it is limited from the Supercub (except directly upwards and from the front seat directly ahead).

The DR400 pilot had, in the Board's view, taken all reasonable measures to ensure notification of his flight and his safe arrival at Sutton Bank; however, arrivals at busy hilltop gliding sites in light ac is not easy or straightforward and requires great care. Members reasoned from the available information that the Supercub had recovered, climbing away from the PFL from the low ground to the S of Sutton Bank and would not have been visible to the DR400 pilot below the ac. Although the DR400 would have been above the Supercub, it had most likely been obscured to its crew by the wing. Another Member opined that during their recovery, both pilots had probably been concentrating their lookout in the vicinity of Sutton Bank looking for gliders and tugs and positioning to join the cct.

A gliding pilot Member pointed out that although FLARM is not recommended by the CAA for GA use or universally fitted, he agreed with the CFI that in this case it would probably have enabled the pilots to see the opposing ac in time to avoid them.

Both ac were operating legitimately in Class G airspace where 'see and avoid' is the principal method of collision avoidance. That neither pilot saw the opposing ac was most likely due to the geometry of the encounter and the poor visibility from the PA18.

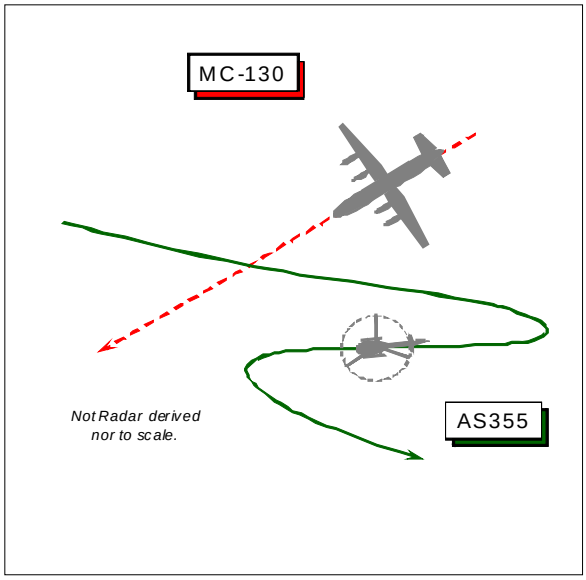
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the DR400 pilot and effectively a non-sighting by the PA18 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 2012008

Date/Time:	17 Jan 2012 1027Z	
Position:	5155N 00510W (2nm NW of Brawdy disused A/D)	
Airspace:	FIR/UKDLFS LFA7 (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	AS355	MC-130
Operator:	Civ Comm	HQ USAFE-UK
Alt/FL:	500ft	~600ft agl
	RAD ALT	NK
Weather:	VMC In Drizzle	VMC NR
Visibility:	8-10km	NR
Reported Separation:		
	Nil V/400m H	500m H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AEROSPATIALE AS355F1 SQUIRREL II HELICOPTER PILOT reports that after departure from Pembrey he was conducting a pipeline inspection task under VFR and was in receipt of a BS from Haverfordwest on 122·200MHz. Whilst approaching a position about 2nm NW of Brawdy disused aerodrome, flying in VMC some 300ft clear below cloud in drizzle, heading 260° at 110kt in a level cruise at 500ft RAD ALT, a C130 was suddenly seen in his 3 o'clock about 400m away overtaking his helicopter to starboard at the same height about 100kt faster. He maintained his track as the C130 flew past with minimum horizontal separation of about 400m. The Risk was assessed as 'medium'.

His helicopter is coloured dark red and the HISLs were on. PCAS is fitted and a squawk of A0036 was selected with Mode C on. Mode S is not fitted.

THE LOCKHEED MC-130 PILOT provided a narrative, reporting that he was operating VFR in VMC conducting tactical low-level training in LFA 7. During the period of the Airprox he was conducting a Self-Contained Approach (SCA) at a 500ft Set Clearance Plane (SCP) to a planned low-approach at Brawdy disused A/D whilst monitoring the Haverfordwest TOWER frequency of 122.200MHz. At 6-mile final, in conjunction with SCA slow-down, he observed helicopter traffic visually and on the ac's ETCAS at a range of 4 miles. The helicopter, subsequently identified visually as an Aerospatiale variant matching the description of the reporting pilot's ac, had initially been observed on a diverging course to the SE. At 4-mile final, he observed the AS355 executing an approximate course reversal, resulting in a near-parallel ground track with a 1mile off-set. Visual avoidance was precluded at that point by solid fog/cloud at 1000ft agl, a lower cloudbase to the N (away from the AS355) and his ac's reduced manoeuvrability in the approach/gear/flap configuration. Electing to continue the SCA, he visually avoided the AS355 by overtaking at an estimated 40-90kt overtake. At 2-mile final, the AS355 was in his MC-130's 8 o'clock position and was observed reversing course again toward the SE. At the closest point the AS355 passed 500m away to port. The remainder of the approach, missed approach, and departure to the N was uneventful and the AS355 was observed on ETCAS throughout the occurrence.

UKAB Note (1): An A/G Service is provisioned at Haverfordwest - callsign Haverfordwest RADIO – when the A/D is open. The RT is not recorded.

UKAB Note (2): The Airprox occurred outwith recorded radar coverage.

UKAB Note (3): Notification of pipeline helicopter activity within LFA 7S was promulgated within the morning notification message issued by the LFBC under Y series NOTAM – Y0110/12, transmitted at 161617Z JAN.

UKAB Note (4): The disused A/D at Brawdy is now a Barracks operated by the Army, within which is situated a HLS.

USAFE-UK comments that further discussions with the Aircraft Commander(AC) established that he first saw the AS355 crossing his track, which he thought was about 240°, from right to left on a generally south easterly heading and passing clear. The subsequent course reversal by the AS355 indicated that its pilot had not seen the MC-130 prior to rolling out on his stated heading of 260°. However, the point at which the AS355 saw the MC-130 is not clear because its track roughly paralleled that of the MC-130 for some 2nm before turning away to the south east. The MC-130 AC was aware of the relevant PINS NOTAM.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings and comment from the appropriate operating authority.

The USAFE-UK Advisor explained that the MC-130 crew was aware of the possibility of encountering a pipeline inspection helicopter from the PINS NOTAM. Nevertheless, Members were briefed that such warnings were spread across a very large tract of the UK DLFS that morning and the unspecific nature of the information was of debatable benefit. Nevertheless, the MC-130 carries a large flight deck crew and the Advisor stated that after the pilot acquired it visually and on his sophisticated ETCAS (Enhanced TCAS) display the crew monitored the helicopter closely. It seemed that at one point during their self-contained (internal aids) approach, the MC-130 crew was restricted in their ability to manoeuvre away from the AS355 by the poor weather to the N and might also have lost visual contact on the helicopter, albeit that they maintained VMC throughout. One Member was concerned that the MC-130 pilot seemed to have carried on their approach regardless and if they had to turn away to the N might have flown into cloud. However, the MC-130 crew always retained the ability to climb-out of the LFS if they encountered IMC and the Advisor stressed that the MC-130 crew retained contact on the AS355 throughout the encounter on their ETCAS and were monitoring the position of the helicopter constantly.

Unfortunately, the occurrence was below recorded radar coverage so the geometry could not be clarified, but from the additional information obtained by the USAFE-UK Advisor, the MC-130 pilot recalled that the AS355 had been manoeuvring before he passed abeam the helicopter and its pilot spotted the MC-130 overtaking about 400m to starboard. It was not evident why the AS355's PCAS had not detected the presence of the MC-130 beforehand – unless the MC-130 was not squawking which seemed unlikely; however, the AS355 is shown squawking the appropriate conspicuity squawk with Mode C sometime earlier whereas the MC-130 is not shown at all. Nevertheless, a helicopter pilot Member suggested that the AS355 pilot might have been startled by the sudden appearance of such a large ac unannounced, but he should be reassured that his helicopter had been seen beforehand.

It was stressed to the Board that the diagram was merely a graphic representation from the best recollection of the MC-130 pilot, who believed there was a course reversal by the AS355 prior to it rolling out on 260° and it was after this point that the MC-130 overtook the helicopter 500m away. It was unclear if the AS355 pilot could potentially have seen the MC-130 any earlier before he turned but he would certainly have been unable to do so when the MC-130 was approaching from astern. The perceptions of the minimum separation from both pilots were not widely dissimilar at 400-500m and it was clear that the MC-130 crew had good SA on the AS355 during the occurrence. Taking all these factors into account the Board concluded that this Airprox had stemmed from a sighting of VFR traffic operating legitimately in Class G airspace. Moreover at these distances, in the Board's view, normal safety standards and parameters had been maintained in the circumstances reported here.

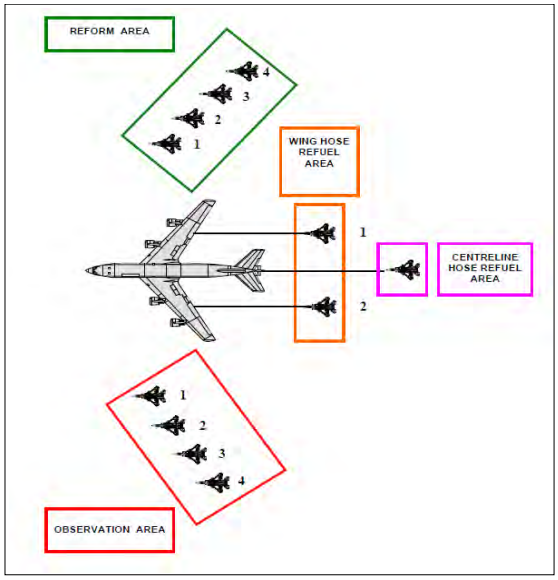
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report.

Degree of Risk: E.

AIRPROX REPORT NO 2012009

Date/Time:	25 Jan 2012 1814Z	(Night)
Position:	5558N 00103E	
Airspace:	(AARA 5)	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Typhoon FGR4
Operator:	HQ Air (Ops)	HQ Air (Ops)
Alt/FL:	FL200	FL200
Weather:	VMC CAVOK	VMC NK
Visibility:	50km	NK
Reported Separation:		
	30ft V/30ft H	NK
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

UKAB Note (1): The above is a diagram taken from ATP56 (B), the NATO manual of AAR.

THE TORNADO GR4 PILOT reports conducting night AAR in AARA 5. He was visual with the VC10 tanker heading 265° at 280kt. The VC10 had 2 Typhoons in tow and he was cleared to join in the 'observation left' position on it. Typhoons 1 and 2 were in contact right and left respectively. When he was about three ac lengths back from the observation position and 50ft low, Typhoon 1 disconnected normally, was cleared to the 'reform right' position and was seen to begin moving.

As the Tornado crew continued forward towards observation left, they began the 'before contact checks' and Typhoon 2 was cleared to disconnect. They interrupted their checks while the pilot raised his NVGs and they heard Typhoon 2 cleared to the 'reform right' position. They stabilised just aft of the VC10 wing line then completed the checks.

The Tornado pilot then saw Typhoon 2 in plan form turning towards him and initiated an immediate pull up. The navigator who was still wearing NVGs also saw Typhoon 2 roll L towards them before passing below the Tornado. Typhoon (2)'s nose passed underneath the Tornado, mid fuselage, and the Tornado crew felt a moderate burble as the ac went below. The Tornado continued the climb to FL210 before discontinuing AAR and commencing RTB.

THE TYPHOON (2) FGR4 PILOT reports flying as No2 of a pair of Typhoons conducting night AAR training in AARA 5 with a VC10. Following a successful refuelling on the left hose, he disconnected and moved to a position about 30ft astern of the hose. Having satisfied himself using external visual cues that the ac was stable and in a safe position, he briefly looked down to locate the refuelling probe switch but was unable to locate it immediately due to the dim cockpit lighting. Within 2sec he looked back up to be presented with a picture of his ac climbing towards the trailing edge of the VC10 wing with what appeared to be significant closure rate. He executed a breakaway manoeuvre by rolling left to 95° AOB and applying full back stick.

Having stabilised the ac he informed the tanker and stowed the probe and at that point the Tornado called to say that they had experienced an Airprox with them. He did not see the GR4 until after the incident, and so he cannot comment on the separation.

HUD video analysis indicated the following:

a. Four minutes prior to the incident, the Tornado called visual with the tanker and was cleared to join.

b. At the time of the incident the GR4 had not reported 'Observation Left'.

c. At the point the breakaway manoeuvre was initiated the Typhoon was positioned aft of the hose basket with a flightpath of just less than 1° above the horizon and 7kts closure.

d. Displacement achieved from the tanker during the breakaway manoeuvre was 300ft low, swept in the 7 to 8 o'clock position at approx 0.2nm slant range.

THE VC10 PILOT reports that two Typhoons and a Tornado were the second and third serial respectively of a night AAR sortie in AARA5. The Tornado GR4 joined the VC10 in a safe and controlled manner and settled into a steady position and, he thought, called 'Observation Left'. The join and position were witnessed and confirmed visually by the tanker captain.

Typhoon (1) completed a second dry contact, before being moved to the reform position [right echelon] then Typhoon (2) was given the order to disconnect, which the pilot acknowledged.

Once out of contact and astern the hose, Typhoon (2) was given the order to 'Go Reform right'; the pilot acknowledged and the [VC10] engineer saw on the CCTV Typhoon (2) begin to move. The engineer then lost sight of Typhoon (2), the captain looked left and saw Typhoon (2) about 0.5nm astern and low and in the 7 o'clock position.

After the incident the Tornado initiated a climb to FL210 as he elected not to refuel, but to RTB and was released by the tanker to contact Scottish Mill.

Typhoon (2) then regained leader and the Typhoon flight departed the tanker iaw published procedures. The VC10 crew continued its sortie without further incident.

UKAB Note (1): Since the incident was not reported on the frequency in use, ScATCC were informed of the incident after the event; however, they provided a comprehensive report. Following discussion with HQ Air BM SM it was agreed that there were no ATC aspects to this incident and for brevity the ScATCC report has not been included.

UKAB Note (2): HQ 2 GP (the VC10 operating authority) conducted a Non-Statutory Inquiry (NSI) into this incident**.** The Inquiry is 10 pages in length (plus additional Annexes) and is classified 'Restricted - Limited Distribution'; for brevity and to comply with the security caveats only the salient points are outlined below (disidentified).

REPORT INTO AIR SAFETY OCCURRENCE ON 25 JAN 12 – TYPHOON FGR4 REG XXX AND TORNADO GR4 REG YYY - *[abbreviated and disidentified]*

Description of Events.

The Typhoon flight, a 2 ship of Typhoons, was tasked to fly a night CT sortie from RAF Coningsby comprising a transit to AARA 5 for non-EO AAR with a VC10, followed by 1v1 intercepts. The sortie had originally been programmed as a 3-ship, but very early in the planning process this was reduced to a 2-ship.

The Tornado flight, a 2 ship of Tornado GR4s, was tasked to fly a night EO Close Air Support (CAS) sortie from RAF Lossiemouth as part of a Sqn pre-deployment trg package for an operation. During the planning process it became evident that the VC10 would be available for night AAR, and the plan was amended to allow the Tornado leader to conduct EO AAR at the start of their sortie while the No 2 conducted CAS in the Dufftown area. After takeoff, the Typhoon flight and the Tornado leader both routed direct to AARA 5 to RV with the VC10 at FL200 and 280kts. The Typhoon flight was the first of the 2 elements to join the VC10, although not the VC10's first receiver; Lossie XX (a single GR4) had already completed AAR and departed from AARA 5. The Typhoons' transit and join

were uneventful and as the aircraft approached the observation left position (but before they were able to make their "observation left" R/T call) the VC10 cleared Typhoon 1 astern the right hose and Typhoon 2 astern the left hose. Typhoon 1 continued as directed but at this stage Typhoon 2 had indications of a minor fuel imbalance and maintained observation left for a further minute until the problem was rectified. Typhoon 2 then proceeded astern the left hose. Both Typhoons manoeuvred normally around the VC10 and had successful contacts. During this passage of flight the Tornado leader was cleared to join the VC10 and checked in on the boom frequency aware of the two Typhoons in contact.

Once fully refuelled Typhoon 1 requested disconnect and reconnect for a dry AAR contact and was cleared to do so. Upon completion of the dry contact Typhoon 1 was cleared to disconnect and subsequently cleared to the reform right position, and Typhoon 2 was cleared to disconnect. At this stage the Tornado was approaching the observation left position and with both crew on NVGs the VC10's external lighting began to interfere with the Tornado pilot's NVGs. He briefly halted his approach short of the observation left position to raise his NVGs; the WSO's NVGs remained down. At the same time that the Tornado pilot raised his NVGs and was about to drive forward to the observation left position, the pilot of Typhoon 2 disconnected and, once he assessed he was stabilised astern, looked inside the cockpit to identify the fuel probe switch. The VC10 crew cleared Typhoon 2 to the reform right position. Unable to immediately identify the probe switch, the pilot of Typhoon 2 looked up after approximately ½ second to be faced with a perception of an upwards closing vector towards the VC10 wing-tip. Instinctively he took evasive action by rolling to ~95º AOB and applying full back stick. The Tornado crew was able to glimpse this manoeuvre occurring, and the pilot pulled aft on the stick in an attempt to gain separation. The Tornado pilot does not believe this action took place quickly enough to have reduced the collision risk.

Typhoon 2 is assessed to have passed underneath the Tornado with a miss-distance estimated by the crew of the Tornado as 20 to 30ft (the proximity was such that the crew felt disturbed airflow as Typhoon 2 passed below them). Once the collision vector with the VC10 was broken, and unaware of having passed close underneath the Tornado, the pilot of Typhoon 2 rolled back on to the tanker's heading and stabilised 500ft low. The Tornado pilot continued climbing to FL210 and informed ATC of his change of altitude. Typhoon 2 pilot acknowledged his clearance to reform right and reported that he had "had to breakaway" and then, once stabilised, continued with his clearance to join Typhoon 1 in the reform right position.

From the reform right position Typhoon 1 had seen Typhoon 2 disconnect and stabilise astern the left hose, but had not perceived any drift from that position before he saw Typhoon 2 execute the evasive manoeuvre. Typhoon 1 did not see the Tornado until it began to climb away from him.

Based on the witness statements and the HUD footage, the Panel does not consider that the collision risk with the VC10 was as high as was perceived by the pilot of Typhoon 2. Nonetheless, given the perceived level of collision risk, the pilot of Typhoon 2 reacted instinctively and in an understandable manner.

The Tornado crew briefly discussed the incident in-cockpit and elected to terminate their sortie and RTB, passing their intentions to the VC10 (a full transcript of intercom and R/T calls is at Annex A [not published]). The R/T calls at this point made it difficult for any of the aircrew to gain a full understanding of what had taken place, although each crew had a picture of what they believed to have occurred which shaped how they continued with their sorties.

a) Tornado. The Tornado crew felt that they had almost collided with Typhoon 2 and were sufficiently shaken to discontinue all tactical aspects of their sortie and return to RAF Lossiemouth. Airborne submission of an Airprox report was discussed but discounted, as the Tornado pilot wished to fully confirm his understanding of events before raising a report.

b) Typhoon. The Typhoons were now both fully fuelled and needed to reduce weight before landing, either by continuing with the intercepts or in some other manner. Having confirmed that Typhoon 2 was content to continue the sortie, Typhoon 1 judged that continuing with the briefed serial was the most appropriate course of action, and the Typhoon flight departed AARA 5 and completed an uneventful 1v1 Intercept profile. Typhoon 2 did not consider airborne submission of an Airprox report as he was not fully aware of the proximity between the two aircraft. Once all aircraft had recovered to their departure bases the crews conducted telephone debriefs to ascertain the facts of the incident. The Tornado crew and Typhoon 2 pilot agreed to submit ASORs via ASIMS and the captain of the VC10 made a full note of the events prior to discussing his requirement for Airprox reporting with the Sqn leadership.

c) VC10. The VC10 crew understood that there must have been a collision risk between Typhoon 2 and the Tornado and that they had not contributed to the incident in any way. The captain elected to continue with the sortie as planned and had no intention of submitting an Airprox report whilst airborne as he did not believe they had been directly involved.

Determine the Cause of the Occurrence and Examine Contributory Factors.

a. Cause. The Pilot of Typhoon 2 became disorientated astern the left hose of the VC10 whilst attempting to stow the probe.

b. Contributory Factor. The pilot of Typhoon 2 assessed that avoiding action was necessary to prevent a collision with the VC10.

c. Other Factor. The momentary pause in the Tornado's progress towards the observation left position put him in the flight path of Typhoon 2 during the latter's avoidance manoeuvre.

The Board reviewed the relevant Tornado and Typhoon publications and instructions and as a result made the following recommendations:

Recommendations:

(1) Advice on disconnecting from the tanker in the TGRF HB and the TUG [respective ac type handbooks] should be amended to specify that: "when safely established in the reform position pilots should then commence the After Refuelling Checks". This wording is specifically intended to prevent pilots from attempting to stow the probe whilst in the astern position.

(2) Advice on conducting pre-AAR checks in the TGRF HB and TUG are aligned to utilize the TGRF HB wording, which does not prohibit initiation of the checks before reaching the observation position.

(3) Chapter 9 of the TGRF HB should be amended to include specific advice on mixed NVG and non-NVG AAR, with an emphasis on when to lift NVGs during a join so as to not interfere with a smooth join to the observation position.

(4) Typhoon, Tornado GR4 and Brize Norton StanEval teams convene a meeting to discuss the NSI Panel's report and agree relevant amendments to the TGRF HB and TUG, to include agreement on use of the ATP-56(B) definitions for all AAR positions, and depiction of same in the TGRF HB and TUG

(5) Typhoon StanEval should include advice on night AAR in the TUG, based on the advice in the TGRF HB and that in the Typhoon StanEval AAR Brief.

Initial Response to the Incident.

A full transcript of R/T calls during and immediately after the incident between the VC10, the Typhoon formation and the Tornado, along with cockpit intercom from the Tornado was provided. The Panel considered two aspects of the initial response to the incident to be worthy of comment.

a. Communications. A previous Aircraft Accident Report highlighted the compelling need to fully communicate any incident around tanker aircraft that is not immediately apparent to the formation leader, and the Panel believed that a few short calls to establish what had happened would have allowed all aircraft to make a fully informed approach to the conduct of the remaining sortie time. The Panel considered that the lack of precise terminology during the immediate aftermath of the incident was not conducive to building an accurate picture of events amongst the VC10, the Typhoons and the Tornado. Typhoon 2 used the term "breakaway" to describe the avoiding action he took to remove his perceived collision risk with the VC10. This is a specific term used during the conduct of AAR defined in ATP 56. Rather than conducting a breakaway, the Typhoon was taking avoiding action to stop a potential collision risk.

b. Airprox Reporting. As soon as possible after being involved in an Airprox, the pilot of a British Military aircraft is to make an initial report to ATC (MAA Regulatory Publication-Gen-RA1410(1) Para 45-49.). In the case of the incident under investigation, none of the pilots made an airborne filing of an Airprox report, and it was not until after subsequent discussion on the ground that initial reports were made. The Tornado and VC10 pilots both submitted ASORs linked to an Airprox, whilst Typhoon 2 submitted an ASOR not linked to an Airprox. The Panel detected a widely held belief that the current Airprox investigation system is regarded by aircrew as taking too long.

Recommendations.

(1) The relevant sections of Air Staff Orders (ASO) for "Aircraft Accidents And Incidents" (ASO 425) be amended to incorporate a requirement to debrief, whilst airborne, all incidents considered likely to lead to submission of an ASOR and specifically all incidents occurring during AAR.

(2) ASO 425 be added to 2GASOs in a similar format to 1GASOs and AWCASOs, incorporating the debrief requirement at sub-para (1) above.

(3) Group Flight Safety Staff ensure that crews are refreshed on the requirements of MAA Regulatory Publication-Gen-RA1410(1) regarding Airprox reporting.

(4) Group Flight Safety Staff investigate the utility and speed of the current Airprox investigation system.

HQ AIR (OPS) comments that units are required by MAA Regulation to investigate their own Airprox, although this is only possible in practice for the most serious incidents. UKAB assessment of risk and cause normally waits for the outcome of such investigation so that they may be considered, and to avoid duplication of investigative effort. Most are left for the UKAB, with Air BM SM support, to investigate, which HQ Air recognises takes time. Furthermore, HQ Air recognises the efforts of the UKAB to reduce this time lag as much as possible, and also distributes the outcomes immediately and performs some limited analysis of the results to assist the units involved.

The Recommendations should prevent recurrence as long as the revised procedures are followed rigorously. This incident highlights that AAR, like many military aviation activities, requires high levels of attention and that things can go wrong very quickly. The dangers of self-induced distraction in close proximity to other aircraft, day or night, must always be considered; periods of 'heads-in' time in such scenarios must be minimised and much more time may be needed for any in-cockpit activity. Furthermore, the only safe breakout direction behind a tanker is directly backwards. Once the situation developed where a lateral movement was required, or was triggered instinctively, a conflict with joining traffic was always a possibility. The information that traffic was joining on the left was available in the Typhoon cockpit but was not able to be factored in at the time.

This incident serves as a salutary reminder that procedures need to be robust and rigorously applied when conducting such potentially hazardous activities.

AIRPROX REPORT No 2012009

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of all 3 ac, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved, a copy of the HQ 2 Gp NSI and reports from the appropriate ATC and operating authorities.

The Board was briefed that, following discussion with the UKAB Secretariat, HQ Air had recommended that an independent NSI be conducted since the UKAB Secretariat lacked the in-depth knowledge of current night AAR procedures.

The Board agreed that the NSI instructed by HQ 2 Gp and provided in full to the UKAB was comprehensive, had identified the cause and relevant factors and had made appropriate recommendations. The Board therefore accepted the report and the HQ Air comment without reservation or further remark; that being the case it was agreed that it would form the basis of the UKAB investigation. Subsequent Board discussion of this most serious incident was therefore confined to assessing the degree of Risk; Members agreed unanimously that there had been a serious risk of collision. Members observed and welcomed that most of the follow-up actions had already been initiated.

The UKAB agreed that there was a perception, identified in the NSI, that many pilots (not only military) believe that Airprox investigations take too long; this has already been identified and addressed both by the UKAB internally and partner organisations. This has resulted in a significant shortening of the process, from about 6 months to just over 3 months, with no reduction of investigation depth or quality.

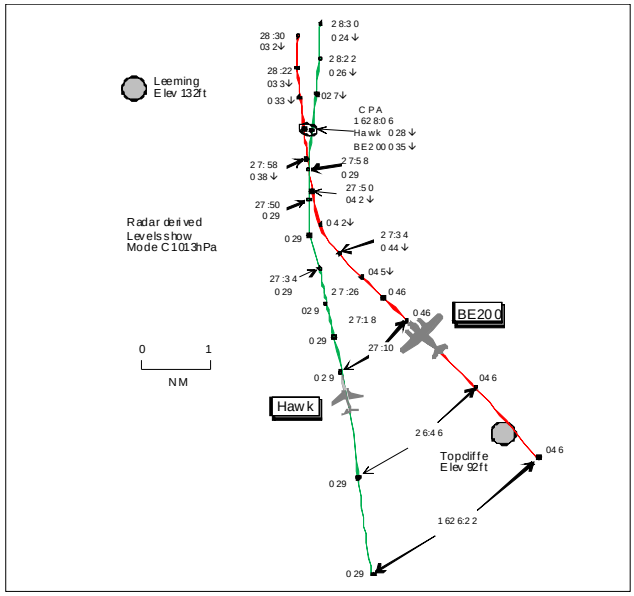
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Attempting to stow the probe while astern the VC10's left hose, Typhoon 2 pilot became disorientated and broke away into conflict with the joining Tornado, which he did not see.

Degree of Risk: A.

AIRPROX REPORT NO 2012010

Date/Time:	1 Feb 2012 1628Z	
Position:	5417N 00128W (2·5nm ESE Leeming - elev 132ft)	
Airspace:	Vale of York AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk1	BE200
Operator:	HQ Air (Ops)	Civ Comm
Alt/FL:	3500ft	4000ft↓
	QFE (1034hPa)	QNH (1038hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	40km	8km
Reported Separation:		
	200ft V	Not seen
Recorded Separation:		
	700ft V/0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T MK1 PILOT reports inbound to Leeming and in receipt of a TS from Leeming DIR on 231·45MHz squawking an assigned code with Modes S and C. The visibility was 40km flying 500ft below cloud in VMC and the ac was coloured black with HISLs switched on. On recovery for a radar to ILS approach they were cleared for descent to 3500ft QFE 1034hPa heading 010°. On levelling-off about 10nm W of Linton-on-Ouse at 230kt they were given TI on a calibrator ac 1600ft above descending in their 2 o'clock range 4nm. A thin solid cloud layer with base 4000ft prevented them visually acquiring the other ac. Passing Topcliffe they were given a traffic update and on this occasion a gap in the cloud allowed them to obtain a 'tally' on traffic, a low-wing twin-engine type, in their 2 o'clock about 2nm tracking N about 1000ft above and only slightly slower than themselves. It became visually apparent that the ac was descending and their converging tracks would take their ac underneath the Calibrator by a few hundred feet. Just as they passed directly beneath the Calibrator at about 200ft MSD (visually assessed) the Calibrator turned R onto 010° and continued descent on top of them. He immediately turned NE and pushed down (bunted) to 3200ft, below their cleared level but with the ground in sight, to avoid the other ac's descent. Further descent clearance was then given to 1600ft and the ILS was flown without further incident whilst maintaining 'tally' on the Calibrator as it turned NW and descended to about 2000ft to transit to the N of Leeming. He assessed the risk as medium.

THE BE200 PILOT reports inbound to Durham Tees Valley VFR and in receipt of a TS from Leeming Zone, he thought [actually during transfer from Linton-on-Ouse to Leeming], on VHF, squawking 0024 with Modes S and C; TCAS 1 was fitted. The visibility was 8km flying clear below cloud in VMC and the ac was coloured blue/white with nav, strobe and anti-collision lights all switched on. They were performing a calibration task for Topcliffe and were routeing into the Topcliffe O/H at around 4000ft when the radar assessors informed them that they were 'task complete' and cleared to RTB. The FO informed Zone that the task was complete and they would RTB, and they took up a direct track to DTV. At this point he initiated a descent at 200kt as they were fairly close to DTV and needed to lose height. They were also approaching a thin layer of cloud which they wanted to descend below to remain in sight of the surface to facilitate a visual recovery into DTV. About this time Zone passed TI on a Hawk ac inbound to Leeming but this traffic was not sighted at any time by them, he thought. As they had not been handed-over to DTV he initiated a L turn onto approximately 330° to remain clear of the DTV CTR and, owing to the traffic call from Zone, he levelled-off at around 3000ft to remain clear. They were handed to DTV and completed a visual approach to land. He was not aware of any Airprox occurring and there was no warning of traffic on the TCAS system.

THE LEEMING DIRECTOR reports operating as the LEO conducting an examination of DIR. A Leeming Hawk was handed over from ACC approximately 25nm S of Leeming for an ILS to RW16 under a TS. The Hawk was

given descent initially to 3500ft QFE and TI was passed to Linton-on-Ouse (LOO). During the descent TI was passed to the Hawk pilot on an ac wearing a Calibrator squawk (indicating below) and the Hawk subsequently levelled-off at a height below the Calibrator ac and at this stage the 2 ac were still laterally separated. The Hawk pilot requested to amend his approach to a PSPC and was subsequently turned from his initial NW'ly heading onto a more N'ly track for a LH pattern (terrain and avoidance areas to the W of Leeming prevent an effective PSPC from being conducted RH). TI on the Calibrator ac, now on a slowly converging heading, was provided on several occasions. Whilst the Calibrator was indicating level with vertical separation of 1600ft based on Mode C, the Hawk pilot eventually gained visual contact. At a position 4nm SE of Leeming the Hawk pilot reported the Calibrator ac descending from a position directly above. The Hawk flight was then given descent to 1600ft (pattern height) and the pilot reported the Calibrator was now separated by 200ft vertically, then 100ft. At the time that the Hawk was given descent to 1600ft, Mode C indicated no less than 500ft vertical separation. The Calibrator flight was shortly thereafter in receipt of a service from Topcliffe Approach (collocated in the Leeming ACR) allowing separation to be maintained for the remainder of the Hawk's approach.

THE LEEMING ZONE CONTROLLER reports covering the Topcliffe Approach position, a standard operating practice during periods of low intensity. At 1628 DTV passed a pre-note on transit traffic routeing S from DTV and during the landline conversation a Calibrator flight free-called on the Topcliffe Approach frequency requesting a TS en-route to DTV and reporting in the descent to 3000ft on 1038hPa (believed to be the DTV QNH). The Calibrator pilot gave no position information during his initial call and the ac was believed to be E abeam Leeming. The Calibrator flight was instructed to squawk ident and, after a short delay, was placed under a TS as requested. The Calibrator was subsequently pre-noted to DTV during the continuing and, at times, convoluted ongoing landline conversation. Leeming Supervisor requested the level that the Calibrator was descending to and its pilot, when asked, reported that he was now descending to 2000ft on 1038hPa. By now the Calibrator was 4nm NE Leeming and in proximity to an ac working Leeming DIR, squawking 0411. The Calibrator pilot was given TI on the Hawk which was conducting a PSPC to Leeming and currently maintaining 1600ft on 1034hPa (Leeming QFE). Additional TI was given on the Hawk which was now 2nm SW tracking W and indicating 700ft below. Shortly after this the Calibrator pilot reported visual contact with the Hawk. The Calibrator pilot was then instructed to maintain his current heading in order to remain clear of the Leeming radar pattern and to continue with DTV.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a Hawk operating IFR in receipt of a TS from Leeming (LEE) DIR being vectoring for an ILS approach and a BE200 operating VFR. The BE200 had been in receipt of a TS from Linton (LIN) Zone up until 1627:40, 33sec prior to the CPA. Both crews reported VMC, with the Hawk pilot reporting a thin, solid layer of cloud with a base at 4000ft. The respective crew's assessment of in-flight visibility differed, with the Hawk reporting unlimited visibility and the BE200 reporting 8km.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated. Initial comparison of the radar replay and LEE tape transcript proved that a 42sec discrepancy existed between the 2 time-bases. Comparison of the radar replay and LIN tape transcript proved that a 15sec discrepancy existed between the 2 time-bases; transcript times were subsequently amended to correlate with the radar replay.

Analysis of the radar replay and tape transcript demonstrated that the BE200 crew free-called LEE Zone 3sec after the CPA. The BE200 had previously been in receipt of an ATS from LIN Zone, whilst conducting a flight check in the vicinity of Linton, on surveillance radar located at RAF Topcliffe, operated by 90 SU. However, due to the length of time taken to establish that the BE200 had been working LIN Zone and that the controller concerned was unavailable due to PDT, no report from LIN Zone was completed in time to inform this investigation.

LEE DIR was manned by a trainee under examination and the Unit's LEO and reported low workload and task complexity with only the reporting Hawk on frequency. LEE Zone reported their task load and complexity as low and, at the point of the CPA, were not working any traffic. Based on analysis of LIN Zone's tape transcript, their workload appeared to be moderate.

The incident sequence commenced at 1621:05 when the Hawk flight called LEE DIR on handover from LATCC(Mil), descending through FL148 for FL100, 9·2nm SSW of the BE200 which was indicating FL046. The Hawk flight was placed under a TS which was, "*reduced...due to limited surveillance performance*."

[UKAB Note (1): Following RT exchanges it was established the Hawk pilot was requesting radar positioning to an ILS RW16 and DIR issued a turn onto 330° (L 10°) and a descent to 3500ft LEE QFE 1034hPa, which was all correctly read back.]

At 1622:03, LEE DIR contacted LIN Zone on landline to pass TI to them on the Hawk, due to its proximity to LIN and Church Fenton, stating the Hawk was inbound to Leeming for the ILS RW16 descending to 3500ft QFE.

Following an instruction to turn L onto heading 320°, at 1622:52, LEE DIR provided the Hawk pilot with TI on the BE200, stating *"(Hawk c/s) traffic right, two o'clock, five miles* (radar replay shows 6·9nm)*, similar heading, four hundred feet below (*radar replay shows 800ft above) *Calibrator",* which was acknowledged.

At 1623:02, the 'live mic' facility captured a conversation between LIN Zone and LIN Supervisor. This involved the Zone controller moving to the APP position and band-boxing these two positions. From 1623:29, Zone had assumed responsibility for this band-boxed control position.

At 1623:08, the Hawk pilot, having levelled at 3500ft QFE and indicating FL029, requested LEE DIR to update him on the range of the BE200; LEE DIR replied, *"(Hawk c/s) that previously reported traffic is now right, three o'clock, six miles, similar heading, slow moving, indicating one thousand feet above* (radar replay shows 1700ft above)*."* During the incident sequence, the BE200 maintained between 200 and 225kt GS, broadly similar to the Hawk.

After being given TI on traffic in the LIN visual cct, at 1624:31 the Hawk pilot requested a, *"short pattern if able*" which was approved by LEE DIR and a vector onto 360° was given. At this point, the BE200 was 7·3nm NE of the Hawk maintaining FL046.

Between 1625:02 and approximately 1625:42, LIN Zone was involved in receiving a handover on an un-related LARS transit. Between these times, separation between the Hawk and BE200 closed from 6·5nm to 4·8nm, with both ac maintaining their indicated levels of FL029 and FL046 respectively.

After being given TI on traffic deemed to be in the Dishforth visual cct, at 1625:24 LEE DIR provided an accurate update of TI to the Hawk pilot stating, *"…that first called traffic the Calibrator right two o'clock, now five miles, crossing right to left, one thousand seven hundred feet above*", which was acknowledged by the pilot. Shortly afterwards at 1625:39, the Hawk pilot asked whether the Calibrator (BE200) was, *"…maintaining his height?*" There was no initial response from LEE DIR and at 1625:45 the Hawk asked again whether the Calibrator (BE200) was, *"maintaining his present level?"* LEE DIR replied, *"…affirm, maintaining flight level four-six on radar"* which was acknowledged.

Between 1626:05 and approximately 1626:41, LIN Zone was involved in landline liaison initially with LIN TWR then LIN Ground about un-related traffic. Between these times, separation between the Hawk and BE200 closed from 3·9nm to 2·6nm, with both ac maintaining their indicated levels of FL029 and FL046 respectively.

At 1626:22, LEE DIR provided a further, accurate update to the TI on the BE200 to the Hawk pilot stating, *"...last reported Calibrator right, two o'clock, three miles, crossing right to left, one thousand six hundred feet above*." The Hawk pilot replied, *"...he's above the cloud layer, so unfortunately I can't* [inaudible] *I can't see him*", which was acknowledged by LEE DIR.

Between 1626:44 and 1627:15, LIN Zone was involved with identifying and applying a BS to an unrelated rotary-wing undertaking a LARS transit to Dishforth. At the completion of this exchange of RT, 1·2nm lateral separation existed between the Hawk and BE200, with both ac maintaining their indicated levels of FL029 and FL046 respectively.

At 1627:10 LEE DIR provided a further update to the TI on the BE200 to the Hawk pilot stating, *"…last reported track Calibrator now right, two o'clock at one and a half miles, crossing right to left, one thousand seven hundred feet above."* The Hawk pilot replied that they were, *"now visual (Hawk c/s)"* later reporting that they gained visual through "a gap in the cloud" and remained visual throughout the remainder of the incident sequence.

At 1627:23, with 0·9nm lateral separation existing, LIN Zone asked the BE200 crew, *"…whether I need to hand you back over to Topcliffe, are you err likely to be coming back out down towards Linton?"* Initially, the BE200 crew asked LIN Zone to, "*standby.*" Concurrently, at 1627:23, LEE DIR became involved in landline liaison with Durham Tees Valley radar, passing them TI on the Hawk, with the landline being transferred to LEE Zone at 1627:47 to receive a pre-note. At 1627:26, the BE200 commenced a descent and then, at 1627:38, with 0·3nm lateral and 1500ft indicated vertical separation, the crew stated that, *"…it looks like we're complete now and request descent and V-F-R back in err Teesside."* LIN Zone acknowledged the BE200 crew's transmission and suggested that they,

"err free call err Leeming err correction, Topcliffe Approach, one-two-five-decimal-zero before going en-route." At this point, 0·2nm lateral and 1300ft indicated vertical separation existed. The BE200 crew acknowledged this instruction, going en-route at 1627:55.

At 1627:47 LEE DIR instructed the Hawk pilot to, *"…turn right heading zero-one-zero degrees"* which was acknowledged. At this point, the BE200 was 0·1nm NE of the Hawk, indicating descent through FL042 and had, simultaneously, also turned onto a track of 010°, as reported by the Hawk pilot. At 1627:50, 0·1nm lateral and 1300ft vertical separation existed between the 2 ac. At 1627:56, the Hawk pilot asked LEE DIR, *"...is that the Calibrator directly above us?"* and LEE DIR replied, *"…affirm, directly above you*." At this point, the BE200 was 01nm NNW of the Hawk indicating descent through FL038, vertical separation 900ft.

[UKAB Note (2): The CPA occurs at 1628:06, the Hawk pilot having commenced descent and turned onto a NNE'ly track to deconflict from the BE200, as reported; the Hawk shown passing FL028 with the BE200 0·1nm to its W passing through FL035, 700ft above. The next sweep shows vertical separation as 600ft but lateral separation has increased to 0·2nm.]

The BE200 crew did not visually acquire the Hawk [until it was on L base leg and passing 2nm to its NE 700ft below] and reported that they had no indications on TCAS of the Hawk's presence. No TI was passed by LIN Zone to the BE200 flight at any point during the incident sequence. LEE DIR did not update the TI to the Hawk to state that the BE200 had commenced a descent.

[UKAB Note (3): At 1628:20 the Hawk pilot transmitted, *"(Hawk c/s) approximately two hundred feet above* (inaudible)*"* to which LEE DIR replied *"…apologies say again"*. The Hawk pilot response was, at 1628:27, *"Er now abeam the er Calibrator and about half a mile and he's 100ft above us"*. LEE DIR then instructed the Hawk pilot to descend to height 1600ft which was correctly read back.]

The BE200 flight free-called LEE Zone at 1628:16 stating that they were, *"…descending altitude three thousand feet, one-zero-three-eight, requesting a traffic service and visual approach back into Durham Tees Valley."*

In terms of the initial TI by LEE DIR at 1622:52, given the discrepancy between the transcript and radar replay and the fact that the Hawk was descending at this point, some difference between the controller's reported height and that presented on the radar replay should be expected. Whilst a difference of 1200ft might suggest a perception/calculation error on the part of the controller, the LEO has confirmed that the initial TI was accurate. However, the LEO has stated that the controller may have made a perception/calculation error in terms of the update given to that TI at 1623:09. That said, given the presence of the cloud layer, this error did not affect the timeliness of the sighting of the BE200 by the Hawk pilot. Furthermore, the 3 further updates on the TI were accurate, enabling the Hawk pilot to continue to develop his mental picture and to visually acquire the BE200 at 1627:16 through the gap in the cloud. The Hawk pilot subsequently maintained visual contact with the BE200 and discharged his responsibility to avoid it, once he perceived that the BE200 was descending and had become a threat. Although a hindsight bias argument could be created to suggest that LEE DIR could have updated the TI to state that the BE200 was descending, this would not have affected the outcome of the Airprox as the Hawk pilot was visual with the BE200 from 1627:16. Moreover, beyond the Duty of Care laid down in CAP 774, there is no clear regulation or policy to determine a controller's responsibilities in these instances.

In terms of the ATS provided by LIN Zone, notwithstanding the pilot's responsibilities to "discharge his collision avoidance responsibility without assistance from the controller" there was a clear requirement for them to have passed TI to the BE200; it has not been possible to conclusively determine a cause for the lack of TI.

Given the respective tracks and vertical profiles of the Hawk and BE200, it might have been reasonable to expect that the TCAS equipment on the BE200 had given some indication of the Hawk's presence. The fact that it did not suggests either a malfunction or an incorrect mode selection on the part of the BE200 crew.

As an observation, given that this was neither a causal nor contributory factor, whilst the inclusion in TI of descriptions of relative speed should be encouraged as they assist the pilot in developing their mental picture, controllers must ensure that they are accurate. LEE DIR's inaccurate description of the BE200 as *"slow moving"* at 1623:08 could have painted an erroneous picture for the Hawk pilot, suggesting that he would rapidly overtake the BE200 down its port-side.

The BE200 and Hawk were on conflicting flight profiles within Class G airspace and the LEE ATM related safety barrier operated effectively, enabling the Hawk pilot to discharge his responsibility to "see and avoid."

HQ AIR (OPS) comments that it would perhaps have been prudent for the BE200 crew to take a DS from LIN, before commencing his descent. It is also surprising that no coordination took place between LIN and LEE ATC (other than the call at 1622:03) given the proximity of the 2 ac. However, ultimately the Hawk pilot was responsible for collision avoidance, and once he called 'visual' (or 'tally' in this case) he should have been aware that under CAP774 (ATSOCAS procedures) he was then required to take action as required to prevent the conflict with the BE200. If he had wanted ATC to provide vectors to ensure separation with the BE200 he should have asked for a DS. HQ Air has recently re-publicised the need for military aircrew to be familiar with the content of CAP774 and re-iterated the responsibilities of aircrew with respect to collision avoidance. This will hopefully reduce the likelihood of reoccurrence of events of this sort.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Military controller Members thought that LIN Zone had not given the BE200 crew a good service. When it became apparent to Zone that the BE200 had completed its task and was requesting descent, Zone had free-called the flight to Topcliffe APP without either a handover or, more importantly, TI being passed on the converging Hawk below. In the absence of TI, the BE200 crew was unaware of the Hawk and descended into conflict with it, causing the Airprox. Members questioned the BE200 crew's flight rules (reported as VFR) and the appropriateness of the TS during their descent through a cloud layer, placing the flight in IMC. A DS would have been better in the circumstances to ensure that deconfliction minima were applied until the flight was able to become VMC. As it was, for whatever reason, the Hawk's presence was not detected on the BE200's ACAS and so the crew was descending effectively without any SA on the potential conflict. Fortunately LEE DIR had been watching the BE200 converge and had passed TI on several occasions to the Hawk pilot which built his SA on its passage. Military pilots Members wondered if the Hawk pilot, whilst being vectored under a TS, was expecting ATC to separate his ac from other traffic. Under the TS the pilot is responsible for maintaining his own separation from other traffic although ATC should not knowingly vector the ac into conflict with other traffic. During this encounter, the tactical vectoring given by LEE DIR steered the ac towards the radar cct pattern but vertical separation pertained up until the BE200 commenced its descent when NW of Topcliffe. Eventually as the BE200 descended through the cloud layer the Hawk pilot saw it directly above and took his own separation on it by turning and descending, which the Board concluded had removed any risk of collision.

The HQ Air Ops Members informed the Board that on the 14th Feb a Safety Bulletin was issued to military aircrew re-iterating the services available under ATSOCAS.

PART C: ASSESSMENT OF CAUSE AND RISK

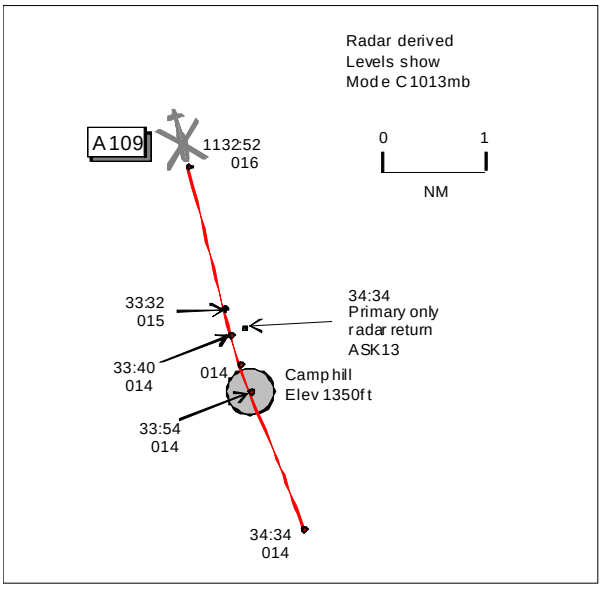
Cause: In the absence of TI from Linton Zone, the BE200 crew descended into conflict with the Hawk.

Degree of Risk: C.

AIRPROX REPORT No 2012011

AIRPROX REPORT NO 2012011

Date/Time:	1 Feb 2012 1134Z	
Position:	5318N 00144W (O/H Camphill G/S - elev 1350ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ASK13	A109
Operator:	Civ Club	Civ Pte
Alt/FL:	100ft ↑ QFE	500ft agl
Weather:	VMC CLBC	VMC NR
Visibility:	>50km	10km
Reported Separation:	400ft V	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK13 PILOT reports flying a dual training sortie from Camphill and in communication with Camphill Radio on 129·975MHz; no transponder was fitted. The visibility was >50km below 4-5/8 cloud base of 1500ft with a moderate/fresh E'ly wind and the ac was coloured white/orange. He was the Duty Instructor seated in the front seat and about to take-off to the N to carry out some instructor training when they heard and saw a helicopter ahead. The red coloured helicopter was fairly large with a single main rotor with a flat underside and retractable undercarriage. It flew S along the W facing slope at the W edge of the airfield at an estimated height of 500ft. As it passed the windsock the helicopter turned 15°L and flew directly O/H the winch launch point. At the time, they had just commenced a launch heading 360°, which they chose to continue since the helicopter was passing 400ft O/H just as they left the ground climbing through 100ft QFE at 55kt. They did have the option of releasing the cable and abandoning the launch if they were going to climb into the path of the helicopter. They felt some turbulence from the wake during the launch but nothing excessive. He assessed the risk as low. If they had launched 30sec to 1min earlier then the helicopter would almost certainly have flown into the winch cable (about 4mm diameter and thus invisible to passing ac) with catastrophic consequences.

THE A109 PILOT reports en-route to Shoreham from a private site near Skipton and was not in communication with any ATSU, he thought, [see ATSI report] squawking with Modes S and C. The visibility was 10km in VMC and the helicopter was coloured burgundy with nav lights switched on. Cruising at 500ft at 140kt, he was heading S flying into sun on a route he flew regularly. He did not see the glider reported to him by RAC Mil and considered that he may have unintentionally flown close to Camphill glider site. He noted how difficult gliders are to see and opined that there are so many sites around and they are poorly marked on the UK 1:500000 maps. In future he intended highlighting all glider sites on his regular routes. He normally flies high or low past glider sites and avoids the cloud base level where gliders can often be found.

ATSI reports the Airprox occurred at 1133:45, O/H Camphill Gliding Site, within Class G airspace, between a Schleicher ASK13 glider and an Agusta A109 helicopter.

The ASK13 flight was commencing a winch-cable launch from Camphill Gliding Site and in communication with Camphill Radio (A/G), but not in receipt of an Air Traffic Control (ATC) Service. The A109 flight was operating VFR, on a flight from Skipton (private site) to Shoreham and, having just called East Midlands Radar, was in the process of being identified, prior to the agreement of a BS.

Camphill Gliding Site is marked clearly on UK Topographical Air Charts and is listed in the UK AIP ENR 5-5-1-1 (5 May 11) as a Glider Launching Site. centred on 531818N 0014353W, by winch/ground Tow with a vertical limit of 2000ft agl (elevation 1350ft), operating from sunrise to sunset.

CAA ATSI had access to RT from East Midlands Radar and area radar recordings together with written reports from both pilots. The weather provided is for Birmingham and East Midlands Airport.

METAR EGBB 011120Z 04011KT CAVOK 01/M03 Q1035=

METAR EGNX 011120Z 05013KT 9999 FEW020 02/M03 Q1036=

At 1132:50 the A109 pilot contacted East Midlands Radar, reporting 30nm NW of East Midlands, squawking 7000, at 2000ft on QNH 1036. The radar recording shows the A109, squawking 7000, 2·3nm NNW of Camphill, tracking 170° towards the O/H and indicating FL016 (2220ft QNH 1036hPa, 1hPa = 27ft). At 1133:20 the A109 pilot is asked to squawk 4555 and, at 1133:40, the radar recording shows the A109 transponder code change to 4555 with the helicopter 0·6nm NNW Camphill, indicating FL014 (2020ft QNH 1036hPa). Sixteen seconds later the A109 passes O/H Camphill, now tracking 160° and still showing FL014 (2020ft QNH) approximately 650ft aal.

At 1134:34, the radar recording shows the A109, 1·5nm SSE of Camphill and also shows a primary contact appear 0·6nm N of Camphill. This is believed to be the ASK13 glider departing after the winch-launch.

At 1136.40, the controller identified the A109 25nm NW of East Midlands and a BS was agreed. The A109 pilot was asked to report approaching Derby. The East Midlands controller was not aware of the Airprox and no RT reports were received from the A109 pilot regarding gliding activity.

The A109 pilot contacted East Midlands Radar as it approached Camphill Gliding site. It was only after the Airprox had occurred that the controller was able to identify the A109 and agree a BS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members were clear that this incident could have been averted through thorough pre-flight planning by the A109 pilot. Route planning using the 1:500000 topographical chart should reveal any airspace hazard that may affect transit through an area, including glider sites. Camphill is marked clearly on the 1:250000 and 1:500000 charts with the site elevation and maximum altitude to which gliders can be encountered on the winch cable. It was unclear whether the A109 pilot was using an on-board navigation system/moving map in flight, the database of which may not show glider launching sites. Pilot Members opined that in transiting at low level, the A109 pilot was not giving himself much time to visually identify ground features, there being high ground to the NW of Camphill with the site situated on the edge of a W facing escarpment and valley. It is the responsibility of pilots to take due regard of airspace hazards and to ensure that any avoidance is taken by a suitable margin. In this case, the A109 pilot flew O/H the promulgated and active Camphill glider launching site below the maximum height of the winch cable and into conflict with the ASK13 which he did not see, causing the Airprox. Because of the helicopter's speed, the GA/gliding Member thought that it would have been difficult for the launch party to have detected the approaching A109 in time before the winch launch sequence had commenced. Fortunately the ASK13 pilot had heard and seen the approaching A109 and had quickly assessed that the launch could continue as there was the option to abort if circumstances changed. As it was, the A109 passed an estimated 400ft above the ASK13 as it climbed through 100ft just after take-off. Members agreed with the ASK13 pilot that there was the potential for a more serious incident if the helicopter had arrived O/H slightly later with the possibility of encountering the glider towards the top of its launch attached to the winch cable. However, in this case, although the ASK13 passed unsighted to the A109 pilot, the early sighting of the helicopter and subsequent actions taken by the glider pilot were enough to persuade the Board that any risk of collision had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

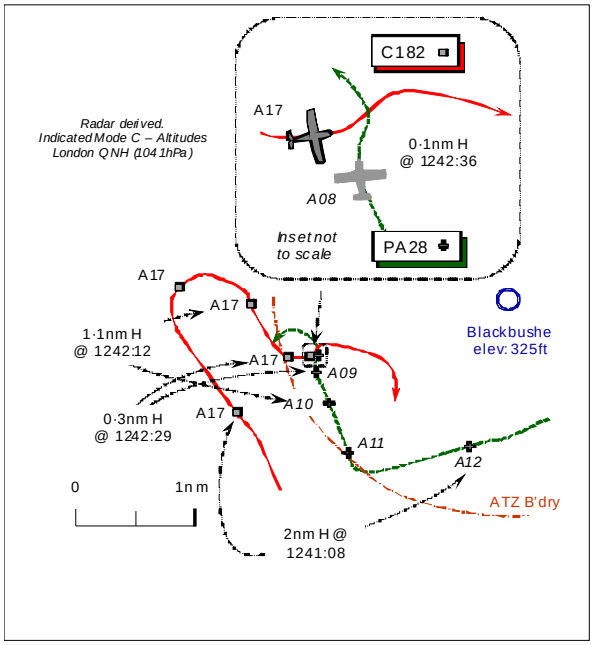
Cause: The A109 pilot flew O/H a promulgated and active glider launching site below the maximum height of the winch cable and into conflict with the ASK13, which he did not see.

Degree of Risk: C.

AIRPROX REPORT No 2012012

AIRPROX REPORT NO 2012012

Date/Time:	8 February 2012 1242Z	
Position:	5119N 00053W (1¾nm final RW07RHC @ Blackbushe - elev 325ft)	
Airspace:	Blackbushe ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28-151	C182
Operator:	Civ Trg	Civ Pte
Alt/FL:	550ft↓	↓800ft
	QFE (1028hPa)	QFE (1028hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	3-4nm	6-7nm
Reported Separation:		
	300ft V/300m H	NK
Recorded Separation:		
	Contacts merged with 900ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER PA28-151 PILOT, a flying instructor, reports he was instructing a low-hours student in the cct to RW07 RH cct at Blackbushe. They were in communication with the A/D FISO, C/S Blackbushe INFORMATION, on 122·300MHz whilst flying the student's fourth cct. Descending from 800ft to 550ft QFE (1028hPa) at 75kt his student, the PF, had just started to turn from R base onto final (340° - 070°) when he heard the pilot of another ac transmit on the RT what he believed at the time to be a call at LH base-leg for RW25. Thinking the pilot was landing on the reciprocal RW, he looked towards the area of base-leg for RW25, but then caught a glimpse of another aeroplane – the C182 - above him and to his L, in a L turn onto final for RW07. He took control from his student, applied full power and whilst remaining level at 500ft QFE turned towards the dead side - to the N of the RW centre-line. The C182 passed 300ft above him with a 'high' Risk of collision. He then made a somewhat heated radio call to Blackbushe INFORMATION before carrying out an orbit to the L and re-establishing his aeroplane on final approach to RW07, from which he landed.

Subsequently, he went up to the Tower to discuss the events with the FISO and advised that he would be filing an Airprox. His aeroplane is white with blue/black stripes; a squawk of A7010 [operating in a A/D traffic pattern] was selected with Mode C.

THE CESSNA C182 PILOT reports he was inbound to Blackbushe from Lee-on-Solent, VFR at 90kt and was in communication with Blackbushe INFORMATION on 122·300MHz; a squawk of A7000 was selected with Modes C and S on. The cloudbase was about 1700ft with poor visibility.

He was intending to pass to the E of Farnborough to join downwind for RW07RH at Blackbushe. However, he was asked by Farnborough ATC to pass to the W of Farnborough to allow traffic to depart from their airfield, which he complied with. This placed him in a position for a straight-in approach to RW07 at Blackbushe, giving way to cct traffic in the RH cct. After looking to his R, he saw no traffic downwind and declared that he was on final for RW07 at 800ft QFE. Some time later there was an outburst on the radio so he abandoned the approach and departed to the W to reposition and join downwind, from which he landed without issue. The PA28 was not seen.

Once on the ground he attempted to clarify the situation as he had no idea what had happened. Upon speaking with the Control Tower by phone, he believed he was told, incorrectly, that when he called final, there were two ac downwind; however, they were in a LH cct when the declared cct is RH for RW07. As he was on final looking to the R for traffic on a RH cct he did not see the traffic approaching from the L on a LH cct. Clearly, he did not see the PA28 but he was looking for ac approaching downwind from the R, not the L.

His aeroplane is white with blue stripes; the HISL, navigation and landing lights were on.

THE BLACKBUSHE FLIGHT INFORMATION SERVICE OFFICER (FISO) reports that two PA28s were flying ccts to RW07RH. The C182 pilot called for joining instructions and was advised that RW07RH was in use with 2 fixed-wing ac in the Blackbushe cct and given the QFE of 1028hPa. The C182 pilot read back the QFE and runway, he thought. [UKAB Note (1): However, the C182 pilot said RW05 not RW07.] The pilot's next call was for L base for RW05 (sic). He asked the C182 pilot his position and acknowledged his read back but he still could not see the aeroplane; the forward visibility looking to the W of the Tower was unofficially 10km+ but picking out a white ac against a grey sky is difficult. The C182 was seen just before the pilot made his final call so when the C182 pilot called final he advised him that there was one ac ahead on short final - depth perception putting the C182 behind the PA28. Apparently, the traffic ahead was not seen by the C182 pilot, but before the intentions of the C182 pilot could be clarified the PA28 pilot enquired what the C182 was doing. The PA28 pilot elected to orbit L to remain clear and the C182 pilot went around at cct height.

ATSI reports that the Airprox was reported to have occurred 1.7nm WSW of Blackbushe. The Blackbushe Aerodrome Traffic Zone (Class G airspace), comprises a circle radius 2nm centred on the RW07/25, except that part of the ATZ located S of the M3 motorway, from the surface to 2000ft above the aerodrome elevation of 325ft.

The PA28 was operating VFR in the RH cct for RW07 and was in receipt of a BS from Blackbushe INFORMATION on 122·300MHz. The C182 was operating on a VFR flight from Lee-on-Solent to Blackbushe and was also in receipt of a BS from Blackbushe INFORMATION on frequency 122.300MHz.

The Farnborough METARs:

1220Z 04012KT 9999 OVC016 M01/M03 Q1040=

1250Z 05011KT 9999 –SN OVC016 M00/M03 Q1040=

At 1241:00, the PA28 pilot operating in the RH cct for RW07 reported downwind for a touch and go and was instructed to report final. At 1241:08, the radar replay shows that the C182 was 2.5nm WSW of Blackbushe crossing the extended approach track for RW07RH S to N. The pilot of the C182 called Blackbushe INFORMATION and requested joining instructions. The FISO advised the pilot of the C182 that there were two fixed wing ac in the cct and that RW07 was in use, right hand.

[UKAB Note (2): The C182 pilot readback the QFE (1028hPa) "..*and runway 0-5 in use* [C182 C/S]", but the FISO did not query the incorrect readback of the RW at this point.

The C182 flew through the extended approach track for RW07RH and made a 180° R turn to position on L base. At 1242:12, the C182 pilot reported *"joining on left base for 05".* The FISO advised the pilot of the C182 that *"..we're 0-7 with a left hand circuit in use can you just say again your position",* mistakenly stating that the circuit was LH. The pilot of the C182 replied that he was *"to the left of the..05 runway".* At 1242:12 the C182 was on left base with the PA28 on right base. At 1242:29 the C182 turned onto final for RW07 from left base indicating 1700ft as the PA28 turned onto final from right base at 900ft. The two ac were 0.3nm apart. As the two ac established on final their tracks converged; the C182 at 1700ft and the PA28 at 800ft.

The written report from the FISO stated that he was not visual with the C182 until just before the pilot called on final. When the C182 pilot reported final the FISO advised that there was cct traffic ahead short final (the C182 appeared to the FISO to be behind the PA28). The pilot of the PA28 made a transmission expressing extreme concern at the proximity of the C182 and advised INFORMATION that he was orbiting at the upwind end of the runway. The report from the pilot of the C182 stated that he was unaware of the presence of the PA28 until the transmission from the pilot.

As both flights were VFR in Class G airspace, the pilots of both ac were ultimately responsible for collision avoidance.

The Manual of Flight Information Services, CAP410 Part B, Chapter 1, Page 1, Paragraph 7.4 states:

'Joining circuit

Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly.'

The FISO advised the pilot of the C182 that there were two fixed wing ac in the RH cct for RW07 and expected that the C182 pilot would position appropriately in the RH cct. Although the FISO subsequently misstated the cct direction as left-hand, the C182 pilot had already positioned on L base at that time so it is unlikely that this contributed to the Airprox. The Airprox occurred on final approach to Blackbushe, within the ATZ, when the pilots of both ac established on final at the same time from opposite base-legs, 900ft apart. The pilot of the C182 was advised by the Blackbushe FISO that there were two fixed wing ac in the RH cct. The pilot of the C182 did not conform to the established traffic pattern and positioned on L base.

As both ac were in Class G airspace, the pilots of both ac were ultimately responsible for collision avoidance. The pilot of the PA28 was concerned about the position of the C182 and took action to avoid it. The pilot of the C182 was unaware of the presence of the PA28 until the Airprox had occurred.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, radar video recordings, a report from the FISO involved and a report from the appropriate ATC authority.

When the C182 pilot called Blackbushe INFORMATION he asked for joining instructions; however, FISOs are not permitted to issue 'instructions' to pilots in the air and the FISO passed the essential information needed - that there were two fixed wing ac already in the cct and that RW07 was in use, with a right hand pattern. Nevertheless, the GA Member opined that the C182 pilot did not assimilate this from the FISO's transmission, nor scan for and locate the ac reported to be in the cct, instead joining from the opposite direction contrary to the Rules of the Air. The Board discussed whether the FISO had 'painted' a correct and satisfactory picture of the cct for the C182 pilot and whether the FISO should have added that the two ac already established in the pattern were 'ahead' in the cct. Controller Members who also undertake FISO duties opined that the difference between offering sufficient succinct information to be helpful to the pilot and not making it sound like an instruction can sometimes be difficult. In these circumstances, it would have been reasonable for the FISO to add that the two ac in the cct were ahead of the C182. Nevertheless, Members concluded the information provided was sufficient and it should have been evident to the C182 pilot that he would be joining an established RH traffic pattern with 2 other ac already circuiting, which he had to acquire visually and fit in with appropriately.

Sound pre-flight planning should have acquainted the C182 pilot with the RW layout and cct directions that he might expect to encounter when he arrived at Blackbushe. Therefore, it was unclear to Members why he had joined on a L base-leg and turned onto final without sighting the other two ac beforehand unless this was a delaying manoeuvre to give him time to spot the two PA28s. Despite the C182's indicated altitude this was evidently not a conventional overhead join nor in conformity with the established RH cct pattern. The C182 pilot's written report had made reference to flying a straight-in approach to RW07 and giving way to traffic in the RH cct, attempting to look R into the downwind for them. It was evident from the RT transcript and the recorded radar data that he had indeed crossed the extended centre-line and positioned for a L base-leg outside the ATZ. Nevertheless, as he could not see the PA28s beforehand, he could have asked the FISO where the other ac were, which would have assisted him with his responsibility to fit in with the traffic already in the pattern.

The Board noted that it was after the C182 pilot reported *"joining on left base for 05"* at 1242:12, that the FISO reaffirmed the RW in use as RW07, but mistakenly advised the C182 pilot that it was *"..with a left hand circuit.."*. The radar recording at this point shows the C182 already in a left-base position, well above the normal cct height. Therefore, the Board agreed that despite his error, the FISO's incorrect cct direction was not contributory to the Airprox. The Board was briefed that at this point the second PA28 was turning downwind with the subject PA28 on a R base-leg, 1·2nm directly ahead of the C182. The C182 pilot reports that the PA28 was not seen at all, perhaps because he was so high that the PA28 was obscured under the ac's nose making it increasingly more difficult to see as they flew closer together. A CAT pilot Member affirmed that the C182 pilot should have been searching for the two ac already in the cct before he attempted to join, whereas another Member suggested that

he might have become confused between RW07 and RW25 which is a LH cct, and muddled this into an erroneous *"..05.."*. It was suggested by a military pilot Member that the C182 pilot might not have spotted the PA28 because of the wide cct flown taking it just outside the ATZ boundary at the turn onto base-leg. However, at civilian A/Ds long downwind patterns are commonplace and it was only the student PF's 4th cct! Taking all these factors into account the Board concluded that this Airprox had resulted because the C182 pilot did not integrate into the established cct pattern and flew into conflict with the PA28, which he did not see.

Turning to the inherent Risk, it was evident that the FISO had spotted the C182 and advised the pilot about the PA28 ahead on final moments before the PA28 pilot himself spotted the other aeroplane above him. It was fortunate that the PA28 was a low-wing ac, which facilitated sighting the C182 above. Members then discussed the options available to the PA28 pilot after he spotted the C182 above him. His L turn into the deadside was contrary to the Rules of the Air, but the subsequent orbit ensured that his PA28 cleared away from beneath the C182 quickly and ensured that he did not turn into the second PA28 following as No2 in the pattern; in practice the No2 was unlikely to have caught him up at that stage if he flew the same wide pattern as that evinced by the radar recording. Nevertheless, the consensus amongst the Members was that an orbit on final was not ideal and a go-around at the cct height of 800ft QFE would have been preferable. Although he might have perceived the C182 was descending following its pilot's *"..turning finals"* call, the PA28 pilot's estimate of 300ft vertical separation was evidently less than it actually was at the time, given the significant height separation of 900ft unverified Mode C shown on the radar recording. The Board concluded therefore that the PA28 pilot's sighting of the C182 and subsequent avoiding action had forestalled a closer encounter and effectively removed any Risk of a collision.

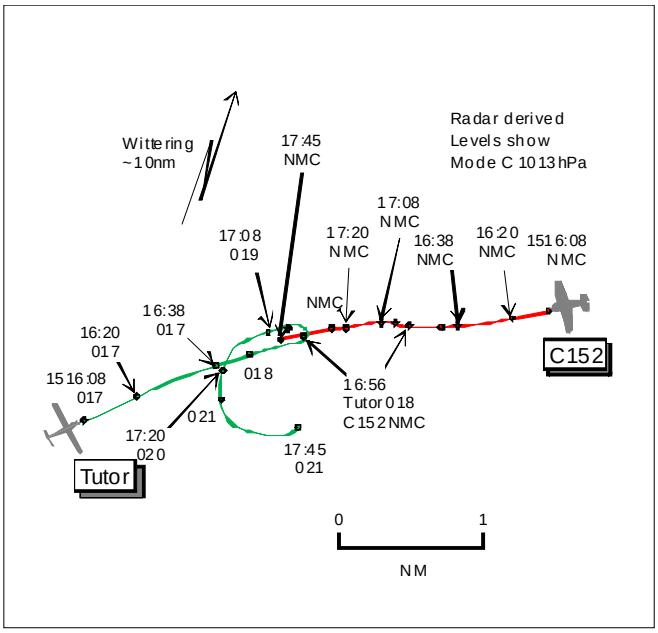
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C182 pilot did not integrate into the established cct pattern and flew into conflict with the PA28, which he did not see.

Degree of Risk: C.

AIRPROX REPORT NO 2012013

Date/Time:	14 Feb 2012 1517Z	
Position:	5226N 00032W (11nm SSW Wittering)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tutor	C152
Operator:	HQ Air (Trg)	Civ Club
Alt/FL:	2000ft	2000ft
	RPS (1018hPa)	QNH (1024hPa)
Weather:	VMC CLBC	VMC CLOC
Visibility:	15km	>10km
Reported Separation:		
	Nil V/1·5nm H	2-300ft V
		/>1000m H
Recorded Separation:		
	0·7nm H 1516:56	
	0·6nm H 1517:45	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUTOR PILOT reports flying a dual local navex training sortie from Cranwell, VFR and in receipt of a reduced TS from Cottesmore on 130·2MHz, squawking with Modes S and C. The visibility was 8-15km flying 2000ft below cloud in VMC and the ac was coloured white with strobe, landing and nav lights all switched on. Heading 055° out of sun at 120kt level at 2000ft RPS 1018hPa, TI was given at range 4nm and again at 2nm before a single-engine Cessna was seen visually in his 1 o'clock at range 1·5nm heading towards him at the same level. An emergency L break turn onto S was taken as avoiding action until he became visual with the Cessna again and the previous heading was resumed. No solid TAS data was available throughout the incident. He assessed the risk as medium.

THE C152 PILOT reports flying a dual local navex training sortie from Peterborough Conington, VFR and in communication with Conington Radio on 129·725MHz, squawking 7000 with NMC. The visibility was >10km flying clear of cloud in haze in VMC and the ac was coloured white/red/blue; ac lighting was not reported. About 2nm S of Oundle heading 281° (tracking 259°) flying into sun towards Harrington disused aerodrome at 2000ft QNH 1024hPa and 90kt (G/S 68kt W/V 340/35) he spotted a Grob Tutor about 1500m or more away in his 11 o'clock high (approximately 500ft above) wings-level heading away from his ac. A few seconds later the Tutor commenced what appeared to be a 60° banked turn to port away from his ac whilst appearing to lose height until rolling wings-level heading about 090°. It then tracked in the opposite direction with a distance no closer than 1000m, passing down his port side about 200-300ft above. The Tutor made no attempt to turn away from his ac at any point, he thought, and he did not feel it necessary to take avoiding action. Once the Tutor was in his 7 o'clock and >1000m away it turned to track NE'ly and at that point he returned his attention to his student's progress with the navex. He assessed the risk as none. In his experience, having instructed for over 10yr and >3500hr total time, he did not believe this to have been an Airprox. If, at any stage during the flight, he felt that he was approaching an Airprox he would have taken action to avoid the other traffic. This was not the case during this flight and at all stages he felt he was remaining clear of all other traffic.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a Tutor T1 operating VFR in receipt of a TS from Cottesmore Zone and a C152, operating VFR speaking to Conington Radio.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The Tutor was operating on a navigation exercise, routing via Kettering and Peterborough before RTB at Cranwell and contacted Zone at 1457:56 following a radar handover from Cranwell ATC. The Tutor's TS was reduced by Zone as Cottesmore were providing an ATS SSR-only; this was neither causal nor contributory to this Airprox.

Zone, manned by an experienced trainee and mentor, described their workload as medium with 7 ac on freq, with low task complexity.

At 1515:06, Zone passed TI to the Tutor flight on the C152 as, *"…traffic twelve o'clock, five miles, opposite direction, no height information"* which was not acknowledged and was thus re-iterated at 1515:18 as, "…*traffic twelve o'clock, four miles, opposite direction, no height information*." The updated TI was acknowledged by the Tutor pilot with c/s. The C152 was not fitted with a Mode C capable transponder and the lack of height information could be considered to have been an aggravating factor in this Airprox.

At 1516:35, Zone provided a further accurate update to the TI for the Tutor flight stating, "…*previously reported traffic slightly right of your twelve o'clock, two miles, opposite direction, no height information*", which was acknowledged by the Tutor pilot.

At 1516:56, with the C152 0·7nm E of the Tutor in it's one o'clock, the Tutor commenced an initially tight L turn onto W, which then continued steadying onto a NE'ly track to pass 0·6nm S of the C152 at 1517:44, having climbed approximately 300ft. This latter time reflects the CPA.

Both pilots report flying at 2000ft, with the Tutor operating on the Barnsley RPS of 1018hPa and the C152 on 1024hPa, equating to 180ft vertical separation. It is likely that these were the reported operating altitudes and thus the vertical separation prior to the avoiding action taken by the Tutor.

Based upon the C152 pilot's report, it appears that their first sighting of the Tutor was as it steadied briefly on W, after that ac had commenced its avoiding action turn at 1517:04, and immediately prior to its continued turn to port to steady NE'ly. It is probable that the C152 pilot's visual acquisition of the Tutor was hampered by them flying into sun and the haze and it is likely that the turn by the Tutor changed the C152's perspective, enabling them to sight it.

Although the Tutor pilot's report mentions that they became visual with the C152 with around 1·5nm lateral separation, the instructor has subsequently amended this to around 0·5nm. Moreover, they have confirmed that they executed the "emergency left break" having become visual with the C152, continuing the L turn until they regained visual contact with it as they passed to the S.

In this instance, Zone provided a good level of accurate TI for the Tutor, which enabled the pilot to take decisive action to avoid the confliction.

HQ AIR (TRG) comments that the TI provided was timely and was updated sufficiently to enable the Tutor pilot to gain visual contact. The information could have been used at an earlier stage to attempt to break the collision in a more controlled manner thorough a small heading change. Based on the radar picture, the sighting appears to have occurred at around 1nm, which is reasonable considering the geometry of the event. Whilst the avoiding action taken was effective in controlling the closure, it put the conflictor into a position where it could not be seen. A turn through 90° or less would have allowed sight of the conflict to be maintained, permitting subsequent avoiding action to be made if required. Whilst the actual risk of collision was nil in this case, the potential risk was high up to the point where the sighting occurred and the avoiding action was taken.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The HQ AIR Ops Member informed the Board that pilots are taught emergency break turns during flying training; however, the SOP is to turn through 90° and then roll wings-level to re-assess the threat ac. The Tutor pilot was given a good level of TI by Cottesmore Zone and, although the potential for confliction should have been apparent owing to the relative bearing remaining constant, the pilot continued on track. A small heading change early on was all that was needed to deconflict the flightpaths. It was at about 1nm range that the Tutor pilot saw the C152 and took avoiding action by executing a 180° turn away, resulting 0·7nm separation at the CPA. It was as it rolled out onto a W'ly heading that the C152 instructor first saw the Tutor, and then watched it turn across his track to pass clear on his LHS. Members agreed that these sightings, although apparently late, had occurred in

reasonable time given the head-on geometry (small target aspect) compounded by the C152 flying into sun. From the C152 pilot's viewpoint, unaware the Tutor had already turned through 180°, nothing untoward had happened and the subsequent manoeuvring by the Tutor pilot was a non-event. Looking at the geometry from the recorded radar, Members agreed that the ac's tracks were always in potential conflict and this had led to the Airprox. However, with the Tutor pilot's sighting and robust action taken, which resulted in adequate separation, and the C150 pilot's sighting, the Board concluded that any risk of collision had been removed and that normal procedures, safety standards and parameters had pertained during this encounter.

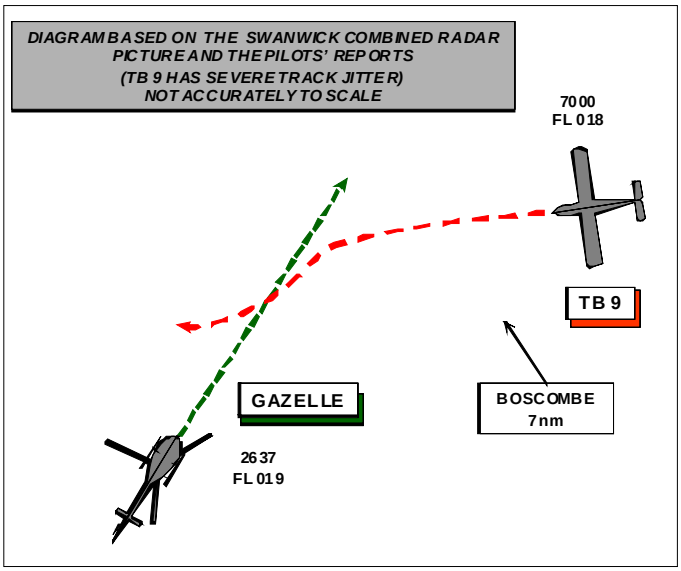
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the Tutor crew.

Degree of Risk: E.

AIRPROX REPORT NO 2012014

Date/Time:	16 Feb 2012 1129Z	
Position:	5102N 00140W (8nm SSE Boscombe Down)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Gazelle	TB9
Operator:	HQ Air (Ops)	Civ Pte
Alt/FL:	2000ft	2200ft
	QFE (1015hPa)	QNH
Weather:	VMC CLBC	VMC CAVOK
Visibility:	25km	20nm
Reported Separation:	100ft V/200m H	50ft V/150m H
Recorded Separation:	~100ft V />0.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports flying a camouflage grey/green ac squawking 2637 with Mode C in receipt of a TS from Boscombe APP; TCAS was not fitted. On completion of the medium level navigation phase of a continuation training sortie the pilot requested radar vectors for a PAR recovery. While being vectored at 2000ft QFE, heading 050° (out of sun) and at 100kt, ATC reported traffic to the E. The crew reported looking and nothing was seen by either aircrew. ATC subsequently re-reported the traffic and the ac captain renewed his attempts to see the ac; on leaning forward to see around the canopy frame he saw a blue and white single-engine light ac in their 2 o'clock position slightly below and in a gentle turn to pass down their R side. The captain and the supernumerary crewmember in the left seat estimated the other ac to be about 100ft below and 2-300m away at its closest point. At no stage did the crew feel the ac presented sufficient risk to take avoiding action but felt that the other ac might have been engaged in avoiding action [on them] when sighted and so they declared an Airprox to ATC, assessing the risk as being medium.

A VFR recovery was subsequently initiated and an in-flight Airprox report made iaw SECTION 1 SPECIAL NOTES 2 of the ERB.

THE TB9 PILOT reports that he was flying a red, white and blue ac on a private VFR flight from Popham to Compton Abbas on a route taking them slightly N of Lockerley, then straight to Compton Abbas and were listening out with them. They were heading 260° at 105kt at about 2200ft in good conditions, with scattered cumulus well above their height, when a camouflage green Gazelle helicopter was first seen about 300m away in their 11 o'clock, slightly above and crossing from L to R. They took avoiding action by banking sharply to the L but the other ac did not seem to react and passed them on their starboard about 150m away. TCAS was not fitted and his GPS does not log data except flight times, so the timings are approximate.

He assessed the risk as being high.

THE BOSCOMBE APP CONTROLLER reported that he was fully briefed on the current airspace and flying situation when he took control of the position. On Boscombe Stud 4 he had rotary traffic arriving for an instrument approach to RW23 from the S. The ac was under a TS and as such had been passed TI on a contact to the E by the off-going controller. The contact was still relevant and closer so he called the traffic again but the Mode C was not displayed. The conflicting traffic continued to converge so he called it again, this time it was inside half a mile with the Mode C then indicating that it was at the same level. Moments later the rotary called visual on the traffic and informed him that he was filing an Airprox so he acknowledged, noted the details and passed them onto the duty ATC Supervisor.

AIRPROX REPORT No 2012014

BM SAFETY MANAGEMENT reports that this Airprox occurred between a Gazelle operating VFR in receipt of a TS from Boscombe APP while being vectored for a PAR and a TB9 operating VFR; both ac reported being in VMC.

All heights/alts quoted are based upon SSR Mode C data unless otherwise stated. The radar replay of the TB9s flight path exhibited significant track jitter which affected the assessment of the final stages of the incident sequence; consequently, the respective crew's description of events and assessments of minimum separation have been used to assess the Airprox.

APP described their workload as medium to low at the time of the Airprox, having recently taken control of the position. The incident sequence commenced at 1127:28, prior to a changeover of controllers, with APP passing TI on the TB9 to the Gazelle, stating, "*traffic right, two o'clock, five miles, crossing right left, similar height*"; this was acknowledged by the pilot. While the TI was broadly accurate, the TB9 was not crossing the Gazelle's path at 90° but was on a converging track. The Gazelle maintained a heading of 050° and indicated height of 1900ft throughout the incident sequence.

CAP413 Chapter 5 1.6.1 states that:

'Whenever practicable, information regarding traffic on a possible conflicting pathshould [include the] relative bearing of the conflicting traffic in terms of the 12 hour clock with the optional prefix 'left or right' as appropriate; distance from the conflicting traffic; direction of flight of the conflicting traffic; relative speed of the conflicting traffic or the type of aircraft and level if this is known…Relative movement and level should be described by using one of the following terms as applicable: closing, converging, parallel, same direction, opposite direction diverging, overtaking, crossing left to right, crossing right to left.'

At 1128:14, APP passed TI to unrelated traffic. At this point, the TB9 was 2.9nm NE of the Gazelle on a converging track from right to left, indicating co altitude with the Gazelle at 1900ft. At 1128:45, having completed the handover of control position, APP updated the TI to the Gazelle as, "*previously called traffic northeast, one mile, manoeuvring, low level*"; however, the Gazelle's callsign at the start of the transmission was garbled, with only the numeric element being audible. Moreover, the numeric element sounded muffled and was spoken rapidly and the TI was not acknowledged by the Gazelle pilot. The TB9 was 1.3nm NE of the Gazelle and on the radar replay, continued to indicate co altitude with the Gazelle at 1900ft. APP reported that at this point, the TB9's SSR Mode C was not showing on their surveillance display.

At 1128:56, APP provided a further (partial) update to the TI on the TB9 stating, "*that previously called traffic now indicating one hundred feet below, descending*"; the pilot replied at 1129:04 that they were, "*err visual with that traffic and err would like to now pass behind us and err will forward an Airprox, standby*". Subsequently, the Gazelle pilot reported that the TB9 was obscured behind the canopy frame and that it was first sighted by the Captain in the, *"two o'clock position, slightly below and in a gentle turn to pass down the right side"* as he leant forward. Based upon the radar replay, the Gazelle's transmission at 1129:04 is approximately the point of the CPA, with assessments of minimum separation being between 150-200m laterally and 50-100ft vertically.

CAP774 requires controllers to update TI if the conflicting ac continues to constitute a definite hazard. It is implicit within the requirement to update TI that the update shall be passed in such time as to enable the pilot to assimilate the information in order to discharge their responsibility to 'see and avoid'. Moreover, CAP774 states that "when passing TI, relative bearings are routinely passed in terms of the 12 hour clock; however, if the ac under service is established in a turn, the relative position of the conflicting traffic should be passed in relation to cardinal points."

Notwithstanding the crew's responsibility to 'see and avoid' and the effect of the canopy frame on their lookout, the ATM aspects of this Airprox warrant further analysis. While the cause of the Airprox was a late sighting by both crews, BM SM contends that the late sighting by the Gazelle's crew was contributed to by the timeliness and accuracy of the TI given by APP.

Based upon the Gazelle crew's report of sighting the TB9 immediately after receiving an update to the TI, it is reasonable to argue that they are referring to the update at 1128:56. Moreover, given the lack of acknowledgement of the TI at 1128:45 and the fact that it is not mentioned within their report, it is reasonable to suggest that the Gazelle crew either did not hear the TI or were unable to determine that the TI was for them. Based upon the initial garbling of the transmission at 1128:45, the latter hypothesis is more likely. However, whilst the TI passed at 1127:28 was sufficiently detailed, it and the updated TI at 1128:14 and 1128:56 did not adequately

describe the track of the TB9 relative to the Gazelle, nor were the updated TI calls in the correct format. Moreover, while APP reported that the update provided at 1128:45 was made without the benefit of SSR Mode C data, they described the TB9 as being at, "*low level*"; it has not been possible to resolve this discrepancy. Notwithstanding that the Gazelle crew may not have realised that the TI at 1128:14 applied to them, the inaccuracies of the three TI broadcasts could have contributed to the late sighting of the TB9 by the Gazelle crew.

In terms of the timeliness of the TI, the update to the TI at 1128:45 occurred 19sec/1.3nm prior to the CPA, with the final update occurring about 8sec/0.5nm before. Notwithstanding the relatively low closure speed of the ac involved, updating TI at such close range gives little time for crews to assimilate the TI, visually acquire the conflicting ac and either avoid it, or seek deconfliction advice if they remain unsighted. It is reasonable to argue that the handover of control position between 1128:14 and 1128:45 may have affected the timeliness of the provision of updated TI.

BM SM has highlighted to RAF SATCOs that caution should be exercised when handing over control positions when aircraft are proximate.

HQ AIR (OPS) comments that the crew of the Gazelle received TI that did not specifically indicate the potential for confliction and which did not appear to have given them an appropriate level of concern. Greater adherence to the CAP413 extract above would go some way to addressing this issue, and may have prompted the crew to have taken their own avoiding action. In addition, there is scope for confusion as to responsibilities when being vectored by ATC, who are required not to vector ac into known conflicts; the interpretation of 'vectoring' is crucial and has been a factor in other Airprox events, where crews not under 'own navigation' have seemed to expect vectors that would not put them into conflict. Despite this confusion, the responsibility for collision avoidance remains with the ac commander when under ATSOCAS, but more assistance from ATC would have been provided had a DS been requested.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members were informed by the HQ Air BM SM Advisor that, although the Gazelle was placed on a heading by the Boscombe Controller, this was issued before the start of the RT transcript and well before any confliction would have been evident to him.

TI was passed to the Gazelle pilot as required when under a TS and updated, but the initial description was not wholly accurate and could have led the pilot into not assimilating that the traffic (in his 2 o'clock) was heading directly towards a point where the ac would be in conflict.

The TB9 pilot was not in receipt of any traffic warnings or information as he was listening out with Compton Abbas with about 15nm to run to the airfield. One Member thought a call to Boscombe as the ac passed to the S of them might have established that they had traffic in the area [the radar recording showed another ac with a Boscombe squawk in the area].

Notwithstanding these factors, both ac were operating legitimately in Class G airspace where 'see and avoid' pertains; both pilots saw the opposing ac at about 300m and the Board agreed that this was later than optimum. Both pilots did, however, see the opposing ac and the TB9 took effective avoidance, resulting in the Gazelle pilot deciding that none was required; this ensured that there was no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

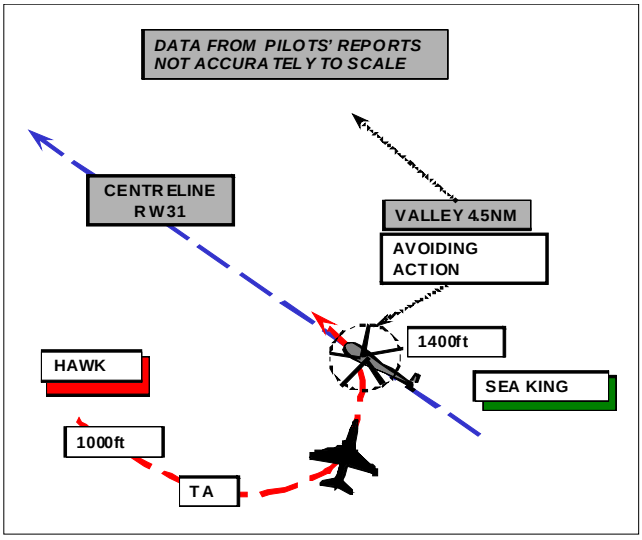
Cause: Late sightings by the pilots of both ac.

Degree of Risk: C.

AIRPROX REPORT NO 2012015

Date/Time:	15 Feb 2012 1304Z	
Position:	5311N 00427W (5nm SE Valley - elev 36ft)	
Airspace:	Valley MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Sea King	Hawk T Mk2
Operator:	HQ JHC	HQ Air (Trg)
Alt/FL:	1200ft	1000ft
	QFE (1029hPa)	QFE (1029hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	30km	20km
Reported Separation:		
	200ft V/0 H	400ft V/ 0 H
Recorded Separation:		

400ft V/0 H (from Hawk Mission recording system)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SEA KING PILOT reports flying a yellow helicopter under RC, he thought, from Valley, squawking with Mode C, but TCAS was not fitted. The ac was being flown from the RHS by a pilot wearing an IF visor. While at 1200ft QFE on a PAR to RW31, heading 318° at 90kt, ATC directed them to climb immediately, which they did, due to traffic approaching from their 6 o'clock at 1nm. Immediately after receiving the instruction a Hawk T2 appeared from underneath their ac, on the same heading & with an estimated vertical separation of 200ft. The Hawk continued straight & level towards Valley.

He assessed the risk as being medium.

THE HAWK TMk2 PILOT reports that he was carrying out an end-of-course check for a student QFI and had launched as a pair from RAF Valley to carry out Basic Fighter Manoeuvres prior to splitting for individual GH. Having rejoined via a straight in PFL, the trainee instructor (who was the handling pilot in the rear seat) was instructed to transit to 'initial' to carry out visual cct teaching on RW31 RH.

At 1301:46 the pilot was cleared to join the cct by the ADC. The ADC informed the Hawk crew that there was instrument traffic at 7nm and the trainee QFI (HP) replied that he was "*looking for that traffic*". The student QFI turned left and levelled at 1000ft to transit to initial. Since Mona was active and operating on RW04, this was an appropriate height to arrive at initial. Current practice is to turn left outbound to initial when operating on RW31. At 1302:47 another joining ac was instructed that there was one joining and instrument traffic at 5½ miles. The trainee QFI stated to the front seat occupant that he was *"just going to look for that traffic".* At 1302:57 the trainee QFI confirmed that he was visual with the pair joining and asked the front seat occupant to confirm that he was also visual and he confirmed that he was.

During the left hand downwind flight to initial, the student QFI discussed the parameters required both for the join and for the cct and both front and rear cockpit pilots gained visual contact with the helicopter 5nm away while downwind. The trainee QFI initiated the left turn to initial with the intention of passing below and laterally displaced to the right of the instrument traffic. At 1303:39 the TCAS, which was selected to TA, gave a 'Traffic,Traffic' alert to indicate that there was potentially conflicting traffic at 2nm. Without adjustment to the flight profile while heading 310° at 350kt, the front and rear seat occupants both confirmed that they were visual with the helicopter. TCAS indicated the traffic to be 500ft above, confirming their agreed visual assessment. At 1303:57 the rear seat handling pilot confirmed his intention to 'stay below him', both pilots confirming again that they were 'visual'.

At 1304:08 the trainee QFI called 'initials' and he was informed again by the ADC that there was instrument traffic at 4nm, to which he replied that he was 'visual'. The trainee QFI's visual assessment of a 500ft separation was approximately correct and the TCAS showed 400ft vertical separation as the Hawk transited below the helicopter.

During the de-brief it was stated that whilst vertical separation alone is safe, more lateral separation would have been preferable to ensure there was no misunderstanding of the Hawk's intentions or flightpath from ATC or by the helicopter crew.

They assessed the risk as low.

This report of events is taken from the Hawk TMk2 mission replay facility, which allows precise and complete review of the entire sortie, displaying HUD imagery, audio (from both cockpits and externally) as well as GPS position, TCAS and all front and rear cockpit multi function displays. The sortie record has been retained and is available for review.

THE VALLEY TALKDOWN CONTROLLER reports that he was the Talkdown controller for the PAR of a Sea King. Around 4 miles he saw an ac return appear on both azimuth and glidepath, in the Sea King's 9 o'clock turning towards the centreline. The speed of the return, heading and height, was sufficient for him to assess there was a risk of collision and he therefore initiated an avoiding action instruction to climb with TI. Following the climb the Sea King captain reported visual with the ac passing directly underneath and that he was to file an Airprox report. Once the confliction had been resolved he continued the talkdown without further issue.

THE VALLEY ATC SUPERVISOR reports that his comments are were written after analysis of the tape transcripts of the ADC and PAR frequencies and from speaking to the controllers involved.

The Sea King pilot reported that an Airprox occurred with a Hawk TMk2 while a Hawk TMk1 formation was also joining the cct.

[UKAB Note (1): Points covered in the BM SM report have been edited for brevity.]

At 1303:59 PAR issued an avoiding action climb to the Sea King due to an ac believed to be on a collision course; this would appear to have been the Hawk TMk2 re-joining through initials. The Airprox appears to occur between 1303:59 (the avoiding action) and 1304:06 (Sea King pilot stating that the ac had under-flown him). The avoiding action instruction is, *"climb to height 1000ft";* at this range from touchdown on PAR (4nm ish) the ac would have been at around 1200ft on a 3° glidepath, so it would not be possible to achieve this avoiding action; however, the instruction to climb was very clear and this error did not in contribute to the Airprox. The Sea King pilot does not address this issue in his report, stating that an avoiding action climb was given and he infers that he was underflown immediately after the climb was given.

The actions of the PAR controller, height error accepted, are consistent with the normal actions expected when a controller assesses a collision risk on PAR. PAR lateral coverage is limited at 4nm from touchdown and any fast-jet ac positioning from the visual cct to initials will appear very late and very fast on the PAR screen. Given that the controller must assess rate of closure, heading, and height, it is not surprising that the avoiding action was a last-minute measure. But again, the avoiding action offered is not a contributory factor. It is assessed that ATC carried out the correct actions and ensured that all ac were made aware of the locations and intentions of all other ac; this is supported by the tape transcripts.

This Airprox appears to have been caused when the Hawk TMk2 underflew the Sea King which was conducting a PAR. The Hawk had been informed about rotary instrument traffic both directly by the ADC and again by hearing the information being passed to the Hawk formation on the same frequency. It is the responsibility of ac joining through initials to avoid PAR traffic by a safe margin; ATC assist in this process by passing TI on instrument traffic - this was done in this case.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a Sea King operating IFR conducting a PAR GCA in receipt of a TS from Valley Talkdown (TD) and a Hawk TMk2 operating VFR in the visual cct area at Valley.

Given the range of RAF Valley from NATS radar heads and the height at which the Airprox occurred, no radar replay was available to inform the investigation.

The ADC reported his workload was medium, with low task difficulty. TD reported their workload as medium to low, with average task complexity. The incident sequence commenced at 1300:52, with Valley operating to RW31 RH, as the ADC made the '8-mile' broadcast on the TWR freq. At this point, the Hawk TMk2 was ahead of the Sea King conducting a straight-in PFL, monitored on SRE.

At 1301:44 the Hawk called TWR to join, stating that they were, "*turning left downwind to initials*." The ADC instructed the Hawk to, "*join runway three-one right hand, Q-F-E one-zero-two-nine, circuit clear, there is rotary instrument traffic* (the Sea King) *at seven miles*." The Hawk replied that they were, "*looking for that traffic*." The Initial Point for RW31 RH is 4nm from the aerodrome on the extended centreline.

At 1301:58, the ADC broadcast on the radar clearance line to TD, "*one out over the bay to initials*" referring to the incident Hawk routeing to initials. Immediately, TD re-broadcast on the radar clearance line and on freq to the Sea King, "*one wide downwind to initials*". Following Airprox 2011123 at RAF Valley, the FOB was amended so that turns out from the visual cct for initials were to be conducted on the deadside; therefore, the Hawk would not have flown, "*wide downwind to initials"* as stated by TD but, *"out over the bay*" as stated by the ADC.

At 1302:14, TD informed the Sea King of an unrelated pair of Hawks [TMk1s] joining for a visual recovery "*passing down your left hand side, visual with yourself*." At 1302:45 this unrelated formation called TWR, were given clearance to join and informed of the, *"one joining* (the reported Hawk), *rotary instrument traffic at five and a half miles*." The unrelated formation reported visual with both the reported Hawk (TMk2) and the Sea King. Simultaneously, TD passed TI to the Sea King on the unrelated formation as, "*traffic left nine o'clock, two miles, indicating slightly below*."

At 1303:48 the unrelated formation reported initials and the ADC re-stated the position of the Sea King and passed the surface wind. At 1303:59, 5sec after the Sea King passed through 4.5nm from touchdown, TD issued avoiding action to the Sea King, instructing them to, "*climb to height one thousand feet immediately, traffic was six o'clock, one mile*." The Sea King replied, "*it's okay, visual, he went underneath us*". Simultaneously, the Hawk had called initials on the TWR freq and was advised that there was, "*one deadside, instrument traffic four miles, wind three-two-zero twelve knots*." This was acknowledged by the Hawk, reporting that they were, "*visual with that traffic*." The Hawk crew has subsequently reported that they were visual throughout the incident sequence and under-flew the Sea King, assessing that the 500ft vertical separation was sufficient. With hindsight, during the de-brief, the Hawk crew acknowledged that "whilst vertical separation alone is safe, more lateral separation would have been preferable to ensure that there was no misunderstanding of their intentions".

The MMATM Chapter 29 Para 23 states:

"Provided that the aircraft return and Data Block can be clearly seen, lower range scales can be selected as soon as the aircraft reaches the relevant range from touchdown (i.e. …at 5 nm, the 5 nm range can be selected). If the PAR controller observes another radar contact, whose position and/or track is likely to affect the PAR close to the point where the range would normally be reduced, then the range change **should** be delayed until the controller is satisfied that he can monitor the situation on the lower range setting."

Aircrew human factors appear to have been the causal factor in this Airprox event; however, some of the ATM aspects do warrant further analysis. In terms of the ADC's actions, BM SM contends that, the TI given to the Hawk on its initial join and TI given on the freq to the unrelated Hawk formation, sufficient information was provided to the Hawk on the Sea King. Further specific TI would have been nugatory and would arguably not have changed the Hawk's flight profile and thus the incident outcome.

In terms of TD's broadcast to the Sea King referring to the Hawk routeing to initials, it is possible that this created an incorrect mental image of the situation for the Sea King crew. However, given that they were flying a GCA and that TD could not have affected the Hawk's flight profile, this would not have affected the outcome of the occurrence and, therefore, is neither causal nor contributory.

In terms of TD's actions, and as SATCO Valley has pointed out, given the 5nm range scale at which they were operating the PAR, TD was faced with having to make a rapid assessment of the rate of closure, heading and

height of the 2 ac. It is to TD's credit that the assessment of the requirement for avoiding action and the principle of issuing a climb for avoiding action was sound; however, given that the Sea King was approaching 1200ft QFE at the time, the instruction could have been interpreted as either a descent to 1000ft QFE, or an immediate climb. In the event, the Sea King crew did not have time to action TD's instruction and the instruction was not a factor in this incident. However, this incident is a reminder to all PAR controllers to maintain situational awareness of where their ac are in 3 dimensions and to consider what their actions might be at any stage in a GCA when faced with similar circumstances.

BM SM will highlight the findings of this investigation to all military ATCOs.

HQ AIR (TRG) comments that the Hawk crew flew sufficiently close to the Sea King to cause them and the controller concern. Whilst it was not noted in their report, the Hawk crew complied with the requirement to route through initials (left of centreline) but observed the Sea King further to their left. Their options were then to err closer to the centreline and the liveside or to route further to the left. The first option would reduce separation from cct traffic and both options would have resulted in the Hawk crossing the PAR controller's display. The offset of the PAR approach might also be considered to be contributory. In the event, the Hawk crew were visual with the Sea King throughout and there was no risk of collision. The fact that they were visual was not communicated in a timely enough fashion to the PAR controller and the Sea King crew to allay their eventual concern. However, the situation was made more likely by the potential conflict in approach directions between the PAR and the visual initial point. Whilst there is also no generally accepted principle regarding visual joiners avoiding instrument traffic by deconflicting laterally to the deadside, doing so at an early stage in this case would have prevented the underflight and the resultant concern.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

There was some discussion regarding the alignment of the RW31 PAR and the position of the IP. It was established that the PAR is not offset [formally], although a pilot with local knowledge opined that traffic that indicates on the C/L to the PAR controller is often slightly left of the C/L. Further, the RAF Valley FOB promulgates the IP for RW 31 as being at a point 3.8nm (from touchdown) on the C/L (Bearing 130.24°T). Further it states:

'a. **Instrument Traffic**. Instrument traffic has priority over traffic joining visually. Aircrew are to ensure that all instrument traffic is afforded safe separation either by visually acquiring it or by procedurally avoiding its reported height and/or position. Aircrew are to be aware of how the Tacan final approaches converge with and cross the visual recovery lanes. PAR and SRA traffic are to be anticipated to be positioned closer to the runway centreline.'

Members noted that the Hawk crew had been visual with the Sea King throughout and had avoided it in compliance with the instruction above. Members agreed however that the PAR Controller, on seeing an unknown return approaching the Sea King took the correct action by instructing it to climb, albeit with an instruction that was not totally clear. Had the Hawk crew avoided the Sea King by a reasonable lateral margin as well as vertically, or the talkdown controller been informed by the ADC that the Hawk was visual with the Sea King, he would probably have not been concerned. Members agreed that it is good practice to overtake on the right and not to under-fly other ac, although in this case proximity to Mona may have precluded this.

No radar information was available but Members accepted that the separation provided by the Hawk crew from their Mission Recording System to be accurate.

Members agreed unanimously that the Hawk crew had complied with the RAF Valley FOB but might have anticipated that they would cause the PAR Controller concern.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: By flying underneath the Sea King on a PAR approach, the Hawk crew caused its crew and the Talkdown Controller concern.

Degree of Risk: E.

AIRPROX REPORT No 2012016

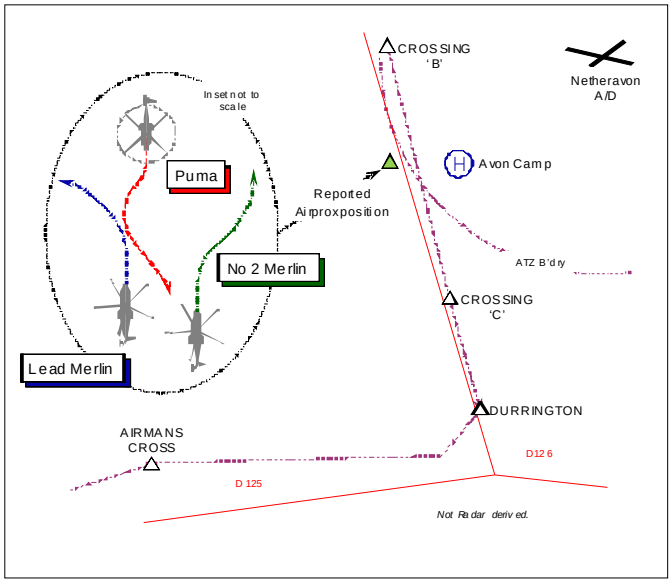
AIRPROX REPORT NO 2012016

Date/Time: 16 Feb 2012 1825Z (Night)

Position: 5114N 00149W (2km S of Crossing Bravo [2nm WSW of Netheravon])

Airspace: SPTA D125 (Class: -)

	Reporting Ac	*Reported Ac*
Type:	Merlin HC3a pr	Puma
Operator:	HQ JHC	HQ JHC
Alt/FL:	300ft agl	↓300ft QFE (1011hPa)
Weather:	VMC CLBC	VMC NR
Visibility:	25km	25km
Reported Separation:	Nil V/<200m H	<200m H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MERLIN HC3a HELICOPTER PILOT reports he was flying as the No2 of a formation of two Merlin helicopters tasked in support of Exercise PASHTUN JAGUAR, within the Salisbury Plain Training Area (SPTA). The formation was tasked to pick-up troops from Shrewton Folly and fly them to the drop-off point at Avon Camp. The formation followed the standard routeings and heights toward Avon Camp: Airman's Cross-Durrington-Crossing Charlie. They were flying under VFR, using NVGs escorted by a Lynx helicopter flying above the formation at 2000ft Portland RPS (1024hPa). A squawk of A7002 [Danger Areas General] was selected with Modes C and S on; TCAS is not fitted.

Under a PS, he thought, the formation was 'listening-out' on a UHF frequency with OVERLORD - a tactical ground station who provided updates on other aviation activity in SPTA - who informed them that a Puma was departing Netheravon A/D via Crossing Bravo and heading S. The crew were 'eyes out' as an approach was made to Avon Camp HLS from 500ft agl. Although the formation were technically flying at night [the end of civil twilight was at 1755], the prevailing red sky under a distant cloud layer, coupled with the cultural lighting from the surrounding towns and villages made it difficult to identify the Puma at distance. During the approach to the HLS the lead Merlin pilot elected to overshoot from about 200ft agl and initiated a turn to the L to set up for the HLS again. At this point, flying straight and level northbound at 80kt, the No2 Merlin crew saw the Puma for the first time about 1km away, taking avoiding action. The Puma crew were seen to break R initially to clear the lead Merlin's overshoot direction, but was then forced to break L at 300ft agl as the lead Merlin pilot turned L to set-up for a further approach. At this point he as the PF in Merlin No2, broke R and climbed to deconflict from the Puma. The Puma was then seen by Merlin No2 PIC passing 200m down the LH side of his helicopter, at the same height, flying in the opposite direction with a 'very high' Risk of collision. No Airprox report was filed on the RT.

He noted that poor light levels, the cultural lighting and the red sky were factors, together with 'poor deconfiction' provided by OVERLORD.

After landing, during the debrief between all crews involved, it emerged that the Puma crew did not see the No2 Merlin at any stage.

The Merlin has a green colour-scheme; navigation lights and a red strobe were displayed.

UKAB Note (1): In a subsequent telephone conversation with the reporting No2 Merlin Pilot, he confirmed that the geometry of the Airprox was broadly that shown in the diagram. The Merlin pair were approaching the HLS in echelon starboard at a spacing of 5-6 rotor spans [5x70ft span = 350ft min]. The lead Merlin crew did not see the

Puma at all prior to the encounter and only saw it clearing to the S when setting up for the second approach. The Lynx was clear to the N and above the formation when the Airprox occurred and its presence was not a factor.

THE PUMA HC1 HELICOPTER PILOT reports he was conducting a night currency sortie from Netheravon A/D within SPTA using NVGs and incorporating low-level operations to a number of HLSs before returning to Netheravon. His helicopter has a green colour-scheme; navigation lights and a red strobe were displayed together with IR formation lights on bright and flashing. He was in receipt of a PS, he thought, from SALISBURY OPS [only a communication service is provided from an A/G Station] on 276·00MHz. A squawk of A7002 was selected with Modes C and S on; TCAS is not fitted.

After departure from Netheravon A/D, descending from 500ft to 300ft agl following the standard routeings S from Crossing Bravo VRP at 120kt, SALISBURY OPS reported on the RT that a formation C/S comprising 2 Merlins and 1 Lynx were operating in the Durrington VRP area. At this point the 3 crew members in the Puma were 'eyes out' looking for the reported ac. The crew found it particularly difficult to spot any ac due to the time of the day - just after dusk - and the backdrop of Durrington town that was 'backing down' the NVG, so spotting any 'strobing' ac was extremely difficult. Approaching a point 2km S of Crossing Bravo, one of the Merlin helicopters was spotted less than 1km away and the Puma PIC elected to roll R in order to move to the R of the standard route, in an attempt to follow the Right-Hand Traffic Rule. At this point the Merlin's course was unclear; however, the direction and height of the Merlin helicopter then became apparent and it was seen that the Merlin was flying a reciprocal to the Puma's southerly course at the same height prompting the PNF to call 'break right' to the PF. While breaking R, the PF was visual with the Merlin and saw that it had started to turn to port toward the Puma. The PF then elected to climb and roll L in order to avoid the Merlin, which appeared to pass below the Puma less than 200m away. The crew lost sight of the Merlin and elected to maintain a straight and level course until the crewman spotted the Merlin again in their 5 o'clock. The Puma crew only spotted one Merlin helicopter.

After a debrief on the ground with the Merlin crews, it was ascertained that the Puma crew had only been visual with the lead Merlin helicopter. The No2 Merlin, whose crew had also taken avoiding action against his Puma, was not seen.

UKAB Note (2): Sunset was at 1716UTC; the Airprox occurred within the period defined as night within the UK LFHB.

UKAB Note (3): The 1750Z Boscombe Down METAR: 29010KT 9999 BKN038 08/03 Q1027 BLU=

THE AIR SUPPORT OPERATIONS CENTRE (ASOC) OPERATOR provided a helpful comment.

The UK ASOC role during Exercise PASHTUN JAGUAR.

OVERLORD is the C/S of the Command and Control agency based in Afghanistan which provides tactical information and routeing. The UK ASOC does not fulfil this particular task in theatre but its personnel, who are from many branches (his own being Battlespace Management), have routine interaction with those that do and have supported exercises in this role when those with direct experience of OVERLORD are unable to attend. The UK ASOC does not offer an ATS, but merely shares traffic information in addition to that provided by SALISBURY OPS. Its primary contribution to the Exercise is to provide tactical information, such as on 'hot' airspace (live or simulated) for the integration of Joint Fire. Co-location with SALISBURY OPS is essential for building situational awareness.

UK ASOC personnel and those in SALISBURY OPS only became aware of the Airprox some 24hr after the event. The aircrews' submissions have provided a degree of retrospective insight, and he recollects there being a time when both SALISBURY OPS and OVERLORD had separate ac on different frequencies. The Merlin flight was inbound toward Netheravon and checking their routeing with OVERLORD whilst the Puma was outbound talking to SALISBURY OPS, presumably after leaving Netheravon's frequency (C/S ODIN). There was no deviation from the standard routeing procedures passed to the ac; information would have been passed on any known traffic in order to widen general awareness of other activity. He has no recollection of any Airprox being mentioned at the time. As is the norm with these exercises, the flights would NOT have been placed under any 'service' by OVERLORD at any stage and were operating under VFR at all times.

UKAB Note (4): The Airprox occurred outwith recorded radar coverage.

UKAB Note (5): The UK Military Low-Flying Handbook at LFA1 2-1-1 para 8 SPTA specifies that:

a. '**Salisbury Plain Air Ground Service.** Salisbury Plain Air Ground service [SALISBURY OPS] exists principally for the co-ordination of air-operations close to SPTA. **It does not provide any form of air traffic service** which, if required, must be sought from local air traffic control agencies….'

HQ JHC comments that this was a very serious event which nearly resulted in a mid-air collision. It remains an operational imperative to train at night and in this event whilst all lighting SOPs were being followed, this Airprox occurred through a combination of factors:

Both the Merlin pair and the Puma crew were passed a warning from the respective agencies (Puma by SALOPs and the Merlins by OVERLORD). This tactical service does not assume responsibility for collision avoidance and it is still the pilot's responsibility to see and avoid other traffic. This was a significant factor with the use of two separate frequencies for traffic (primary is for range deconfliction including ground units and live ordnance).

The time of day with the effectiveness of the Night Vision Goggles being reduced by the high levels of ambient light.

This Airprox occurred during a particularly intense period of aerial activity as part of a recurring exercise to prepare crews and troops for deployment to Theatre and HQ JHC recommends that for future exercises the additional deconfliction measures are implemented;

Unidirectional use of the SPTA helicopter routes during the exercise.

Aircraft conducting non-exercise training or currency flights are to depart the SPTA by the most expeditious route and not to use the areas within SPTA for that flight (for example, departing to the north directly from Netheravon).

JHC has asked OC Tactical Operations (Air Traffic Management) of 1 Air Control Centre to produce a Memorandum of Understanding on the use of a single frequency during the exercise for purpose of OVERLORD and SALOPs. Following the incident, for the remainder of the exercise, OVERLORD and SALOPs operated on the same frequency (the published SALOPs frequency) to permit direct communication between ac in potential confliction.

HQ JHC, though Tactical Operations (Air Traffic Management) of 1 Air Control Centre, are intending to deploy a mobile Watchman Radar to Netheravon for the next Exercise pending resolution on a number of operational and environmental issues. In addition it is clear that the fitting of TCAS, which is being actively pursued by this HQ, would have significantly helped to prevent this incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of two of the ac involved, a report from the ASOC Operator and comments from the appropriate operating authority.

The HQ AAC helicopter pilot Member opined that the Lynx, as part of the mixed formation, was not a factor in this Airprox but might have been able to prevent it. In his view, the Exercise scenario called for the Lynx to provide 'top cover' for the two Merlins as they made their approach to the HLS at Avon Camp. In view of the warning from OVERLORD that the Puma was southbound along the route from Crossing Bravo, the Lynx crew ahead of the Merlins should have spotted the approaching Puma and warned the lead Merlin pilot. The No2 Merlin pilot's report confirmed that they were aware of the Puma beforehand and were looking for it, but neither Merlin crew spotted the Puma as they made their approach to the HLS. A Member suggested it might have been wiser to have delayed the approach to the HLS until the Puma was spotted and had passed clear to the S, as the Merlin pilot had highlighted the difficulties of operating on NVG close to high levels of background 'cultural' lighting especially with the remaining red sky. The helicopter pilot Member concurred that this would have caused significant difficulty for the Merlin crews in sighting another ac in the LH forward quadrant as they flew N, which is about where the Puma was. Furthermore, the Member opined that the Puma crew, also operating on NVG, did not have quite the same difficulty, but the background lighting of Durrington – to the S of the Airprox location - would have affected the efficiency of the Puma crew's NVG. The Board discussed the issue of operating on NVG at length; the helicopter pilot Member confirmed that NVG give aircrew much better SA about the topography of the ground, but spotting

ac lights against a background of cultural lighting remains a problem. However, lifting-up the NVG to revert to normal vision will allow crews to spot other ac lights. There was nothing fundamentally wrong with using NVG and other Members familiar with their use agreed it was a matter of technique.

It was explained that SPTA is a very busy exercise area but SALOPs are not able to effect deconfliction of individual flights within the area and it was clear that there was some confusion within the minds of the helicopter pilots involved about the exact role of OVERLORD and SALOPs. Whilst tactical ATC teams do set up for these pre-deployment exercises – apparently there was one operating at Netheravon – they had no input here. However, the Board noted and welcomed the measures proposed by HQ JHC for future Exercises to reduce the risks of airborne conflicts: uni-directional routes; operating on a single frequency; excluding non-exercise participants from SPTA and deploying a mobile Watchman Radar would all be beneficial.

The helicopter crews were operating quite legitimately under VFR at night with conventional lighting displayed. Both crews had been forewarned of each other's presence but they were operating in the same vicinity on different frequencies. Unfortunately, as the Airprox occurred at low-level none of the recorded radars available to the Board had captured the event. Nevertheless, the pilots involved all broadly share the same view of what had occurred. The Puma crew saw a single Merlin – the lead helicopter - whilst it was making its approach to the HLS and turned R to remain to the R of the route in an attempt to deconflict themselves from the single helicopter they had seen. The Board agreed that the Puma crew had probably seen the lead Merlin as soon as they might reasonably have been expected to do so. As the Merlin's direction of flight became clear the Puma crew hardened their turn to the R but their attempt to maintain separation was thwarted by the lead Merlin crew who, whilst unsighted on the Puma, elected to overshoot and turned to the L to set up for another approach to Avon Camp. The Board concluded that the non-sighting of the Puma by the lead Merlin crew was part of the Cause. As the lead Merlin turned L towards them, the Puma crew was forced to reverse their R turn by climbing and rolling L into an avoiding action turn to pass the lead Merlin on its starboard side, unaware that the No2 Merlin was also to the starboard of the leader. This caused the No2 Merlin crew, who had gained visual contact with the Puma as it made its initial starboard turn, to break R as the Puma passed between the Merlin pair with 200m horizontal separation, the No2 Merlin pilot reports. Members agreed that this was the second part of the Cause; while avoiding the lead Merlin, the Puma crew flew into conflict with the No2 Merlin, which they did not see.

Turning to the inherent Risk, the Puma crew's robust action had enabled them to fly clear of the lead Merlin by an estimated 200m, which Members agreed had removed the actual Risk of collision with that ac. However, they then flew into close proximity with another helicopter that they were unaware of. Fortunately, by that stage the No2 Merlin crew had gained visual contact with the Puma and were able to take effective avoiding action, also achieving 200m separation. Although this also ameliorated the Risk, the Board concluded that with two crews unsighted on another helicopter at close quarters, the safety of the ac involved had certainly been compromised in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: 1. A non-sighting of the Puma by the lead Merlin crew.

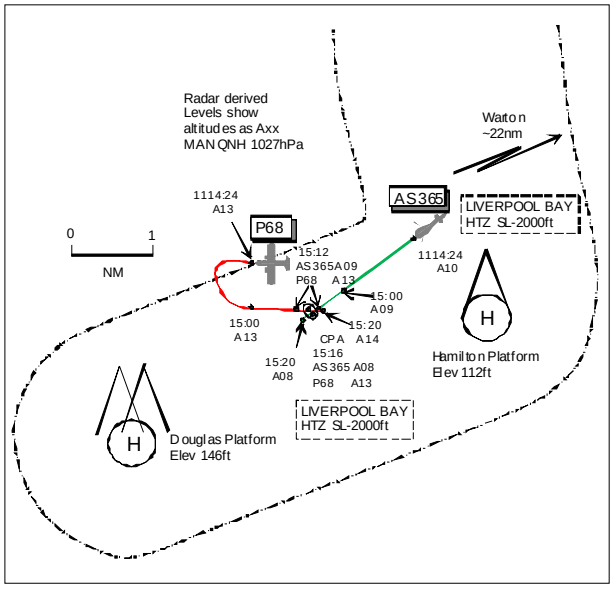
2. While avoiding the lead Merlin, the Puma crew flew into conflict with the No2 Merlin, which they did not see.

Degree of Risk: B.

AIRPROX REPORT No 2012017

AIRPROX REPORT NO 2012017

Date/Time:	16 Feb 2012 1115Z	
Position:	5334N 00331W (3nm NE Douglas Platform - elev 146ft)	
Airspace:	Liverpool Bay HTZ (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	AS365	P68
Operator:	CAT	Civ Comm
Alt/FL:	1000ft↓	1350ft
	QNH (1027hPa)	QNH (1027hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	>10km	10km
Reported Separation:		
	300ft V/Nil H	800ft V/400m H
Recorded Separation:		
	500ft V/0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS365 PILOT reports en-route from Blackpool to Douglas Platform, VFR and in receipt of a BS from Warton Radar on 129·525MHz, squawking 0467 with Modes S and C; TCAS 1 was fitted. The visibility was >10km flying 3000ft below cloud in VMC and the helicopter was coloured red/grey with nav, anti-collision and strobe lights all switched on. With approximately 15nm to run to the rig heading 239° at 135kt and 1000ft QNH 1027hPa they noticed an ac on ACAS in the vicinity of Douglas Platform. This ac was manoeuvring between their level and 300ft above as they approached. They asked Warton if they were working the ac but were told that it was working Liverpool and that Warton would contact Liverpool for further information. They saw the ac at about 10nm range and as they approached Douglas with about 5nm to run the ac turned towards them on an intercepting track. At this point a TCAS TA was generated and they started their descent to the Platform and watched as the high-wing twin-engine ac overflew them about 300ft directly above. He assessed the risk as medium/high. Warton subsequently requested the ac to move onto their frequency and it became clear that the other ac's pilot was unaware of the HPZ sic HTZ (Helicopter Traffic Zone).

THE P68 PILOT reports flying a local sortie from Hawarden, VFR and in receipt of a BS from Liverpool on 119·85MHz, then Warton on 129·525MHz, squawking 0260 with Modes S and C. The visibility was 10km flying 2500ft below cloud in VMC and the ac was coloured white/blue with wing and tail strobes switched on. He was giving Liverpool 'Operations Normal' calls every 30min and the incident occurred when he was on Line 8 of his aerial survey heading 090° at 140kt level at 1350ft QNH 1027hPa. About 2-3nm N of Douglas Platform he saw an AS365 about 2nm away on a converging/crossing track about 500ft below and watched it pass underneath by 800ft, descending, heading in the opposite direction about 400m away; he did not consider the helicopter to have been a threat. Liverpool ATC asked him to call Warton and the controller said that he should not be operating in that area so he broke-off the survey line and moved from the area.

THE P68 DEPUTY CHIEF PILOT comments that the company has had a root and branch investigation into the circumstances surrounding this Airprox which was viewed as a serious incident. A new extensive low-flying brief, including SMS, covering all aspects of the company's operations has been written and is being reviewed by the CAA. The P68 pilot has been involved fully in the investigation and is committed to ensuring that a repeat of his mistake will not recur. It came to light that the pilot had been using the Southern Area 1:500000 map so had he been using the correct chart this incident in all probability would not have happened. While on the day he was complying with ATC instructions he was obviously speaking to the wrong ATSU. The pilot is fully aware of the implications of using the wrong chart but by way of mitigation he stated that the changeover from the Northern to Southern chart was very close to where the ac was operating. The HTZ was in the top RH corner of the survey square. On reflection it is clear that the correct chart was the Northern Area 1:500000 and although the pilot did have both charts in the ac on the day he used the incorrect one. Since this incident the company have amended

their survey brief so that any ACN/NOTAM generation is considered, the flights will contact Warton midweek and Blackpool at weekends by telephone before commencing the survey and have 2-way radio contact with them during the flight.

THE WARTON LARS/APPROACH CONTROLLER reports working the AS365 as it transited from Blackpool to the Liverpool Bay Rigs. The helicopter was flying at 1000ft QNH 1026 under a BS and as it was about 5nm E of the HTZ the controller was aware of a 0260 radar contact travelling W'bound and did not consider this contact to be traffic to the AS365. The controller then dealt with other traffic to the SE of Warton and another flight near DCS. On the next scan of the Liverpool HTZ the controller saw a 0260 contact approximately 3nm from, and 400ft above, the AS365 and passed TI to its crew. The crew mentioned they had seen it on their TCAS and expressed surprise that the ac was in the HTZ. The controller contacted Liverpool Approach who informed LARS that the ac was under a BS so Liverpool Approach were asked to free-call the ac to the Rigs frequency of 122·375MHz in order to obtain permission to fly within the HTZ. A colleague then took over the position and the off-going controller made further enquiries, establishing the other ac, a P68, was on a survey flight. The P68 pilot called LARS stating that he was unable to make contact with the rigs frequency before he was told to vacate the HTZ.

ATSI reports that the Airprox occurred at 1115:16, in Class G airspace, 26nm SW of Warton and within the boundary of the designated Helicopter Traffic Zone (HTZ) of the Liverpool Bay Gas Field.

The AS365 was operating on a VFR flight from Blackpool Airport to the Douglas Platform situated in the Liverpool Bay Gas Field and in receipt of a BS from Warton Approach. The P68 was operating VFR off the N Wales coast to conduct an Aerial Survey at an altitude of 1300ft and was in receipt of a BS from Liverpool Radar.

The UK AIP Page ENR1-6-7-9 (30 Jun 11) describes off-shore operations in the Liverpool Bay area as follows:

'3 Morecambe Bay and Liverpool Bay Gas Fields - Helicopter Support Flights.

3.1 Permanent platforms positioned on the Morecambe Bay and Liverpool Bay Gas Fields are shown at ENR 6-1-15-7.

3.2 Helicopter Traffic Zone (HTZ)

3.2.1 A Helicopter Traffic Zone (HTZ), established as notification of helicopters engaged in platform approaches, departures and extensive uncoordinated inter-platform transit flying, is established around the Morecambe Bay and Liverpool Bay Gas Fields. An HTZ consists of the airspace from sea level to 2000ft amsl contained within the tangential lines, not exceeding 5nm in length, joining the neighbouring circumferences of circles 1·5nm radius around each individual platform helideck.

3.3 Airspace Structure – Morecambe Bay……

3.4 Airspace Structure – Liverpool Bay

3.4.1 The helicopter support land base is Blackpool Airport. Low level flights, normal operating height 1000ft amsl on the Blackpool QNH, operate daily between Blackpool Airport and the helidecks. Transit height to/ from the Lennox platform is 500ft amsl. Flights between helidecks are normally conducted between 500ft and1000ft.

3.4.2 The route structure is:

(a) Blackpool to Gate G (534449N 0030441W) to Hamilton (533357N 0032716W);

(b) Blackpool to Gate G to Lennox (533719N 0031037W).

Note: Routes are bi-directional.

3.4.3 Helicopter traffic information is available from Warton Approach during the Warton ATC published hours of operation. Outside these hours, information is available from Blackpool Approach.

3.4.4 Gas release and burn-off operations may take place at any time without prior notification from off-shore gas installations.'

(Rigs operated by BHP Petroleum and RTF Traffic and LOG 122·375MHz).

In the RT transcript reference is made to Helicopter Protected Zone (HPZ). These were renamed Helicopter Traffic Zones (HTZ) on 8 April 2010. CAA ATSI had access to the following:

RT recording from Liverpool and Warton ATC. NATS Area radar recording, Warton ATSU radar recording, written report from both pilots, Warton controller written report.

Warton and Liverpool METARs:-

METAR EGNO 161050Z 27014KT 9999 BKN044 08/06 Q1026=

METAR EGGP 161050Z 28011KT 9999 SCT046 08/06 Q1027=

At 1055:30, the P68 flight contacted Liverpool Approach and reported on task conducting an aerial survey in the Rhyl/Prestatyn area, off the N Wales coast at an altitude of 1300ft for a period of 3hr. The Liverpool controller agreed a BS, allocated a squawk 0260 and passed the Liverpool QNH 1027. The P68 pilot advised that he would give an 'Ops' call every 30min and reported commencing the survey.

At 1104:20, the AS365 flight, on departure from Blackpool, contacted Warton Approach, reporting in the climb to 1000ft. The Warton controller agreed a BS and passed the Warton QNH 1026.

At 1113:16, Warton radar recording shows the P68 N of the Douglas Platform, on the boundary of the HTZ, tracking W and indicating an altitude of 1200ft. The AS365 is shown entering the HTZ to the NE of the Hamilton Platform, indicating an altitude of 900ft. The distance between the 2 ac is 5nm.

At 1113:42, the Liverpool controller warned the P68 pilot to look out for traffic approaching from the NNE, squawking the rig conspicuity code (0467) and indicating 1000ft unverified. The P68 pilot reported looking out for t

At 1113:47, the Warton controller warned the AS365 pilot about traffic, 12 o'clock at a range of 3nm at 1300ft manoeuvring over the rigs showing a squawk allocated by Liverpool. The AS365 pilot advised Warton that the other aircraft [P68] was in a Protected Helicopter Area [AIP refers to Helicopter Traffic Zone]. The radar recording shows the 2 ac on reciprocal tracks at a range of 2·5nm, with the P68, indicating an altitude of 1300ft and the AS365, indicating an altitude of 900ft. The P68 is then observed to commence a L turn and track W.

At 1114:25, after a discussion with Liverpool, the Warton controller advised the AS365 pilot that the P68 was conducting an Aerial Survey. In response the pilot reported that the P68 was turning back towards them and said it would be helpful if the ac was on the company frequency [Rig RTF 122·375MHz]. The radar recording shows the P68, 2·1nm W of the AS365, turning onto an E'ly track. The 2 ac then track towards each other on converging headings.

[UKAB Note (1): By 1115:12, the radar recording shows the AS365 at altitude 900ft in the P68's 12 o'clock range 0·3nm, the P68 at altitude 1300ft. The next sweep at 1115:16 is the CPA, the tracks of the 2 ac having crossed, the P68 indicating an altitude of 1300ft with the AS365 indicating an altitude of 800ft in its 0130 position range 0·1nm. The next radar sweep shows the P68 now at 1400ft and the AS365 at 800ft as the 2 ac begin to diverge.]

At 1115:50, the AS365 pilot requested the registration of the P68 from the Warton controller and reported that the P68 had flown directly towards the helicopter at about 300-400ft above. The Warton controller informed the pilot that the P68 was shortly to come onto the Warton frequency. The radar recording shows the AS365 helicopter landing at the Douglas Platform at 1117:33 and the P68 tracking E/W indicating an altitude of 1300ft.

At 1120:40, the Liverpool controller (at the request of Warton) requested that the P68 pilot contact the Liverpool Bay Rig frequency 122·375MHz. Shortly afterwards at 1122:40 the P68 pilot reported back on frequency reporting 'no response' from the Rig frequency. The AS365 pilot subsequently reported that the P68 flight had called on the

Rig frequency but using the 'Warton' c/s. At 1125:40 the Liverpool controller instructed the P68 pilot to squawk 7000 and contact Warton Radar.

At 1126:35, the P68 flight contacted Warton and the pilot was asked whether he had been authorised to operate in the Rigs protected zone. The P68 pilot responded 'negative'. The controller agreed a BS allocating a squawk 3642. As part of the survey the P68 pilot indicated a requirement for tracks backwards and forwards until clear of the area and asked for permission to continue. The Warton controller responded that this couldn't be approved without prior authorisation and should really have been arranged before getting airborne. The P68 pilot advised that he would continue the survey work nearer to the shore and commented that he didn't have 'that helicopter area' on his chart. The P68 pilot then reported changing back to the Liverpool frequency.

When the AS365 helicopter reported airborne from the rigs returning to Blackpool the controller advised the pilot that the P68 did not have the HPZ on his chart and had been advised he wasn't allowed in. This was acknowledged by the AS365 pilot.

As a result of this incident, the Warton ATSU issued a bulletin to remind controllers of the status of the HTZs as described in the UK AIP. Warton also indicated that it is common practice for Warton controllers to remind pilots operating sorties off-shore that they should remain clear of the Liverpool HTZs. Warton considered it likely that over a period of time, this may have pre-disposed controllers into believing that pilots required permission to enter the area, when this was not the case.

It was not clear if the P68 pilot was aware of the off-shore operations, the Rig RTF frequency or the helicopter information available from Warton Approach specified in the UK AIP. The HTZ is not restricted or protected airspace and there seems to have been a misunderstanding by the controller regarding the status of the HTZ (referred to as HPZ). This resulted in the controller refusing permission for the P68 to continue in the area of the Gas Rigs.

Both flights were in receipt of a BS from 2 separate units. As indicated in the AIP, it would have been more appropriate for the P68 pilot to have contacted Warton to receive a service and additional information on helicopter activity in the area. The P68 pilot advised the Liverpool controller about survey work "just off the N Wales coast in the vicinity of Rhyl and Prestatyn"'. It may not have been obvious to the Liverpool controller that the P68 was going to operate in the vicinity of the Rigs. Both controllers gave a warning to their respective ac. CAP774, UK Flight Information Services, Chapter 2, Page 1, Paragraph 1, and 5, state:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.

Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ), and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot's situational awareness. This will not normally be updated by the controller/FISO unless the situation has changed markedly, or the pilot requests an update. A controller with access to surveillance-derived information shall avoid the routine provision of traffic information on specific aircraft, and a pilot who considers that he requires such a regular flow of specific traffic information shall request a Traffic Service. However, if a controller/ FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

After the Airprox, when it became apparent that the P68 was likely to be in conflict, a number of factors led to further misunderstanding.

a) The P68 was asked to contact the Rig RTF frequency 122.375MHz but appears to have used the 'Warton' callsign on that frequency. Receiving no response the P68 pilot returned to the Liverpool frequency.

b) The Warton controller seems to have been unclear regarding the status of the HTZ, referring to the HPZ and the requirement for prior authorisation.

CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

The Airprox occurred when the AS365 and P68 flights, whilst in receipt of a BS, came into close proximity when operating in Class G airspace within the Liverpool Bay Gas Field HTZ. There was no requirement for the controllers to monitor the flights but each passed a warning to their respective ac.

A number of factors were considered to be contributory:-

a) The 2 flights were operating in the same area but operating on separate frequencies.

b) The P68 pilot appears not to have been familiar with the guidance promulgated in the UK AIP regarding off-shore operations in the vicinity of the Liverpool Bay Gas Field.

c) The P68 pilot reported operating off the N Wales coast in the vicinity of Rhyl and Prestatyn. It was not obvious to the Liverpool controller that the P68 intended to operate in the vicinity of the Liverpool Bay Gas field.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

It was clear to Members that there were some misunderstandings within both cockpits of the subject ac and in Warton ATC. The AS365 pilot was apparently expecting more protection within the HTZ than was available; a HTZ is not an ATZ nor is it exclusive to helicopter traffic. The HTZ is Class G airspace where the presence of helicopters is highlighted for other users but with no ATC service available; the frequency is manned by ground personnel and is licensed for administrative and logistic purposes associated with safe offshore operations. The procedures followed by helicopter operators whilst flying within the HTZ were established by local agreement, there being no procedures promulgated for traffic transiting a HTZ. Similarly, the P68 pilot was unaware of the HTZ, owing to poor pre-flight planning, and was using the wrong chart during the survey flight. However, there was no reason for the P68 to be excluded from the Class G HTZ; the pilot did not need to contact any ATSU during the survey portion of the flight. That said, had the P68 pilot noted the HTZ's existence from the Northern Area chart, he would have been cross-referred to the AIP entry which mentions the availability of TI from either Warton or Blackpool ATSUs. The Board agreed it would be good airmanship to contact the relevant ATSU for TI whenever flying in a HTZ. Warton ATC erroneously believed that permission/authorisation was required for transiting traffic to enter the HTZ and that the P68 flight, without 'clearance' to be there, must vacate the HTZ. Given the Class G status of the airspace, both pilots were responsible for maintaining their own separation from other ac through see and avoid. In the end both flights, although under a BS from 2 different ATSUs, received a traffic warning on each other. This warning enhanced the P68 pilot's SA and enabled him to visually acquire the approaching helicopter about 2nm away and, he estimated, 500ft below; content that no action was necessary; he watched it pass well below by 800ft. Meanwhile the AS365 pilot already had a 'heads-up' on the P68 from his ACAS but was concerned that there was 'unknown' traffic within the HTZ. The AS365 pilot saw the P68 manoeuvring at about 10nm range and when the P68 turned onto an E'ly track a TCAS TA was generated. The AS365 pilot elected to descend to increase separation estimating the ac crossed with 300ft separation. The radar recording shows the converging ac initially separated by 300ft; they cross 0·1nm apart and separated by 500ft vertically. Members agreed that the visual sightings by both crews had ensured that any risk of collision had been effectively removed and, as there was no requirement on the P68 pilot to participate in procedure or contact an ATSU, the Board concluded that this had been a sighting report in a HTZ where normal procedures, safety standards and parameters pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report in a HTZ.

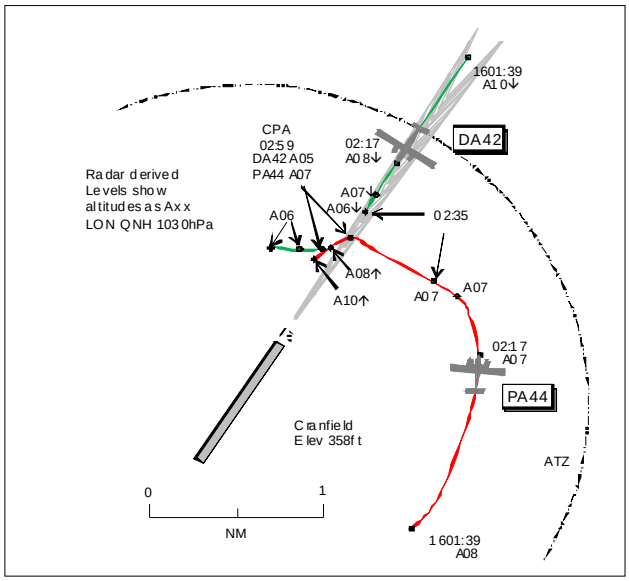
Degree of Risk: E.

AIRPROX REPORT NO 2012018

Date/Time:	20 Feb 2012 1602Z	
Position:	5205N 00036W (1nm FIN APP RW21 Cranfield - elev 358ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DA42 Twin Star	PA44
Operator:	Civ Club	Civ Trg
Alt/FL:	400ft↓ agl	800ft QNH
Weather:	VMC NR	VMC NSC
Visibility:	>10km	10nm

Reported Separation:
<100ft V/<100m H 200ft V/0·4nm H

Recorded Separation:
200ft V/0·2nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DA42 PILOT reports flying a short engineering test flight (1 visual cct) from Cranfield, VFR and in receipt of an ACS from Cranfield Tower on 122·85MHz, squawking 7000 with Modes S and C. The visibility was >10km in VMC and the ac was coloured white with wing-tip strobes switched on. On short final RW21 heading 213° descending through 400ft agl at 85kt he heard another flight being advised that they were No 2 to a DA42 (his ac) on final. His onboard EFIS/TAS audible warning alerted him to the presence of other traffic in close proximity but it gave no relative position. Traffic was immediately observed in his 10 o'clock range 100m about 100ft above and descending on base leg. He initiated avoiding action by applying power and commencing a level turn R turn and advised ATC that he was breaking-off the approach owing to an ac on a conflicting course. ATC instructed the other flight to go-around and he was instructed to re-establish on final. He assessed the risk as high.

THE PA44 PILOT reports flying dual training sortie from Cranfield, VFR and in receipt of an ATS from Cranfield on 122·85MHz, squawking 7000 with Modes S and C. The visibility was 10nm with no significant cloud in VMC and the ac was coloured white/blue with strobe and landing lights switched on. After going around into a low-level cct he was told he was No 2 to a DA42 on base leg. He looked but did not see any ac when he turned base due in part to the other ac being very low. He also expected to be No 1 by this point and ATC did not say anything until very late. Heading 290° at 100kt and 800ft QNH he had just spotted the DA42 ahead about 0·5nm away on low final and had just started a go-around when ATC finally asked whether he was visual. He estimated separation as 200ft vertical and 0·4nm horizontal at the CPA and he assessed the risk as medium. In summary, he thought the DA42 had carried out a wide and low cct, ATC had given a very late warning and his instructional workload was medium to high when he made a poor assumption that he had become No 1.

THE CRANFIELD ADC reports he was taking over from the previous controller as the PA44 was just going around from an NDB approach into a low-level cct and the DA42 was late downwind in the cct to land after an engineering flight check. As the PA44 flight went around it was passed TI on the DA42 and was told by the off-going controller that it was No 2. When the PA44 flight called downwind the DA42 traffic was re-iterated by the off-going controller and the DA42 was about to turn onto final. Both he and the off-going controller had sight of both ac. The off-going controller cleared the DA42 flight to land and he, the on-coming controller took over the control position. The DA42 pilot then called, "taking avoiding action on the (incorrect PA44 operator c/s)" and the ac broke R. He acknowledged the transmission, double checked the position of both ac and then instructed the PA44 flight to go-around to increase the separation before again passing TI to its pilot. The DA42 then orbited on final and made a normal landing while the PA44 flew another cct and landed.

AIRPROX REPORT No 2012018

ATSI reports that the Airprox occurred 1·3nm to the NE of Cranfield in the Cranfield ATZ (Class G airspace), which comprises a circle radius 2nm centred on the longest RW (03/21), from the surface to 2000ft above aerodrome level.

The DA42 Twinstar was operating VFR on an engineering test flight which required one visual LH cct.

The PA44 was operating VFR in the LH cct following a go-around from an NDB approach.

CAA ATSI had access to recordings of RT from Cranfield Tower and area radar recordings together with written reports from both pilots and the Cranfield ADC.

The Cranfield METARs are provided for 1550 and 1620 UTC:

METAR EGTC 201550Z 23019KT 9999 FEW035 07/M01 Q1028= and EGTC 201620Z 23015G25KT 9999 FEW045 06/M00 Q1028=

At 1557:10 UTC the PA44 pilot reported at 4 DME and was cleared for a low approach and go-around RW21.

At 1558:20 the DA42 pilot reported, "…*downwind simulated asymmetric*" and was told by ADC, *"…number two following a P A forty-four inside four miles on the N D B approach".*

At 1600:00 the pilot of the PA44 reported going around and the ADC enquired, *"(PA44 c/s) is this to circle ????? minima"*. The PA44 pilot replied, *"Affirm with er two further low levels to follow if possible"* and was told, *"…you are number two following a D A forty-two er mid-point left base"*. The PA44 pilot acknowledged *"Number two (PA44 c/s)"*.

At 1601:00 the DA42 flight was cleared to land. The pilot of the PA44 reported, "…*turning downwind low for two one*" and was told again, *"…number two following a D A forty-two final"*. The PA44 pilot read back *"Number two (PA44 c/s)"*. The report from the ADC stated that a handover took place when the PA44 was late downwind and that at the time of the handover both controllers had both ac in sight.

At 1602:17 the DA42 was on final 1·8nm NE of the airfield at 800ft while the PA44 was S of the DA42 by 1·3nm at 700ft.

At 1602:35 the PA44 at altitude 700ft had turned base inside the track of the DA42, which was indicating 600ft and was in its 10 o'clock position range of 0·6nm. The DA42 then fades from radar.

[UKAB Note (1): Just after 1602:40 the DA42 pilot asked, *"Er confirm the (erroneous company name)'s visual with us"* and Tower replied, *"Say that again"*. The DA42 pilot replied, at 1602:50, *"…is breaking off the (erroneous company name)'s heading straight for us*". The ADC asked the pilot of the PA44, "…*are you visual with the Twinstar you were told you were number two to*" to which the PA44 pilot replied, "…*we are now*". The CPA occurs at 1629:59 as the DA42 reappears on radar 1nm NNE of the ARP, just to the W of the FAT turning through a WSW'ly heading indicating altitude 500ft with the PA44 0·2nm to its NE turning L onto the FAT, 200ft above. Thereafter the ac diverge, the DA42 tracking W at altitude 600ft and the PA44 tracking SSW and climbing, in accordance with the ATC 'go-around' instruction.]

The written report from the pilot of the PA44 acknowledged the instruction to position No 2 to the DA42 but stated that he did not see any traffic when he turned base and that he expected to be No 1 by that point.

The radar replay shows that the PA44 flew a much smaller cct than the DA42. In addition, the DA42 was simulated asymmetric and the surface wind was reported as 23018G28kt when the DA42 was given landing clearance. The DA42 had a GS of 77kt on final compared to the 119kt GS of the PA44 on the downwind leg.

The Cranfield ADC instructed the PA44 flight to go around to increase the separation between the ac. Both ac subsequently landed without further incident.

As both flights were in Class G airspace, VFR, the pilots of both ac were ultimately responsible for collision avoidance.

The pilot of the PA44 was told twice to position No 2 to the DA42. When the pilot turned base he could not see the DA42 but continued to final in the belief that he had become No 1. The smaller cct flown by the pilot of the PA44 in combination with the difference in GS may have led to the PA44 pilot's perception that the DA42 was further ahead than was in fact the case.

Having instructed the PA44 to position No 2 to the DA42 the Cranfield ADC had an expectation that the pilot of the PA44 would position appropriately behind it.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The PA44 pilot was told twice by the ADC that he was No 2 to the DA42, which he acknowledged, and on both occasions was given accurate TI on its position in the visual cct; in between these 2 transmissions the ADC cleared the DA42 to land. The PA44 pilot appeared to have become task focussed on flying a low-level cct (usually a cct close-in to the RW) and had turned onto base leg without visually acquiring the DA42, having made an assumption that he had become No 1. The DA42's slow GS in the strong SW'ly wind may have caught out the PA44 pilot who may have thought the DA42 would have been much closer to the threshold by the time he had reached his turn onto final. It was only after the DA42 pilot asked the ADC whether the PA44 pilot was visual with his ac, and the ADC then asked this of the PA44 pilot, that the PA44 pilot reported visual contact just as he was commencing a go-around. Although these had been late sightings, the Board agreed that the root cause of the Airprox was that the PA44 pilot did not comply with the ADC's instruction to position as No 2 and flew into conflict with the DA42 on final which he had not seen.

Controller Members thought that the ADC had done all that was required of him and that it would have been difficult for him to assess exactly where the PA44 was in relation to the DA42 without an ATM. He had a justifiable expectation that the PA44 would position behind the DA42, as instructed, and was undoubtedly surprised when the 2 ac came into close proximity on final approach. Having ensured the PA44 pilot was visual with the DA42 the ADC instructed the PA44 flight to go-around to resolve the conflict and increase separation. The DA42 pilot, being concerned about the PA44's conflicting flightpath, had pre-empted the ADC's and PA44 pilot's actions and had initiated avoiding action by turning R, although this could have been constrained owing to the pilot's need to transition the ac from simulated asymmetric landing configuration into a go-around. The radar recording shows the ac separated by 200ft and 0·2nm at the CPA on short final. Taking all of these elements into account, the Board concluded that the actions taken by all parties were enough to remove the actual risk of collision but the ac had passed with safety margins reduced below those normally expected such safety had been compromised during this encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA44 pilot did not comply with the ADC's instruction to position as No 2 and flew into conflict with the DA42 on final, which he had not seen.

Degree of Risk: B.

AIRPROX REPORT NO 2012019

Date/Time:	20 Feb 2012 2008Z (Night)		
Position:	5818N 00621W (CPA 4.1nm N Stornoway - elev 26ft)		
Airspace:	Scot FIR	(Class: G)	
	Reporting Ac	*Reported Ac*	
Type:	S92A	Tornado GR4	
Operator:	Civ Trg	HQ Air (Ops)	
Alt/FL:	2000ft	2000ft	
	QNH (1011hPa)	NK	See radar snapshots below.
Weather:	VMC CLBC	VMC	
Visibility:	20km	10km	
Reported Separation:			
	0ft V/1-1.5nm H	Not seen	
Recorded Separation:			
	0V/1.3nm H		

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE S92A (S92) PILOT reports that he was flying an IFR training flight from Stornoway, squawking 7000 with Modes C and S, transmitting blind simultaneously on the APP frequency (ATC was closed) and Scottish FIS who provided a BS; TCAS 1 was fitted.

During the outbound leg from SAY, heading 355° at 120kt following the NDB 18 Approach Plate at 2000ft in VMC (night), when about 3nm N from SAY, they received an audio warning 'Traffic Traffic'. A TCAS contact was indicated in the front left position (10 o'clock) of the ac at about 2-3nm. A second 'Traffic Traffic' warning was then heard and avoiding action was taken by immediately turning to the R and initiating a descent and turning the searchlight on. During the turn the other ac was seen paralleling them on an E'ly track at a similar height and about 1-1.5nm away. During the turn, Scottish Control informed them there was a radar contact 2nm on their LH side but by then they were visual with the contact. Had the avoiding action not been taken he believes there would have been a High risk of collision; this view was agreed by Scottish in a subsequent discussion.

Earlier in the flight, as they departed the airfield, communication was made with the other ac [Callsign given] who had called Stornoway ATC. The helicopter pilot relayed that ATC was closed but they would be conducting approaches to RW18 at Stornoway. The Tornado pilot informed them that they were 45nm SW of Stornoway, routeing to 15nm to the W before returning feet wet, low level to Lossiemouth [he thought]. There was no further communication between the ac but he (the S92A pilot) continued to transmit 'blind calls' on the Stornoway ATC frequency.

He reported the incident to the Supervisor at Scottish Control after landing and assessed the risk as being high.

THE TORNADO GR4 PILOT reports flying a night low-level tactical training flight in the UKNLFS, squawking 7001 with Mode C. The report was made after viewing the mission replay system; the RT excerpts are as recorded.

At 1954 they contacted Scottish West Coast FIS (127.275) and asked if there was any traffic in the [West Coast] area; they were informed *"no traffic to affect"*. Then at 2001:50, a free call was made to Stornoway APP (iaw Lossie SOPs) stating their intentions; Coastguard XXX replied stating the, *"Tornado C/S from Coastguard XXX, Stornoway is closed. We're making blind calls on the frequency. We're operating an NDB 18, 3nm south of the field climbing to 2000ft"*. The Tornado crew replied, *"Tornado C/S we are 40nm to the south, routeing inland to the west of Stornoway at low level before boxing to the north before recovering to Lossie feet wet"*.

The helicopter pilot replied S92A: *'Coastguard xxx that's copied, will continue blind calls on frequency'*.

During a simulated attack (SAP) [TFR-Loft-TFR] run at 2006:25, a call was heard stating *'beacon outbound'*. At about 2008 they completed the recovery from a loft manoeuvre, then climbed to level at 2000ft amsl, heading outbound on 105° at 450kt to point 24 on the map provided. As the crew passed point 24 at 2008.03, they began a descent back to low-level. At 2009:55 they made a blind call 'en-route', to which the helicopter pilot replied, *"copied ?????"* (word unreadable).

They were informed of the incident later by the SFSO; they did not see the helicopter and assessed the risk as being low.

THE SCOTTISH AREA CONTROLLER reports he was called on 127.275 by a S92 helicopter, airborne from Stornoway who advised that he was going to do some practice NDB approaches but that ATC had closed at 1945; he requested and was given a BS. His position correlated with a 7000 squawk O/H Stornoway and the controller understood that to be him but did not give him a radar service.

He had been told about a Tornado ac that was operating in the area by the previous controller and he could see a 7000 squawk about 15/20nm SW of Stornoway, which he understood to be the Tornado. He told the helicopter that there was a Tornado operating in the area and passed the position of the traffic that he could see. Shortly afterwards he saw the Tornado turn N and he passed further information to the helicopter. The helicopter pilot advised him that he had spoken to the Tornado on the Stornoway frequency (123.5) and they had exchanged information. Sometime later the 7000 squawk turned towards the helicopter a couple of miles N of Stornoway airfield and he again passed TI and the pilot replied that he had it on TCAS. When they were within about 2 miles of each other the other traffic turned away to the NE. The helicopter then told the controller that in his conversation with the Tornado he had been told that he would not be coming within 15nm of Stornoway.

The S92 pilot did not say at the time that he was filing an Airprox and the controller only learnt of this sometime later.

ATSI reports that an Airprox was reported 5nm to the N of Stornoway in Class G airspace at 2008:02 between a Tornado GR4 (Tornado) and a Sikorsky S-92A helicopter (S92).

The S92 was carrying-out practice approaches at the Stornoway NDB (SAY) while the airfield was closed and was in receipt of a BS from Scottish Westcoast Sector on 127.275 MHz whilst also transmitting blind on Stornoway APP frequency 123.500 MHz.

The Tornado was on a tactical low-level flight about to commence a return to Lossiemouth and was listening out on the Stornoway APP frequency.

CAA ATSI had access to recordings of RTF from Scottish Westcoast Sector (Scottish) and the Stornoway frequency, area radar recordings together with written reports from both pilots and the Westcoast Controller.

The Stornoway METARs for 1950 and 2020 were:

METAR EGPO 201950Z 21005KT 9999 FEW018 05/02 Q1012=

METAR EGPO 202020Z AUTO 23007KT 9999 FEW035/// 04/01 Q1012=

At 1946:40 the S92 was inbound to Stornoway and the pilot advised Stornoway APP that they would be dropping off two crew before departing again for some instrument training; Stornoway advised the pilot that ATC was closing and to continue with blind calls.

At 1959:40 the S92 reported departing from RW18 on the Stornoway frequency.

At 2002:00 the pilot of the Tornado called on the Stornoway APP frequency; the S92 pilot advised him that Stornoway was closed, and that they were transmitting blind on the frequency.

The written report from the S92 pilot stated that they were told by the Tornado pilot that the Tornado would be operating '45 miles Southwest of Stornoway, routing west by 15 miles before returning feet wet, low level to Lossiemouth'. The report from the Tornado pilot stated that they were '40 miles to the south, routing inland to the

west of Stornoway at low level before boxing to the north before recovering to Lossie feet wet'. The ground-based RTF receiver at Stornoway only recorded the latter part of the conversation between the two ac which was "*Stornoway at er low level before boxing to the north and recovering er back to er Lossie feet wet".*

At 2003:20 the S92 pilot contacted Scottish and advised them that the ac was at 2000ft, operating overhead Stornoway and intended to do the NDB procedure to RW18; Scottish advised the S92 that there was a Tornado operating to the SSW of Stornoway by about 15nm heading N at about 1500ft. The pilot of the S92 advised Scottish that they were two-way with the Tornado on the Stornoway frequency and a BS was agreed.

The written report from the S92 pilot stated that during the outbound leg from SAY they received a TCAS traffic warning indicating traffic in their 10 o'clock position at a range of approximately 2-3nm. A second 'Traffic, Traffic' warning was given and avoiding action was taken by the pilot by turning to the right and initiating descent.

At 2007:40, as the S92 was in the turn, Scottish passed TI on the Tornado to the pilot of the S92, stating, "*Tornado in your vicinity now passing through your 12 o'clock range of about 2 miles showing you're the same altitude*". The S92 pilot obtained visual contact with the Tornado which was paralleling the S92's track. The minimum distance was 1.4nm [after the S92 had turned to the E] with both ac at 2000ft.

The Tornado subsequently tracked to the NE of Stornoway and advised on the Stornoway frequency that they were routeing E at low level and were going en route.

As both ac were in Class G airspace, the respective pilots were ultimately responsible for collision avoidance.

In respect of a Basic Service, CAP774 the Manual of Flight Information Services, Chapter 2, paragraph 5 states:

'Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ)...on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot's situational awareness... A controller with access to surveillance-derived information shall avoid the routine provision of traffic information... However, if a controller/FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

The Scottish controller gave generic traffic information on the Tornado operating to the SSW to the S92 pilot and then passed a warning when the Tornado flew into proximity with the ac.

When the S92 pilot received a traffic warning on TCAS, avoiding action was taken. The Tornado was not TCAS equipped and the pilot of the Tornado did not see the S92.

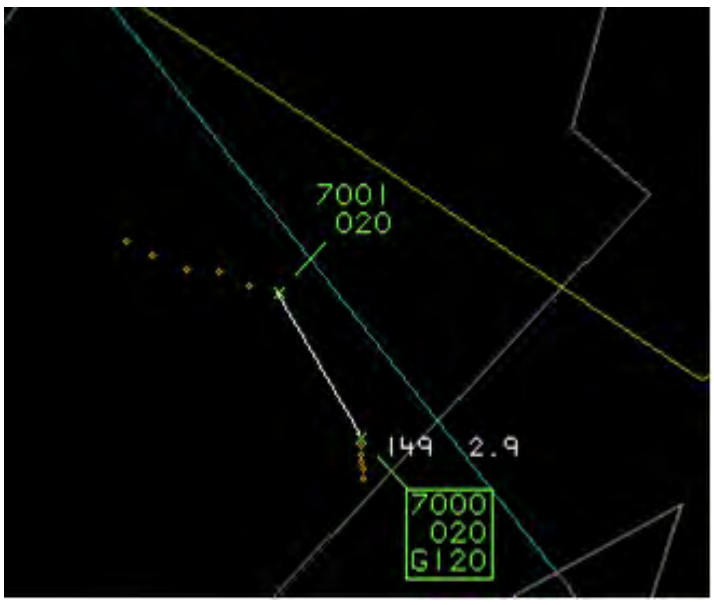


Figure 1. Scottish Controller passes TI to Coastguard XXX. (2007:40)

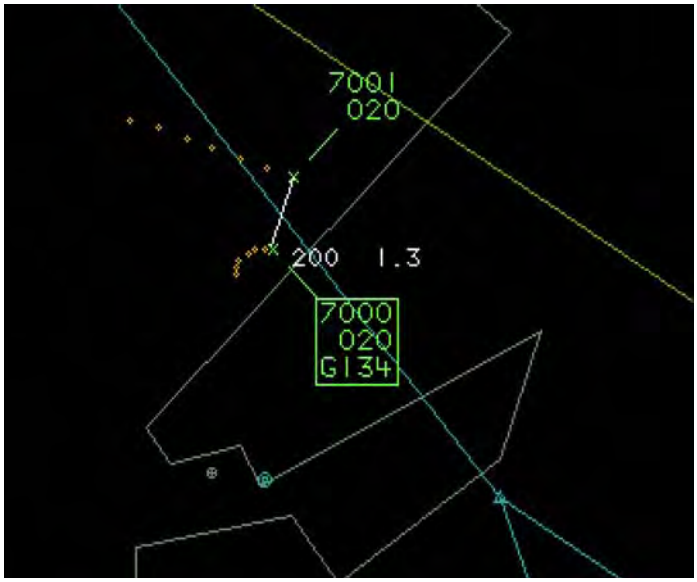


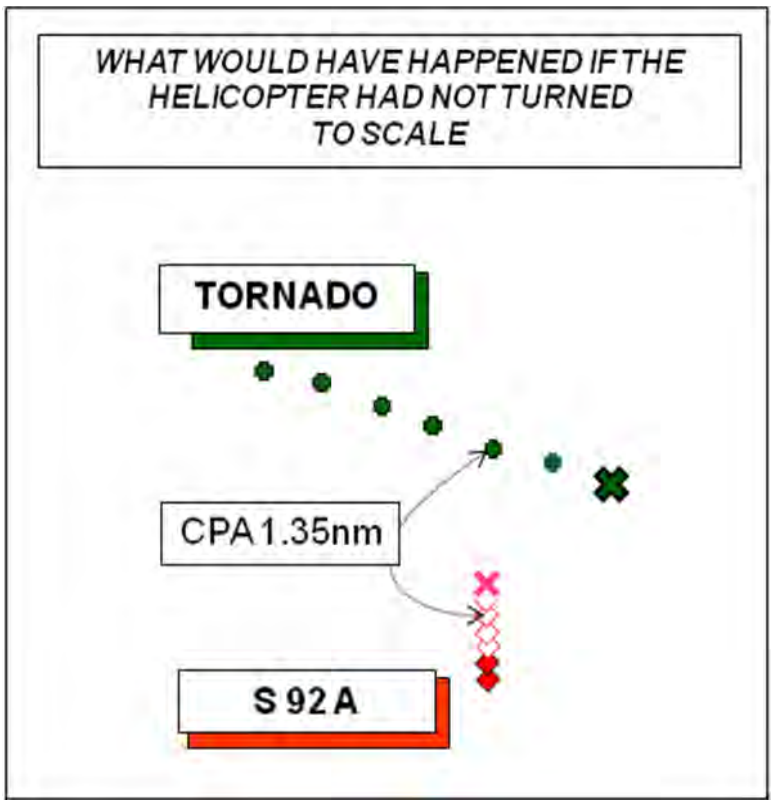
Figure 2. Closest point of approach 1.3nm & 0ft (2008:00)

HQ AIR (OPS) comments that the Airprox was a perceived conflict in Class G. Both parties took sensible precautions in establishing communications with other traffic, but neither was under a Traffic Service. This communication failed in that neither appeared to comprehend the intentions of the other. The Tornado crew did not appreciate that the S92 was actually routing to the north at 2000ft as they do not routinely carry NDB approach plates and had heard the report that the S92 was to the south of Stornoway. Equally, the Tornado crew's reference to "boxing" to the north appears not to have been understood by the S92 crew, who believed the Tornado would not approach within 15nm. In both cases, a longer but clearer description of routings may have assisted in the mutual understanding of the potential for conflict. It is interesting that neither crew felt the need to question the other's calls, apparently content that no conflict existed. The benefit of the S92's TCAS in this incident, coupled with the Tornado's requirement to operate IFF, is evident; fitment of TCAS to the Tornado fleet is still under consideration but is not yet funded, and it is very likely it would have increased the Tornado crew's SA on the S92.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the ScACC RT frequencies, radar recordings, reports from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

The Board was shown a diagram (below) depicting what would have happened had the S92 not turned to the right (using actual G/S and headings taken from the Stornoway SSR). It showed that the Tornado would have passed from left to right through the S92's 12 o'clock at a distance of 1.3nm at the same alt (2000ft amsl). That being the case Members agreed that the S92's turn had not had the desired effect of increasing the separation between the ac.



The Board agreed that both ac had been operating legitimately in Class G airspace where 'see and avoid' is the principal method of collision avoidance. Stornoway Airport was closed and the Tornado would not have anticipated any local traffic in the area. Nevertheless, the crew called Stornoway in accordance with SOPs and were made aware of the presence of S92 and that it was conducting IF approaches; they would not, however, have been aware that RW18 NDB pattern conflicted with their planned route.

Although aware that the S92 was in the area, the Tornado crew did not see it and therefore were not able to increase the separation (perhaps vertically). Members opined that this might have been due to the background of cultural lighting from the town. The S92 pilot, seeing the Tornado approach from their left, initially only on the TCAS, opted to turn right and remain at 2000ft, the minimum alt for that sector; having turned to parallel the Tornado they first saw it visually on their left when it was overtaking them.

Although Members considered the separation reasonable (1.3nm H) and they agreed that was no risk of collision, they observed that had there been more effective communication between the ac regarding each other's intentions when they talked on the APP frequency, the incident would most likely have been avoided.

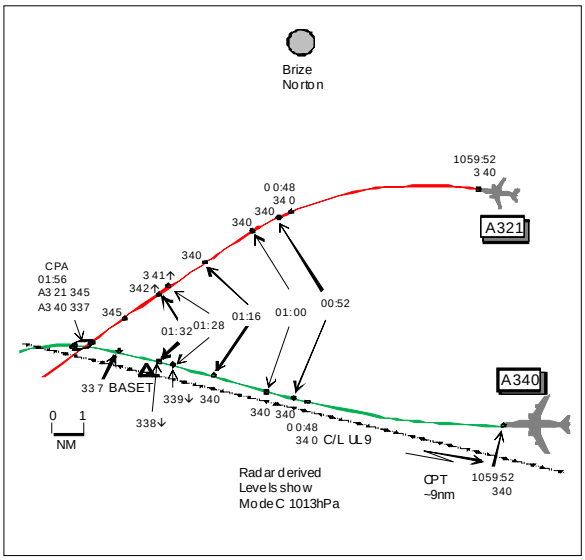
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Tornado crew and effectively a non-sighting by the S92 crew.

Degree of Risk: C.

AIRPROX REPORT NO 2012020

Date/Time:	25 Feb 2012 1102Z (Saturday)	
Position:	5135N 00146W (21nm WNW CPT)	
Airspace:	UAR UL9	(Class: C)
	Reporting Ac	*Reporting Ac*
Type:	A321	A340-600
Operator:	CAT	CAT
Alt/FL:	FL340	FL340
Weather:	VMC CLNC	VMC NR
Visibility:	NR	NR
Reported Separation:		
	500ft V/1-2nm H	500ft V/1000m H
Recorded Separation:		
	800ft V/0·4nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports cruising at FL340 heading 270° at 450kt near BASET intersection and in communication with London on 135·255MHz, squawking with Modes S and C. Behind them, also at FL340, was an A340. Both flights reported light to severe turbulence and since Met conditions were similar at both higher and lower levels they needed frequent heading changes for about 15min (Wx avoidance). They were cleared BASET – LIPGO, he thought, when the FO came back to the flightdeck after a short absence; the Capt had been alone for some minutes. The clearance read back was not challenged by the controller, the read back was supposedly correct. The crew were about to confirm the turn to BASET when ATC changed the clearance to another waypoint followed by heading changes to them and the A340. Before the turn could be performed a TCAS RA 'climb' was received and this was executed; the A340 received a TCAS RA 'descend'. At the CPA there was 500ft vertical and 0·5nm horizontal separation and he assessed the risk as high.

THE A340 PILOT reports cruising at FL340 at 480kt near CPT routeing direct to SLANY and in communication with London, squawking with Modes S and C. The Wx was VMC. There was dense traffic in the London area with several ac on ATC headings. They were aware of an A321 which approached from their R and behind which triggered a TCAS TA and then an immediate RA 'descend', which was executed. At the CPA 500ft vertical and 1000m horizontal separation existed and he assessed the risk as medium.

THE LAC S8/35T CONTROLLER reports the A321 was en-route to Dublin and the A340 was routeing to N America both at FL340 and were transferred to him from London Upper Sector (LUS) on parallel headings; the A321 was on the N side of the A340. He sent the A321 direct to BADSI then LIPGO which involved a R turn and then he sent the A340 direct to SLANY which is also a R turn. He then noticed STCA flashing red [high severity alert] because the A321 had turned L towards the A340. He turned the A321 R onto heading 310° or 315° but thought the turn instruction was not acknowledged. He then gave avoiding action to the A321 to turn R onto heading 315° and gave avoiding action to the A340 to turn L onto 180°. He thought the A321 flight acknowledged but the A340 flight didn't. He then gave the turns again however, another flight checked-in immediately after the avoiding action was given but he ignored the call. The A321 flight reported a TCAS RA which he acknowledged.

ATSI reports that the Airprox occurred at 1101:56UTC, in Class C CAS, 12nm WNW of reporting point KENET. The 2 ac involved were in receipt of a RCS from LAC, Brecon (BCN) Sector 35 (S35). Both ac were being operated by the same airline.

The A340 was operating IFR on a flight from Europe to N America and had flight planned to route UAR UL9 between CPT and SLANY (Fig 1).

AIRPROX REPORT No 2012020

The A321 was operating IFR on a flight from Europe to Dublin and had flight planned to route UAR UL9/UL18 between CPT and DIKAS then UL18 DIKAS to LIPGO (Fig 1). UL18 is classified as a conditional route which was available on the Saturday of the Airprox.

LAC BCN S8 and S35, 2 of 4 Brecon sectors, were combined and manned by a tactical controller (T) and planner controller (P), utilising the interim Future Area Control Tools Support (iFACTS) system, which uses Trajectory Prediction, Medium Term Conflict Detection, and Flight Path Monitoring. The ATSA position was not manned and the other two BCN Sectors S5 and S23 were also operating combined. The S35(T) controller had been operational at Swanwick for 2·5yr and the S35(P) controller for 6 months.

CAA ATSI had access to RT recordings and area radar recordings together with written reports from the controllers and pilots. The Eurocontrol Automatic Safety Monitoring Tool (ASMT) recorded four messages related to this encounter.

The 2 ac were maintaining FL340, radar heading 280° and established on parallel tracks. As the ac passed N abeam the WOD NDB, the A340, squawking 2514, was in the centre of the UAR and the A321, squawking 2515, was offset to the N, separated by 8·4nm. As the 2 ac approached the CPT VOR the ac were transferred from LUS to the S35(T) controller with an instruction to 'report heading'.

At 1058:41, the A340 flight contacted the S35(T) controller, *"London (A340 c/s) level flight level three four zero".* This was acknowledged, *"(A340 c/s) Roger"* and there followed a discussion regarding turbulence about 40 to 50 miles ahead.

At 1059:22, the A321 flight contacted the S35(T) controller, *"Hello London (A321 c/s) level three four zero heading two eight zero."* The S35(T) controller replied, *"(A321 c/s) good afternoon route direct to BADSI then LIPGO."* The A321 pilot responded, *"(A321 c/s) direct BASET er after to er LIPGO."* The S35(T) controller acknowledged, *"Affirm."* The incorrect read back was not detected by the controller.

The A321 pilot's written report stated, '(A321 c/s) was cleared BASET – LIPGO when FO came back to cockpit after short absence (Capt alone for some minutes). The clearance read back, however was not objected by controller (read back supposedly correct).'

At 1059:52, the S35(T) controller instructed the A340 flight, *"(A340 c/s) route direct to SLANY"* and the A340 pilot replied, *"(A340 c/s) direct to SLANY thank you."* The lateral separation between the 2 ac was 7·9nm. The S35(T) controller's expectation would be that the 2 ac would establish on tracks to SLANY and BADSI (Fig1), diverging by approximately 20°. The iFACTS system showed that the S35(T) controller had placed the 2 ac on their own navigation and that the diverging tracks were not in confliction.

Fig 1

At 1100:48, the radar shows the A321 had commenced a L turn towards BASET. At 1100:52, the distance between the ac was 6·4nm. The S35(T) controller instructed the A321 to turn R 'now' to BADSI and at the same time STCA activated. The S35(T) controller immediately gave avoiding action to both ac. The three transmissions occurred in quick succession, with 1sec between each, as shown below:

"(A321 c/s) er turn right now to BADSI, right now to BADSI."

"(A321 c/s) avoiding action turn right heading two correction turn right heading three two five."

"(A340 c/s) avoiding action turn left heading one eight zero degrees."

The A321 pilot mistakenly replied to the avoiding action given to the A340, "*(A321 c/s) turn left heading one eight zero degrees."* The S35(T) controller responded, *"(A321 c/s) negative right heading three two five."* The A321 pilot replied, *"Right heading three two five (A321 c/s)."* However, during this conversation a TCAS TA was recorded by the Eurocontrol ASMT at 1101:01, followed by a TCAS RA at 1101:15. The A321 received a 'climb alert' and the A340 a 'descend alert'.

The A321 pilot's written report stated that, 'Pilots were about to confirm the turn to BASET when ATC changed the clearance to another waypoint followed by heading changes given to (A340 c/s) and (A321 c/s). Before turn could be performed TCAS RA came up with climb for (A321 c/s) and descent for (A340 c/s)."

At 1101:16, (distance 3·9nm) the S35(T) controller instructed the A340 flight, *"(A340 c/s) left heading one eight zero degrees now."* There was no response and the S35(T) controller made 2 further transmissions to the A340 flight:

"(A340 c/s) left heading one eight zero degrees."

"(A340 c/s) left heading one eight zero degrees" and after this third transmission the pilot responded, *"(A340 c/s) left heading one eight zero TCAS descent.*" This was followed with a transmission from the A321 pilot, *"(A321 c/s) we have TCAS climb."*

The S35(T) controller responded with *"Roger."*

The A340 continued on the W'ly track as it responded to the TCAS RA.

At 1101:32, radar shows the 2 ac converging with a lateral separation of 2·4nm. The A340 is at FL338 descending and the A321 at FL342 climbing. The A340 levels-off at FL337 and the A321 at FL345.

[UKAB Note (1): The CPA occurs at 1101:56, the A321 passing 0·4nm behind the A340 with vertical separation of 800ft].

The Local Area Supervisor (LAS) arranged for the S35(T) controller to be relieved by the adjacent S35(P) controller and an oncoming supervisor took over the planner position. Additional staff was called to provide relief. At this point, it was not clear to the S35(P) controller, what clearances were valid as the electronic strip marking was no longer up to date.

At 1102:06, the A340 crew reported, *"…clear of conflict returning to as assigned erm clearance."* The A340 commenced a L turn to the previously assigned heading of 180°. The S35(P) controller instructed the A340 flight to stop the turn heading 220°. Radar shows the 2 ac tracking SW, separated by a distance of 2·2nm. The A340 flight, being the W'ly of the 2 ac, was then instructed to route direct to SLANY.

At 1102:37, the A321 crew reported clear of conflict and the S35(P) controller instructed the A321 flight to descend to FL330 on the S'ly heading. At 1103:36, lateral separation has increased to 5·5nm and the S35(P) controller instructed the A321 flight to turn R heading 280°.

At 1104:55, the S35(P) controller was also relieved from the operational position and the oncoming controller continued to provide a service to the 2 flights.

Within 2min of the ac coming on frequency the S35(T) controller had issued direct routeings to both flights with an expectation that their tracks would diverge by approximately 20°. (Fig 1).

The A321 crew was instructed to, *"route direct to BADSI then LIPGO"*, but gave an incorrect read back "*direct BASET er after to er LIPGO."* This was not detected by the S35(T) controller and resulted in the A321 commencing a L turn to intercept the UAR C/L at BASET, bringing it into conflict with the A340. A number of contributory factors may have caused the pilot to mistake BASET for BADSI and the S35(T) controller to miss the incorrect read back:

The next waypoint in the A321 Flight Management System (FMS) after KENET was 'BASET' and this may have influenced the pilot's mindset/ perception of what he heard and his belief that BASET was the next way point, despite the controller's reference to BADSI.

It was not clear if the reported absence/return of the FO to the flightdeck, was a distracting factor which may have contributed to the incorrect read back.

CAA ATSI considered that the pilot's accented read back of BASET, with an emphasis on phonetics 'B' 'A' and 'S', could easily have been misconstrued by the controller in the operational environment as BADSI. It was only with the benefit of a number of recorded playbacks that CAA ATSI was able to identify the waypoint as BASET.

The controller's bias of expectation, (hearing what he expected to hear or half hearing) together with the phonetic similarities, very likely predisposed the S35(T) controller into believing that the read back was correct, which he acknowledged with *"Affirm."*

Once the controller was alerted to the error and potential conflict, the S35(T) controller instructed the A321 to turn R 'now' for BADSI but almost immediately, probably as a result of the STCA activation and the urgency of the situation, gave avoiding action to both ac. This resulted in the 3 rapid transmissions with only 1sec interval between each:

"(A321 c/s) turn right now for BADSI – right now to BADSI."

The A321 crew indicated that they were about to confirm the routeing to BASET when ATC changed the clearance to another waypoint. The A321 crew would not have been familiar with BADSI, previously affirmed as BASET and there was insufficient time for the pilot to assimilate the information before immediately being given avoiding action:

"(A321 c/s) avoiding action turn right heading two correction turn right heading three two five."

"(A340 c/s) avoiding action turn left heading one eight zero degrees."

The A321 crew mistakenly responded to the heading instruction meant for the A340, which was corrected by the S35(T) controller, but it was then too late as both crews reacted to the TCAS RA. The rapid delivery of these instructions to the 2 flights with the same company callsign-prefix was very likely confusing and did not afford the crews the opportunity to assimilate or acknowledge them. The flightdeck workload was likely to have been very high in response to the TCAS RA alerts.

The Manual of Air Traffic Services (MATS), Part 1, Appendix E Pages 1/2 state:

'Radiotelephony provides the means by which pilots and ground personnel communicate with each other. Used properly, the information and instructions transmitted are of vital importance in assisting in the safe and expeditious operation of aircraft. However, the use of non-standard procedures and phraseology can cause misunderstanding. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of non-standard phraseology. **The importance of using correct and precise standard phraseology cannot be over-emphasised.'**

'Be aware that the mother tongue of the person receiving the message may not be English. Therefore, speak clearly and use standard radiotelephony (RTF) words and phrases wherever possible.'

'It should be noted that standard phraseology with clear enunciation and an urgent tone must be used for collision avoidance instructions.'

The avoiding action did not contain the word **'**immediately**'** or provide TI. MATS Part 1, Appendix E (Attach), Page 11, specifies the phraseology to be used when giving avoiding action:

"(A/c identity) avoiding action, turn left/right immediately heading (three digits) traffic (left/right) (number) o'clock (distance) miles opposite direction/crossing left to right/right to left (level information).* (**Clear enunciation and an urgent tone must be used.)"*

The Airprox occurred as a result of the incorrect read back by the pilot of the A321, which was not detected by the S35(T) controller and resulted in the 2 ac coming into conflict with a loss of separation. The situation was resolved by the interaction of the TCAS RA.

A number of factors were considered to be contributory;

The A321 was cleared to route direct BADSI-LIPGO when coincidentally BASET was the next waypoint in the FMS. This may have caused the A321 pilot's misperception and response, 'BASET-LIPGO.' It is considered likely that neither of the reporting points BASET or BADSI would have been familiar to the pilot.

The A321 pilot's accented read back, together with the controller's bias to hear what he was expecting to hear, caused the controller to accept the read back as being correct.

The speed of events, the use of same company callsign prefix and the rapid succession of RT transmissions from the S35(T) controller in attempting to recover the situation was very likely confusing to the crews.

The avoiding action phraseology was non-standard and did not allow the crews to acknowledge or respond. This resulted in the A321 crew acknowledging the heading meant for the A340. It was then too late as the 2 crews responded to the TCAS RA alerts.

Recommendations:

CAA ATSI recommends that NATS Swanwick ATSU include this or a similar scenario, together with lessons learned in controllers' Training in Unusual Circumstances and Emergencies (TRUCE) module.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

It was clear that that there were several human factor elements underlying the primary cause of this incident. When the A340 flight first called on frequency, the crew did not report their radar heading, as instructed by the previous controller on the LUS, and the S35T did not confirm this fact which was essential to ensure that the radar separation from the A321 was maintained. That said, Members agreed the crucial point occurred when the A321 flight made its initial call on frequency. The S35T controller intended that the A321 and the A340 should take up divergent tracks. He instructed the A321 flight to take a direct routeing to BADSI that should have placed the ac onto a more NW'ly track away from the A340 flight, which was given a direct track to SLANY; this track divergence was confirmed by iFACTS. However, the A321 crew did not assimilate the 5-letter name-code designator given and had read back BASET, the next waypoint on the ac's FMS. This incorrect read back went undetected by the S35T controller, which had led to the A321 turning towards the A340 and caused the Airprox. Members sympathised with the S35T's predicament, as the accented reply by the A321 crew had made the controller's recognition of the BASET waypoint read back more difficult. However, the onus is on a controller to ensure an accurate read back of instructions passed. The RT recorded playback, analysed by ATSI, had found the waypoint read back to be unclear i.e. open to misinterpretation. This, when combined with the controller's expectation bias had led to him believing that the read back was correct. The BADSI waypoint was apparently not expected by the A321 crew and, as their read back of BASET had gone unchallenged, the crew believed that it was correct. Notwithstanding that their read back was not challenged, the crew was unsure about the instruction but by the time they were ready to query it, the controller was transmitting avoiding action. A CAT pilot Member stated that the

FMS would list several waypoints on a page for the intended route and that BADSI could have been off the bottom of the page listing and the list may have needed scrolling to bring the waypoint onto the FMS page. Around this time, the FO was returning to the flightdeck which would have meant there was no cross-cockpit confirmation of RT transmissions while the flight was operating single crew. While accepting that "needs must", a CAT pilot Member opined that single pilot operation in such busy airspace, particularly when Wx avoidance and turbulence was reported, was unfortunate timing.

Although the A321 crew had started the L turn to BASET, Members agreed that the situation was recoverable. However, when S35T noticed it, he gave the A321 flight a R turn to BADSI and then avoiding action to both flights in rapid succession. This left insufficient time for A321 crew to assimilate the waypoint information ahead of the avoiding action heading instructions and for either crew to acknowledge. The A321 crew read back the heading instruction meant for the A340 flight, which was corrected by the controller, however this delay had resulted in the ac flight paths broaching the ACAS 'safety bubble' leading to TCAS RAs on both flightdecks. Neither crew acted on the avoiding action issued but both reacted promptly to the coordinated RAs which resulted in the ac passing with 800ft vertical separation at the CPA of 0·4nm. These actions were enough for the Board to conclude that any risk of collision had been effectively removed.

Owing to the close similarities between BASET and BADSI waypoints, and noting another waypoint BAKUR in the same area, Members were minded that a safety recommendation was required to ensure that the 5 letter name-code designators were reviewed by the CAA to avoid potential future confusion.

PART C: ASSESSMENT OF CAUSE AND RISK

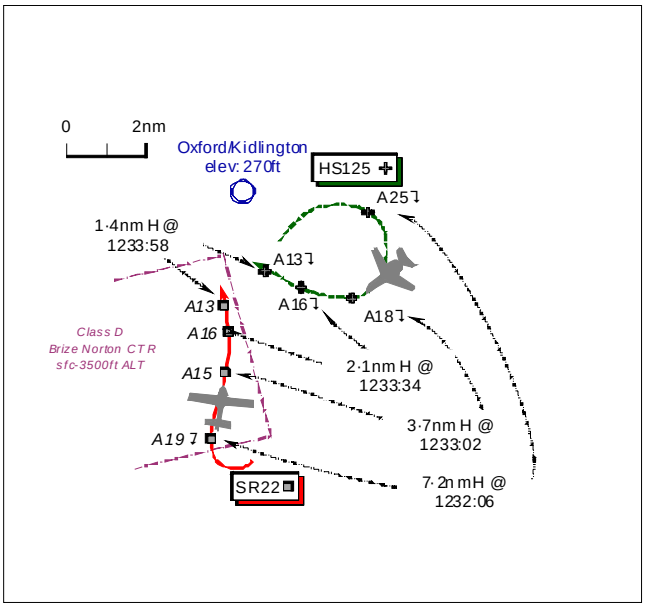
Cause: The S35T controller did not detect the A321 pilot's incorrect read back.

Degree of Risk: C.

Recommendation: The CAA is recommended to review the 5-letter name-code designators in this area to avoid potential confusion between BASET, BADSI and BAKUR.

AIRPROX REPORT NO 2012021

Date/Time:	25 Feb 2012 1235Z (Saturday)	
Position:	5148N 00120W (Final approach to RW01 @ Oxford/Kidlington - elev 270ft)	
Airspace:	CTR/ATZ	(Class: D/G)
	Reporting Ac	*Reported Ac*
Type:	HS125	SR22
Operator:	Civ Comm	Civ Pte
Alt/FL:	700ft↓	1200ft↓
	QNH (1027hPa)	QNH (1027hPa)
Weather:	VMC CLOC	VMC NR
Visibility:	10km+	>10km
Reported Separation:		
	NK	5-700ft V/1nm H
Recorded Separation:		
	<1·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RAYTHEON HAWKER 800XP (HS125) PILOT reports that they were on a short VFR positioning flight from Farnborough to Oxford/Kidlington following a charter flight that had terminated at Farnborough. The in-flight weather was good and reported at Oxford as: visibility 10k+, with FEW clouds at 2900ft. They had opted for a visual join and the 1st Officer was the PF at the time of the Airprox. Oxford TOWER was providing a PS/BS on 125·325MHz. A squawk of A7000 was selected with Modes C and S on; TCAS II is fitted.

From overhead, they made a descending right hand orbit to the E of the A/D to join on a R base for RW01. ATC reported their ac was in sight from the Tower during this period and they were cleared to land as they commenced their turn onto final approach. There was no other traffic reported in their vicinity at this point. On short final, heading 010° at 140kt descending through 700ft less than 1min before landing, ATC transmitted on the RT 'Aircraft on finals identify?' He assumed they meant his HS125, but this confused them because they had been cleared to land and previously reported as 'in sight' by ATC; he answered with '[HS125 C/S] short finals to land'. ATC then replied; 'no, the other aircraft on finals, identify?'

By this time they were less than half a mile from the threshold, so it was clear the other ac was behind them. ATC asked the pilot of the other ac – the Cirrus SR22 - if he was visual with their HS125, who replied that he was. He believes ATC then instructed the SR22 pilot to go-around and he remembers hearing the pilot acknowledge this transmission.

After landing they listened to the RT as ATC told the SR22 pilot that he had mistakenly flown the wrong procedure and had not only come close to their HS125 on their final approach but had also, more than likely, infringed the Brize Norton CTR. As they taxied-in, his 1st Officer asked ATC how close to them the SR22 had been when first sighted by ATC, the controller replied 'approximately half a mile'.

The HS125 has a final approach speed of about 140kt and being a light single engine ac the SR22 must be closer to 70kt [100kt reported]; therefore, as they made their turn onto final the SR22 must have been extremely close to them to have flown to within half a mile astern as they pulled ahead onto short final. TCAS gave them no warning - neither a TA nor RA was enunciated. Neither he nor his colleague saw the SR22 during the period of the Airprox and he assessed the Risk as 'medium'.

He suggested that a radar installation at Oxford would have prevented this Airprox as ATC would have known the SR22 pilot was flying the wrong procedure as soon as he started. His ac is white with blue stripes; the HISLs, anti-collision bacon nav and landing lights were all on.

AIRPROX REPORT No 2012021

THE CIRRUS SR22 PILOT reports he was flying solo in VMC and in receipt of a BS from Oxford APP on 125·325MHz. His ac is coloured white; he did not report the status of his aeroplane's lighting.

He was descending on the ILS for RW19 when ATC called to advise of a RW change due to the surface wind backing. He misheard the instruction from the controller, which was for him to use the RW100 *(sic)* procedure, and changed his approach to that for the NDB procedure to RW01.

On final descent through 1200ft QNH (1027hPa) heading 010° at 100kt, bearing 190° from the OX NDB at 1·5 – 2nm DME, he saw a business jet – the HS125 - on final approach about 1nm ahead and 500-700ft below his aeroplane, so he immediately broke off the approach and turned R to avoid it. His TCAS did not activate and the controller also reported the HS125 ahead of his ac. Minimum separation was 1nm horizontally and 500-700ft below his ac; he assessed the Risk as 'low'.

THE OXFORD COMBINED AERODROME AND APPROACH CONTROLLER (APP) reports that the ADC position was bandboxed with APP operating on 125·325MHz. The SR22 pilot was booked in for 2 ILS training approaches on RW19. After the 1st approach the RW in use was changed to RW01 and the SR22 pilot elected to continue training by flying the NDB 100 Procedure and circling to land on RW01. She checked that the pilot had the correct approach plates to which he replied 'affirm'. After 8min in the hold she cleared the SR22 for the NDB 100 Procedure, again emphasising the circle to land on RW01. When the SR22 pilot reported 'beacon outbound' the DF indication was to the N of the OX. Meanwhile, the HS125 crew called SE of the A/D requesting a VFR R base-leg join for RW01; she approved the R base-leg join for the HS125 and the ac continued inbound towards the A/D. The SR22 pilot reported 'base turn complete' and was instructed to report at 4 DME; the pilot's intentions were obtained, which was a missed approach and depart the area. Missed approach instructions were issued to the SR22 pilot, which involved the ac flying overhead the A/D W to E and departing to the E, which was acknowledged. When the HS125 crew reported on right-base for RW01, she cleared the flight to land and was awaiting the 4DME report from the SR22 pilot, which she believed was on the FAT of 100° as per the procedure.

As she watched the HS125 on final for RW01 an ac was observed about half a mile behind it, which by checking the DF and pilot report she established was the SR22. A 4DME report had not been passed by the SR22 pilot, who had flown the wrong procedure and flown the NDB RW01 procedure not the 100° procedure for which they had been cleared.

The SR22 was sent around immediately and TI was passed. The HS125 crew continued inbound for a normal landing; no TCAS RA or TA was reported. The SR22 went around and she advised the pilot that he had flown the incorrect procedure. The SR22 pilot departed to the E and changed frequency to Denham at 1239 upon leaving the ATZ. She contacted Brize Norton to advise them that the SR22 crew had flown the RW01 NDB Procedure by mistake (Oxford ATC is required to obtain permission from Brize Norton ATC to clear ac for this procedure as it infringes the Brize Norton CTR). Brize Norton reported they had no traffic to affect the ac on this occasion.

UKAB Note (1): The UK AIP at AD 2-EGTK-1-5 promulgates the Oxford/Kidlington ATZ as a circle radius 2nm centred on the midpoint of RW01/19, extending from the surface to 2000ft above the aerodrome elevation of 270ft and active in Winter, daily, from 0630 – 2230.

ATSI reports that the Airprox occurred about 1.9nm SSW of Oxford Airport on final approach to RW01 at the boundary of the Oxford ATZ; the HS125 was inside the ATZ and the SR22 just exiting the Brize Norton CTR. The HS125 was inbound VFR to RW01 on a positioning flight from Farnborough and in receipt of a BS from Oxford APPROACH. The SR22 was inbound IFR from Denham for training, having pre-booked two ILS approaches for RW19. After the SR22 completed the first hold and ILS for RW19, the runway in use changed to RW01. On the second approach the SR22 was cleared for the NDB (L) DME100 hold and approach to the A/D, which required the SR22 to extend the hold to the W, letting down in the procedure. The SR22 was in receipt of a PS.

There are two holds at the Oxford NDB (OX):

a) A one-minute racetrack pattern approaching the NDB (L) OX on a track of 100°(M) turning L at the 'OX', used for the NDB (L) DME 100° and the NDB (L) DME RW01 approach.

b) A one-minute racetrack pattern approaching NDB (L) OX on a track of 339°M, turning right at the 'OX', used for the NDB (L) DME RWY 19 and the ILS/DME/NDB (L) RWY 19 approach.

There are five published procedures at Oxford:

a) ILS/DME/NDB(L) RW19.

b) LLZ/DME/NDB(L) RW19.

c) NDB(L)DME RW19.

d) NDB(L)DME 100° to Aerodrome.

e) NDB(L)DME RW01.

The Oxford Manual of Air Traffic Services, Part 2, Page 4-7, states that: 'when any runway other than RW19 is in use, the active procedure will be the NDB (L) DME 100°.

The AIP entry for the NDB(L)DME RW01 procedure requires the permission of Brize RADAR as it transits their CTR. The AIP page (10 Mar 11) AD 2-EGTK-8-1, Instrument Approach Chart states that the 'procedure is not available for training'.

The Oxford controller reported operating a combined Aerodrome and Approach service, without the aid of surveillance equipment. Workload was considered to be medium/heavy.

The Unofficial Oxford weather for 1210Z: 30008KT 9999 BKN027 10/03 Q1027

The Brize Norton METAR for 1212Z: 32005KT 9999 SCT025 09/02 Q1027 BLU NOSIG=

At 1204:45, the SR22 was established in the hold waiting to commence the first of two ILS approaches for RW19. The controller informed the pilot that due to the wind, the runway was soon to be changed to RW01 and requested the pilot's intention after the ILS. The SR22 pilot replied, *"..after the ILS..can I do an NDB approach on runway 0-1."* The controller responded, *"you can do an NDB approach for the 1 hundred procedure it's the same as the 0-1 hold but it's procedure out to the west of the airfield just let me know you've got the correct plates for that."* The pilot acknowledged, *"..affirm I have the correct plates so..you would I will do a..NDB approach for..0-1."* The controller responded, *"Affirm I'm happy for you to fly the first ILS but..I may have to break you off early and send you into the visual pattern just let me know your intentions."* At 1206:25, the controller broadcast the runway change with RW01 in use.

At 1211:21, the controller asked the SR22 pilot if he was still in the hold. The SR22 pilot replied, *"..sorry negative..I'm just er localiser established apologies."*

At 1213:57, the SR22 pilot reported at 4 DME and the controller replied, *"if you break off to the left and then you can establish a climb to altitude 3 thousand 5 hundred feet back to the OSCAR XRAY and report entering the 1 Hundred Hold."* The pilot replied, *"..breaking off to the left climb to 3 thousand feet and then returning to Oscar report in the 1 Hundred Hold ????? ?????."* The controller corrected the level, "[SR22 C/S] *3 thousand 5 hundred please and how many holds do you require*." The pilot gave a correct readback and requested one hold.

At 1220:52, the controller asked if the SR22 had taken up the hold and the pilot responded, *"..just outbound to pick up the hold* [SR22C/S]*".* The pilot was instructed to report ready for the procedure. Recorded radar data shows the SR22 outbound and correctly positioned in the NDB (L) DME 100° hold. At 1225:34, the SR22 pilot reported ready for the procedure and the controller instructed the pilot to continue in the hold. At 1226:22, the controller gave the following clearance, "[SR22C/S] *cleared NDB Locator 1 Hundred procedure with a circle to land for Runway 0-1 report beacon outbound."* The pilot acknowledged, *"..cleared for the Locator Procedure for er the One Hundred report beacon outbound* [SR22C/S]*."*

At 1228:02, the SR22 pilot reported beacon outbound and shortly afterwards reported descending with the procedure. Recorded radar data shows the SR22 tracking eastbound from the 'OX' and that instead of making a L turn for the NDB (L) DME 100 procedure, the SR22 turned R for the NDB approach for RW01.

The SR22 pilot indicated that after the approach he required a low approach and return to Denham. The controller responded, *"*[SR22C/S] *roger be the low approach then off the 1 Hundred Procedure to fly low level over the airfield and track eastbound remaining clear of Weston on the Green and then a VFR departure to Denham."* The pilot replied, *"..low approach and then fly eastbound and..then departure to Denham* [SR22C/S]*."* The SR22 was instructed to report base turn complete.

At 1229:20, the HS125 crew contacted Oxford, reporting VFR inbound and requesting a visual join for RW01. The HS125 pilot was instructed to remain outside the Brize CTR routeing to the E and then R base for RW01. This was acknowledged by the HS125 pilot. Radar shows the HS125 descending to the E of the A/D.

At 1232:12, the SR22 pilot reported base turn complete and the controller replied, "[SR22C/S] *roger report..commencing the..go around on the 1 Hundred Procedure."* This was acknowledged correctly. Radar recording shows the SR22, S of the airfield on a 6.3nm final for RW01 and inside the Brize Norton CTR. The controller's expectation was that the SR22 would be approximately 6.5nm W of the airfield. At this point no TI had been provided to either the SR22 or HS125. At 1233:22, the HS125 reported on right base and the controller issued a landing clearance with surface wind 310/07kt.

At 1234:18, radar shows the SR22 fading from radar, on a 2.5nm final for RW01, with the HS125 turning onto final 0.6nm ahead of the SR22. The HS125 also fades from radar. The indicated ground speed of the SR22 was 106kt and the HS125 as 126kt. The controller's written report indicated that an ac was sighted half a mile behind the HS125 and at 1234:44, the controller transmitted*, "Aircraft on final for 0-1 report yourself."* The controller believed that the SR22 was to the W of the airfield.

At 1234:50, the HS125 pilot reported short final and the SR22 pilot reported going around. The controller responded, "[SR22C/S] *the wrong procedure you were instructed to fly the 0 the 1 Hundred Procedure with a circle to land for 0-1."*

After the HS125 landed, the pilot reported that there wasn't a problem, he didn't have the other traffic on TCAS and having been cleared to land, continued the approach to land. The SR22 pilot returned to Denham VFR.

The SR22 pilot's written report stated that, *"I misheard the instruction (which was for me to use R/W 100) and changed my approach for R/W 01".* Brize Norton were advised of the incident and reported that they had no traffic to affect and that on this occasion there wasn't an issue.

The SR22 pilot had mistakenly carried out the NDB (L) DME ***RW01 procedure***, instead of the NDB (L) DME ***100° to Aerodrome procedure***. This resulted in the SR22 infringing the Brize Norton CTR and turning onto final for RW01, bringing it into conflict with the HS125.

It was not clear if the SR22 pilot was familiar with the NDB (L) DME 100° to Aerodrome procedure or fully understood that this was the procedure specified by ATC. The SR22 pilot had pre-booked and planned for two ILS approaches.

When the controller explained the runway change the following RT exchange occurred:

SR22 pilot: *"erm after the ILS erm can I do an NDB approach on runway 0-1."*

Controller: *"you can do an NDB approach for the 1 Hundred Procedure it's the same as the 0-1 hold but it's procedure out to the west of the airfield just let me know you've got the correct plates for that."*

SR22 pilot:*"Er affirm I have the correct plates so erm you would I will do a er NDB approach for er 0-1."*

The pilot's last response mentioned having the correct plates, but refers to the NDB approach for RW01. This was not challenged by the controller. However, when the SR22 pilot reported ready for the procedure, the controller gave the following clearance:

Controller:"[SR22C/S] *cleared NDB Locator 1 Hundred Procedure with a circle to land for Runway 0-1 report beacon outbound."*

SR22 pilot:*"er cleared for the Locator Procedure for er the 1 Hundred report beacon outbound* "[SR22C/S].*"*

The controller used the term 'the 1 Hundred Procedure' on a number of occasions. The SR22 pilot's written report stated, *"I misheard the instruction (which was for me to use RW 100) and changed my approach for RW01".* The pilot's reference to runway 100 rather than the 100 procedure also indicated unfamiliarity with the procedures at Oxford.

The SR22 pilot had flight planned and prepared for two training ILS approaches on RW19. When the runway changed the pilot requested an NDB for RW01. It is considered that it was very likely that at this point the pilot believed he was to expect the NDB approach for RW01. When the pilot was subsequently cleared for the NDB Locator 1 Hundred procedure he may have been predisposed into thinking that the clearance was for the NDB approach to RW01.

The controller was not aware that the SR22 pilot had carried out the incorrect procedure and entered the Brize Norton CTR. No warning was received from Brize Norton who subsequently reported that they did not have any conflicting traffic.

The controller had an expectation that the SR22 pilot would be letting down and approaching the airfield from the W. The SR22 pilot reported base turn complete (normally 6.5nm W), whilst the HS125 was joining on R base for RW01 from the SE. The controller did not believe at that point that a confliction existed.

CAP774 Procedural Service, Chapter 4, Page 5, Paragraph 5, states:

'The controller shall provide traffic information, if it is considered that a confliction may exist, on aircraft being provided with a Basic Service and those where traffic information has been passed by another ATS unit; however, there is no requirement for deconfliction advice to be passed, and the pilot is wholly responsible for collision avoidance. The controller may, subject to workload, also provide traffic information on other aircraft participating in the Procedural Service, in order to improve the pilot's situational awareness.'

The Airprox occurred when the SR22 pilot was cleared for the Oxford NDB (L) DME 100° to Aerodrome procedure and mistakenly flew the NDB (L) DME RW01 procedure. This resulted in the SR22 incorrectly turning onto final approach for RW01 into conflict with the HS125, which was also turning onto final for RW01.

A number of factors were considered to be contributory:

The pilot had prepared for two training approaches using the ILS for RW19 and may not have been fully prepared for the short notice change of runway.

The pilot misunderstood and may not have been familiar with the Oxford NDB 100 procedure referring in his written report, to an approach for RW100.

The SR22 pilot had requested and was likely predisposed into thinking that he was cleared for NDB approach for RW01.

The controller missed the opportunity to challenge the pilot's initial misunderstanding that he had the 'correct plates' and would do an NDB approach for RW01. However the pilot was subsequently given a specific clearance for the "..*NDB Locator 1 Hundred procedure.."* and the controller used the term *"..1 Hundred procedure.."* a number of times.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, radar video recordings and reports from the air traffic controller involved and appropriate ATC authority.

It was evident to the Board that this Airprox had stemmed from the SR22 pilot's incorrect selection of the appropriate approach procedure to use at Oxford following the RW change. However, it was unfortunate that APP had missed an opportunity to correct the SR22 pilot when the pilot advised that, *"..I have the correct plates so..I will do a..NDB approach for..0-1".* Nevertheless, the subsequent clearance issued by APP for the NDB (L) 100°

to A/D procedure albeit that it was issued as, "..*cleared NDB Locator 1 Hundred Procedure with a circle to land for Runway 0-1..*" should have made it evident to the SR22 pilot the approach he was being cleared to fly by the controller. Undoubtedly the similarity in the nomenclature of the two procedures did not help and a pilot Member suggested that if the controller had emphasised that the NDB (L) DME RW01 procedure was not available to the SR22 pilot, for example, it might have given him a clearer understanding of what approach he was being cleared to fly. It seems the SR22 pilot did not appreciate that training NDB approaches are not permitted on RW01 and a GA pilot Member suggested that there was probably an element of unfamiliarity with the Oxford procedures here. However, the fact that the NDB (L) DME RW01 procedure is not available for training is clearly marked on the TAP chart. The GA pilot Member stressed that it was important to conduct thorough pre-flight planning when contemplating IFR training, so it seemed that the SR22 pilot might have been caught out by the RW change onto RW01 and had not briefed himself adequately on the specific detail of the Oxford procedures when the other RW was in use.

Controller Members noted that the APP controller had not mentioned the use of VDF; this often under-rated aid is very useful in the procedural environment and could have highlighted to the controller that the SR22 pilot was approaching the A/D from the S and not the W when he reported base turn complete. A controller Member emphasised the importance of accurate DME calls from pilots during procedural approaches as these are the only means the controller has of deducing at what stage the ac is on the approach and upon which any TI will be based. A pilot Member questioned why TI had not been passed to the HS125 crew about the SR22 earlier, but controller Members suggested that APP might normally ask for a 4 DME call from the SR22 pilot to gauge the position of the instrument approach against the HS125 on final. However, here APP had asked the SR22 pilot to advise when he was commencing his go-around, which was after APP recognised what had occurred. As it was, APP was unaware that the SR22 pilot was executing the wrong procedure and believed the SR22 pilot was to the W of the A/D, flying the NDB (L) DME 100° to Aerodrome until the controller identified the SR22 on final visually, behind the HS125, just after 1234:44. The last opportunity the HS125 crew might have had to sight the SR22 was when the latter was 3·7nm away and 300ft below them as they turned R through W. However, it was the controller's transmission that alerted them to the presence of the SR22 astern a little later as they were on short final to land. For their part the HS125 crew had little impact on the outcome of this Airprox at all, which the Members agreed resulted because the SR22 pilot did not fly the cleared procedure and flew into conflict with the HS125. Unfortunately both ac contacts fade on recorded radar data as they descend below 1300ft and the CPA is not apparent. However, neither ac received TCAS alerts and the HS125 on final had been spotted by the SR22 pilot, who reports seeing the executive jet about 1nm ahead. Consequently, the SR22 pilot elected to break off the approach and turn R out of the pattern, which convinced the Members that no Risk of a collision had existed in these circumstances.

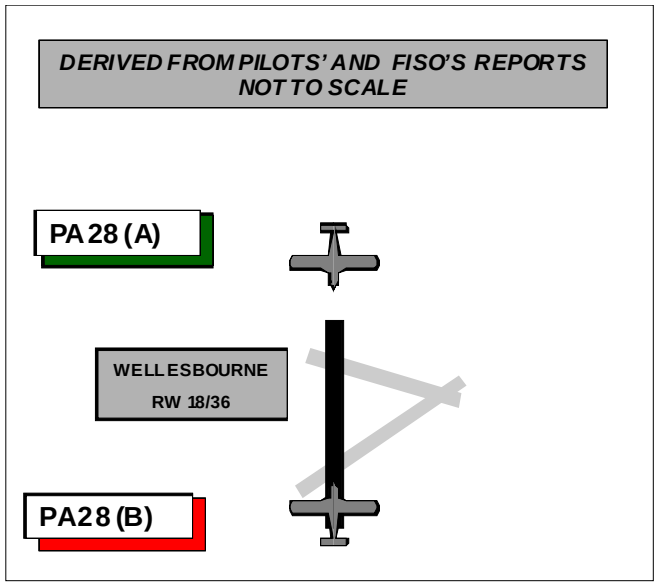
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The SR22 pilot did not fly the cleared procedure and flew into conflict with the HS125.

Degree of Risk: C.

AIRPROX REPORT NO 2012022

Date/Time:	26 Feb 2012 1205Z (Sunday)	
Position:	5212N 00137W (Wellesbourne Short Final RW18 - elev 158ft)	
Airspace:	Wellesborne ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	PA28
Operator:	Civ Trg	Civ Pte
Alt/FL:	100ft	10ft
	NK	NK
Weather:	VMC CAVOK	VMC CLBC
Visibility:	>10km	1km
Reported Separation:		
	100ft V/50m H	4m V/920m H
Recorded Separation:		
	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

PA28 (A) PILOT reports that he was flying as an instructor and was performing a currency check on a PPL holder in a white and green ac with strobes switched on and in receipt of a BS, he thought, from Wellesbourne and squawking 7000 with Mode C but Mode S was not fitted.

While on short final for RW18 at 70kt and about 100ft, he noticed another ac above the horizon and around 1000m ahead, which he believed had just departed [on RW36]. As the ac was descending, he believed it must have been carrying out a practice engine failure after takeoff. A few moments later he saw the other ac descend below a tree line ahead and as he could still see it he realised it must be coming towards him. He took control from the HP and immediately initiated a go-around, somewhat in disbelief; the other ac continued to land on RW36.

He first saw the ac when they were at a height of around 150ft and the other ac was at a similar height; he initiated the go-around at about 50ft. He then positioned on the deadside of the RW18 cct and when they were abeam the other PA28 it was no more than 100ft in height and possibly closer than 50ft horizontally.

He reported the incident immediately to Wellesbourne Information.

The biggest factor from his perspective was that the last thing he expected to see was an ac approaching head-on at such a late stage of landing. His student, a PPL holder, was a little unsure as to why the pilot had taken control as he did not see the other ac until it was pointed out, almost as they passed abeam it.

He assessed the risk of collision as being extremely high.

PA28 (B) PILOT reports flying in a red white and blue ac on a VFR private flight from Gloucester to Wellesbourne, squawking with Mode C but Mode S was not fitted. While inbound to Wellesbourne heading 360° at 65 kt, he was not able to contact them on 124.025, which he later learnt was because you need to pull the radio control out in order to get the 02. He inadvertently called on frequency 124.05 [he thought see ATSI report] believing it to be Wellesbourne Information but the agency replied "Contact East Midlands Radar". He asked why he was being asked to do this when he was positive of his location but there was no response to any further requests from him although he could hear the controller referring other ac to the same East Midlands frequency.

Having failed to establish contact with Wellesbourne he endeavoured to make his presence known by circling O/H at 2000ft while at the same time trying to discern the pattern direction. He circled for one minute, but during this time there were no departures or arrivals, so he concluded that they must have seen him and held ac on the ground

and therefore he considered it fairly safe to land. As he approached touch-down, another ac appeared at the opposite end of the RW but it immediately aborted.

He landed in the shortest distance possible taking a quarter of the RW and vacated immediately at the first exit.

The Windsock indicated calm.

ATSI reports that an Airprox was reported by the pilot of PA28 (A) in the Wellesbourne Mountford ATZ (Class G airspace), which is a circle of radius 2nm centred on RW18/36 from the surface up to 2000ft above aerodrome level (159ft); he was approaching to land on RW18 when another PA28(B) was observed to land on RW36.

The reporting PA28, (A) was operating VFR, flying training circuits in the RH cct for RW18 at Wellesbourne Mountford and was in receipt of a FIS from Wellesbourne Mountford TWR on frequency 124.025 MHz. The reported PA28, (B) was operating on a VFR flight from Gloucester to Wellesbourne Mountford.

CAA ATSI had access to recordings of RTF from East Midlands TWR, area radar recordings, with written reports from the pilots of both Cherokees and the Wellesbourne Mountford FISO.

The UK Aeronautical Information Publication pages AD2-EGBW-1-1 to AD2-EGBW-1-5 (21 Oct 10) state that Wellesbourne Mountford is PPR, that the aerodrome is not available to ac unable to communicate by radio and that pilots are requested to contact Wellesbourne at least 10min before ETA Wellesbourne.

The Coventry METARs are provided for 1150 and 1220 UTC:

METAR EGBE 261150Z VRB03KT 9999 FEW016 10/06 Q1029=

METAR EGBE 261220Z 23004KT 190V270 9999 SCT020 10/06 Q1028=

At 1150:00 East Midlands TWR received a very faint call from the pilot of the PA28(B) on frequency 124.0 MHz addressed to “Wellesbourne Information”; the controller gave a very clear station ident of ‘East Midlands TWR’ and requested the callsign of the ac. The pilot of the PA28 (B) passed his flight details to the controller and requested a handover to Wellesbourne. The East Midlands TWR controller instructed the PA28 (B) to contact East Midlands Radar. The instruction was readback and no further calls were received from the pilot of the PA28 (B) by TWR. No calls were received by East Midlands Radar from the pilot of the PA28 (B).

At 1200:13 radar recordings show the PA28 (B) 2.1nm SW of Wellesbourne Mountford and two other ac making approaches to the airfield, one on final and one downwind for RW18.

Radar recordings show the PA28 (B) make an overhead join at Wellesbourne Mountford while one ac is on final approach to land and another ac getting airborne from RW18. PA28 (B) subsequently made an approach to RW36 and landed.

The report from the pilot of the PA28 (A) states that he saw PA28 (B) at approximately 150ft while on short final for RW18 and he initiated a go-around at approximately 50ft.

The report from the FISO at Wellesbourne Mountford states that the PA28 (A) was about to touch down when the PA28 (B) landed on RW 36. The FISO was unaware of the presence of the PA28 (B) prior to it landing as no radio contact had been made.

The report from the pilot of PA28 (B) states that he could not select the frequency 124.025 MHz due to being unable to operate the radio correctly. The pilot contacted frequency 124.0 MHz (East Midlands TWR) believing it to be Wellesbourne Information. When the pilot called on 124.0 MHz the controller clearly gave the station ident as “East Midlands TWR”. When the pilot was instructed to contact East Midlands Radar he readback both the instruction and the frequency correctly. The pilot’s report states that he queried the instruction to contact East Midlands radar as he “was positive of his location”, but received no response; however, no further calls were received either by East Midlands TWR or East Midlands Radar from the pilot of PA28 (B). Having failed to establish contact with Wellesbourne he circled overhead at 2000ft to make his presence known and to observe the traffic pattern. The pilot’s report states that there were no arrivals or departures during that time so he made the decision

to land. As the pilot of PA28 (B) approached touchdown he observed another ac at the opposite end of the RW which immediately aborted the approach.

Both ac were operating VFR in class G airspace. CAP 774, Chapter 1, Paragraph 2 states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment. The Class F and G airspace environment is typified by the following:

It is not mandatory for a pilot to be in receipt of an ATS; this generates an unknown traffic environment;

Controller/FISO workload cannot be predicted;

Pilots may make sudden manoeuvres, even when in receipt of an ATS.'

The pilot of PA28 (B) attempted to contact Wellesbourne at 1150, approximately 10min before arriving in the overhead but due to being unable to operate the radio correctly, contacted East Midlands TWR. It is unclear why the pilot believed that Wellesbourne Information would be available on 124.050 MHz when he was unable to select the correct frequency of 124.025 MHz. It is unfortunate, that being aware that he was unable to select the correct frequency to contact Wellesbourne, the pilot did not seek assistance from the station he had established contact with, East Midlands TWR. The pilot continued to Wellesbourne Mountford and orbited overhead in order to make his presence known; however, this was unsuccessful as the FISO and the ac in the RH cct were unaware of the PA28 (B)'s presence until it landed. The pilot of PA28 (B) states in his report that whilst he was orbiting overhead Wellesbourne there were no arrivals or departures but radar recordings show one ac departing and one landing during the time PA28 (B) was overhead the airfield.

The pilot of PA28 (B) did not make contact with Wellesbourne Mountford and landed against the established traffic pattern.

The FISO at Wellesbourne Mountford was unaware of the presence of PA28 (B) and was therefore unable to provide assistance in the form of TI.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of East Midlands RT frequencies, radar recordings, reports from the air traffic controllers/FISO involved and reports from the appropriate ATC authorities.

The Secretariat was asked whether the pilot of PA28 (B) was a student pilot on a qualifying Cross-Country; although this was not known at the time of the Board Meeting, it was subsequently determined that he was a recently qualified PPL holder, not a student.

The GA Board Member observed that the pilot of PA28 (B) had most likely been nervous and not properly briefed on the radio controller. Although his planned course of action for the approach to Wellesbourne had been correct, this was thrown into disarray when a key element, namely permission to approach and airfield information on the RT, was not available and his back-up plan was rushed and ill-considered. There was enough information available to the pilot (namely 2-way communication with East Midlands TWR) to indicate that his radio (in use) was not unserviceable. That being the case, D&D on 121.5 would have answered any call for assistance and would have been able to contact Wellesbourne (or any other airfield) by land line and relay information or instructions, albeit fairly slowly, thus most likely requiring an orbit in the overhead at a height providing good separation from traffic joining or in the circuit. Another Member pointed out that as far as he was aware, PA28s normally have two radios thus offering another possible solution. A third Member opined that all these factors were symptomatic of inadequate preparation for the flight or insufficient instruction on the ac fit.

Members observed that Wellesbourne has no local RT failure procedures and in the situation faced by PA28 (B) pilot, strict adherence to the UK RT fail procedures (civil) promulgated in the AIP, may not have resolved the situation, merely moved the problem to another location. Therefore Members understood his decision to land at Wellesbourne, despite the 'mandatory RT' requirement; they agreed unanimously, however, that the pilot should have been more patient in attempting to determine visually and subsequently confirm the RW in use and circuit

direction, particularly since there is no ‘signals area’ at Wellesbourne. Although self-generated, the pilot was in a genuine emergency situation and landing at Wellesbourne was agreed to be the safest course of action.

In the event however, Members agreed that since PA28 (A) reacted quickly and appropriately by going around and PA28 (B) landed and vacated the RW expeditiously, there was no risk that the ac would have collided.

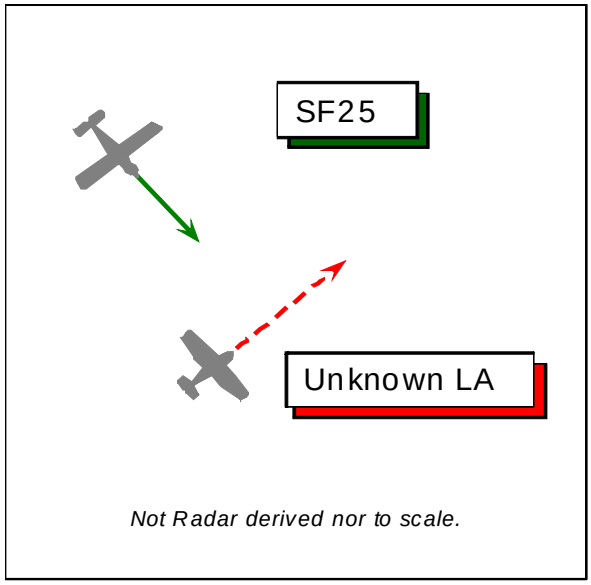
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unable to make RT contact with Wellesbourne, the pilot of PA28 (B) did not conform to the circuit pattern established by other ac and landed into conflict with PA28 (A).

Degree of Risk: C.

AIRPROX REPORT NO 2012023

Date/Time:	26 Feb 2012 1155Z (Sunday)	
Position:	5414N 00113W (Sutton Bank GLS - elev 920ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Falke 25 MG	Unknown LA
Operator:	Civ Club	Civ Pte
Alt/FL:	300ft aal	NK
Weather:	VMC CLBC	NK
Visibility:	4nm	NK
Reported Separation:	35ft V/80m H	NK
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FALKE SF25 SELF LAUNCHING MOTOR GLIDER (SF25 MG) PILOT reports he was airborne to establish the prevailing cloud base for the club's duty officer-in-charge of gliding operations, but also to practise bad weather ccts at 500ft QFE. He was in communication with Sutton Bank on the A/G Station frequency of 129·975MHz. SSR is fitted, but selected 'off' and the Mode C was unserviceable. His SF25 MG is coloured green and white; a HISL is not fitted.

After take-off from RW24 at Sutton Bank glider launching site (GLS), once clear of the escarpment, he commenced a climbing turn to the L onto the cross-wind leg heading 150° at 60kt climbing through 300ft aal (about 1220ft ALT), some 300ft clear beneath the overcast cloud with an in-flight visibility of 4nm. At this point [he did not specify the sighting distance] an unknown high-wing single-engine light ac (LA) flew from R to L about 80m ahead and 35ft above him, so to avoid it he lowered his MG's nose. When the unknown LA (coloured red and white) had passed, he continued his climb and turned LH downwind for RW24 at reduced speed in order to monitor the LA's flight path. The LA flew along RW02 in a gentle climb until it reached the base of cloud O/H the threshold of RW20, whereupon it turned R through about 160°. He called the pilot of the unknown LA on the Sutton Bank A/G frequency requesting his intentions but received no reply before it departed from the vicinity heading SE'ly.

He assessed the Risk as 'medium' but his main concern in reporting this Airprox is that without prior radio contact the pilot of the unknown LA flew across the downwind leg and departed via the final leg of a prominent glider launching site, ignoring standard cct joining procedures. It was fortunate that the 3 gliders awaiting aerotows were precluded from launching by the low cloud base. However, a group of four ac comprising one microlight and three flexwings had landed at the site shortly before the incident, having first established radio contact, stated their intentions and followed standard cct joining procedures. Had their arrival coincided with the other ac's radio silent transit the consequences could have been more serious.

Fortunately winch-launching operations, (the wind being W'ly) were not possible due to the low cloud base O/H the site. He reported the Airprox to the club safety officer on landing.

THE GLIDING CLUB'S FLYING DIRECTOR commented that the 'big sky' theory saved the day again. Sutton Bank is a busy glider launching site without an ATZ. The pilot of the other ac displayed poor airmanship and lack of common sense during this incident.

UKAB Note (1): The UK AIP at ENR 5-5-1-6 promulgates the glider launching site at Sutton Bank as active from Sunrise to Sunset, for aerotows and winch launches to 2000ft above the site elevation of 920ft amsl.

UKAB Note (2): A primary contact that might be the SF25 MG 'pops up' WSW of the reported Airprox position for 3 sweeps and is last shown heading ESE before fading. The Radar Analysis Cell (RAC) at LATCC (Mil) detected 4 potential ac tracks on the Swanwick radar recording that might be the reported ac, however, none of these tracks were displayed consistently throughout the period of the Airprox. One of the recorded intermittent tracks is a microlight (ML) resembling the description of the high-wing Cessna-type monoplane reported by the Falke SF25 MG pilot. This white high-wing ML with the registration written in red down each side departed from Bagby A/D to the SE and was initially perceived to be the reported ac. However, subsequent to receipt of the ML pilot's comprehensive report and analysis of the attached GPS flight data, comparison with the recorded radar data revealed that this ML was not the reported ac. Further attempts to trace the reported ac have subsequently proved fruitless; consequently, the identity of the reported ac remains unknown.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the SF25 MG pilot and radar video recordings.

It was unfortunate that despite the best efforts of the RAC, the reported LA remains untraced. While the SF25 MG pilot's report was comprehensive, it was difficult for the Board to arrive at meaningful conclusions on the Cause and Risk with just one pilot's report and only very limited radar data that did not illustrate the relative geometry and minimum separation. Some Members perceived that there was insufficient information available; nonetheless, the overwhelming majority considered that this Airprox could be assessed on the basis of the SF25 MG pilot's report alone.

It was not clear if the reported LA pilot was aware that he had overflown Sutton Bank GLS or seen the SF25 MG. If he had been aware of the GLS beforehand, then this Airprox illustrated poor airmanship on the part of the reported LA pilot as he would not necessarily be aware that winch launching had been curtailed because of the prevailing weather. The danger of over flying an active GLS below the maximum promulgated height of the winch cable was self-evident and pilots should plan their flights to ensure that they give active glider launching sites as wide a berth as feasible. Members understood the SF25 MG pilot's main concern that the reported LA pilot had flown through the cct area of the GLS without prior radio contact. If he had strayed off his planned track, or was lost, then a call on the RT (if the ac was radio equipped) could have alerted the GLS operator and other pilots operating in the vicinity to his presence. However, such advice was predicated on foreknowledge of the RT frequency in use at the specific GLS and Members were not confident that these were well known to GA pilots. Whilst the frequency for Sutton Bank (129.975 MHz) could be easily found on their website - http://www.ygc.co.uk/oursite.php– and is shared with nearby Rufforth, those in use by the other various GLSs in the UK might not be so easy to determine. The question of the promulgation of GLS frequencies was discussed further and the GA gliding Member advised that there are only a limited number of frequencies that are commonly used for gliding within the UK and he helpfully agreed to provide them.

On the limited information available, however, the Board could only conclude that this Airprox had resulted because the untraced light aircraft pilot flew over an active GLS (below the maximum promulgated height of the winch cable) and into conflict with the Falke SF25 MG.

Turning to the inherent Risk, there was no reason to doubt the veracity of the SF25 MG pilot's report where he had estimated the minimum separation at about 80m when the unknown LA flew from R to L ahead and 35ft above him. Whilst these distances suggested to some Members that safety had been compromised, it was evident that the SF25 MG pilot had time to lower his ac's nose to avoid the unknown LA, which did not suggest to other Members that robust avoiding action had been necessary. The Board was fairly evenly divided on this point and so on the basis of the limited information available and following a vote, it was concluded by a majority that there was no actual Risk of collision.

[Post meeting Note: Gliding in the UK is allocated a small number of simplex frequencies at 25KHz spacing which are available for use by all glider pilots and all gliding sites throughout the UK. The frequencies below are assigned on a shared basis and are not afforded any protection against mutual interference.

129.900MHz Ground to ground safety management

129.975MHz Common Field Frequency. Safety and sporting use within 10nm and 3,000' of a gliding airfield

130.100MHz Gliding safety/sporting use

130.125MHz Gliding safety/sporting use

130.400MHz Gliding safety/sporting use

When using Common frequencies, it is necessary to correctly address the airfield concerned as other sites in the area could answer if not.]

PART C: ASSESSMENT OF CAUSE AND RISK

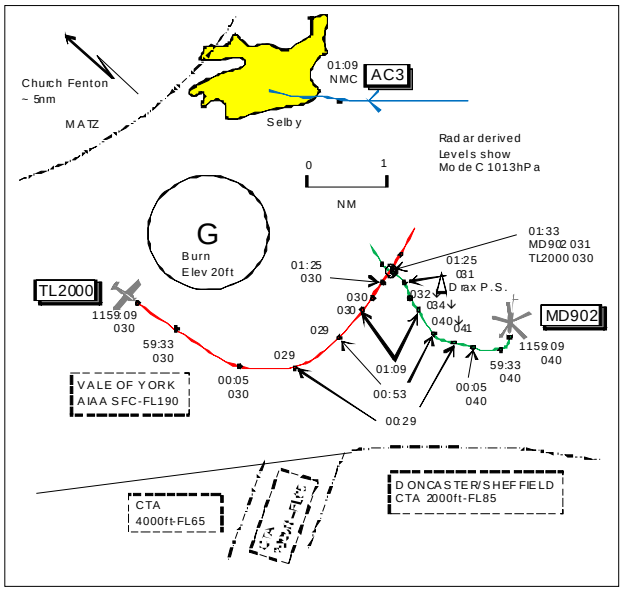
Cause: The untraced light aircraft flew over an active glider launching site (below the maximum promulgated height of the winch cable) and into conflict with the Falke SF25 MG.

Degree of Risk: C.

AIRPROX REPORT No 2012024

AIRPROX REPORT NO 2012024

Date/Time:	25 Feb 2012 1202	(Saturday)
Position:	5344N 00101W (8nm SE Church Fenton)	
Airspace:	VoY AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	MD902	TL2000
Operator:	Civ Comm	Civ Pte
Alt/FL:	3000ft↓	NR
	RPS (1021hPa)	NK
Weather:	VMC CLBC	VMC CLOC
Visibility:	>10km	30nm
Reported Separation:		
	20ft V/50m H	50-100ft H
Recorded Separation:		
	100ftV/returns merge	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MD902 PILOT reports flying a local sortie from Humberside, VFR and in receipt of a BS from Church Fenton on 126·5Mhz, squawking Modes S and C; TCAS 1 was fitted. The visibility was >10km flying 1200ft below cloud in VMC and the helicopter was coloured blue/yellow with anti-collision, nav and HISLs switched on. Initially they had been operating between 4000-4500ft Barnsley RPS 1021hPa on a photo detail at Drax Power Station. On completion a descent was started to a planned altitude of 1000ft on heading 350°across sun and 75kt. ATC was busy with GA traffic so their flightpath was cleared visually ahead and below. After several minutes in a gentle descent a TCAS TA was received showing 500ft below and ahead of them. A light fixed-wing ac was observed 0·5-0·75nm ahead and below which appeared to correspond to the TCAS contact. They stopped their RoD and re-assessed the contact which was passing clear. A light sports ac (LSA) was then seen out of the corner of the pilot's eye (8-9 o'clock) about 100m away moving rapidly from L to R simultaneously as the observer in the LH seat alerted the pilot to it. Owing to the rapid crossing rate the safest option was to execute a hard L max rate turn, which was carried out. The white/red LSA passed about 20ft below and 50m to their R and was observed to continue on an E'ly heading without deviation. The risk of collision was assessed as high. The incident happened very quickly, lasting only a few seconds, and was immediately reported to Church Fenton ATC. Had the RoD not been arrested the risk would have been higher still. The pilot could not say with any certainty which contact caused the TCAS alert; however, it almost certainly prevented a mid-air collision.

UKAB Note (1): The MD902 pilot was contacted to clarify the geometry of the encounter. Following the TCAS TA both the pilot and observer seated in the LH seat saw a light ac ahead assessing it was passing R to L at a distance commensurate with the TCAS contact (0·5-0·75nm). It did not appear to be an unrealistic contact distance; however, the TCAS was set at 10nm range, so as to include ac operating to/from Church Fenton, so accurate bearing and distance close-in is not as precise as it could be.

THE TL2000 PILOT reports en-route from a private site in Cheshire to Full Sutton [15nm NNE Drax Power Station], VFR and listening out with Full Sutton Radio on 120·1MHz squawking 7000 with Modes S and C. The visibility was 30nm flying out of sun, clear of cloud in VMC. About 10nm S of Selby heading 360° at 100kt routeing S and E of Burn gliding site he first saw a blue helicopter in his 4 o'clock range 50-100ft as it was passing behind his ac. No avoiding action was taken and he assessed the risk as low.

THE CHURCH FENTON APP CONTROLLER reports working 6-7 ac under a BS including the MD902 and 1 flight under a TS. The MD902 pilot reported that an Airprox would be filed on an ac that passed within 500ft and approx 100m. The MD902 was tracking 330° towards Selby when the other ac passed E'bound. The MD902 pilot reported the traffic as a light ac with 2 POB.

THE LINTON ON OUSE USMO reports a Supervisor is not rostered on Saturdays at Linton-On-Ouse in support of Church Fenton flying operations. The controller concerned was rostered with another to provide radar cover for Tutor ac with both controllers rotating the radar position. The MD902 pilot, who had been on frequency for some time under a BS, informed the controller that an Airprox had occurred. The Church Fenton APP position at weekends is demanding with the primary task of supporting 4 Tutor ac requiring a TS and providing a VHF service to multiple GA traffic flying in the local area and recovering to Sherburn-In-Elmet, one of the busiest GA airfields in the country. The controller's workload was high with ac on frequency and he did not see any radar contact in the area of the MD902. After the Airprox he did notice an intermittent 7000 squawk within 3nm of the MD902 but the flight was not on frequency. The radar coverage in that area is not good as the PSR and SSR heads are at Linton-On-Ouse so ac below 1500ft in that area may not show on radar and it may account for the intermittent 7000 squawk.

BM SM reports that this Airprox occurred 20·5nm SSE of Linton on Ouse, in the vicinity of Drax power station, between an MD902 in receipt of a BS from Church Fenton APP and a TL2000; both ac were operating VFR.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The Church Fenton METAR shows EGXG 251150Z AUTO 28009KT 9999 BKN035/// 09/01 Q1025=

APP described their workload as high, providing ATS to 7 or 8 ac at the time of the Airprox: 6/7 BS and 1 TS. At weekends, APP's primary task is to provide ATS to Church Fenton-based Tutor ac and to Sherburn-in-Elmet inbounds and outbounds.

[UKAB Note (2): The radar recording at 1159:09 shows the MD902 1nm SE of Drax Power Station tracking S at FL040 with the TL2000 5nm to its W tracking SE at FL030. The MD902 then commences a R turn, initially steadying on a track of 280° as the TL2000 commences a L turn onto a NE'ly track. By 1200:29 the TL2000, indicating FL029, is 2·1nm WSW of the MD902 which is turning onto a NNW'ly track indicating FL041. Both ac maintain these tracks, on a constant relative bearing, until immediately prior to the CPA.]

At 1200:53 the MD902 begins descending and at this point the TL2000 was 1·2nm W of the MD902, indicating FL029. At 1201:09 the SSR Mode C of the TL2000 and MD902 indicated 400ft vertical separation existed. At this point, the TL2000 was 0·9nm W of the MD902 in its 10 o'clock. The MD902 pilot reports gaining a TCAS TA on an ac "500ft below and ahead of the ac" and correlated that with a "light fixed wing ac…ahead at approx 0·5-0·75m and below." The only other ac that was "ahead" of the MD902 was 3·2nm NW, AC3, in the MD902's 12 o'clock, showing NMC.

The MD902 pilot reported that having correlated the TCAS contact with the "light fixed wing ac" they "stopped (the) RoD and re-assessed the contact which was passing clear." They then "saw a light sports ac out of the corner of (their) eye moving rapidly across (their) view L-R." The pilot then reversed the gentle R turn, executing a "hard L max rate turn" to avoid the TL2000, passing behind it. Based upon their report, the TL2000 pilot's first sighting of the MD902 was at around the CPA, as it passed through their 4 o'clock, 50-100ft behind.

[UKAB Note (3): The radar recording at 1201:25 shows the MD902 level at FL031 0·3nm E of the TL2000 which is maintaining FL030. The CPA occurs on the next sweep at 1201:33 when the radar returns merge, the MD902 having turned L onto a NW'ly heading with 100ft vertical separation.]

From the point that the confliction became evident between the MD902 and TL2000 at 1200:45 and the CPA at 1201:33, there was a constant exchange of RT between APP and a number of ac inbound to Sherburn-in-Elmet. The MD902 pilot's report states that "ATC was busy with GA so (they) visually cleared (their) flight path ahead and below." This suggests that the MD902 pilot was aware that there was a reduced likelihood that APP would be able to warn them of a definite collision risk.

Whilst Linton-on-Ouse suggest that the base of radar cover may have played a part in APP's ability to detect the confliction, this is unlikely given that the Airprox occurred at 3000ft, 20·5nm S of Linton. That said, BM SM contends that, given their workload, APP would have been unable to pass a traffic warning to the MD902 about the TL2000 and that there are no ATM aspects to this Airprox that warrant further analysis.

AIRPROX REPORT No 2012024

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

As this incident occurred in circumstances and conditions where both pilots should have been able to see each other in good time, Members wondered whether anything better could have been achieved; in particular, could a radar service have been obtained by either the TL2000 or MD902 flights? The area of the Airprox, within the Vale of York AIAA, is covered by Linton-on-Ouse, a LARS unit; however, this service is available on weekdays only. Church Fenton Approach is not a LARS position and it is tasked to provide services to station-based Tutors and Sherburn-in-Elmet GA traffic. It was unlikely that anything other than a BS could have been obtained from Doncaster Approach as it is not a LARS unit. The MD902 flight had obtained a BS from Church Fenton APP. However, the position was busy with its primary task so it was not surprising that the MD902 pilot could not call on the frequency to update his change in flightpath or that the developing confliction between the subject ac went unnoticed by the APP. Without any ATC assistance available, within this Class G airspace, it was solely down to both pilots for maintaining their own separation from other traffic through see and avoid. The MD902 pilot's SA was enhanced by ACAS equipment but it appeared that the pilot did not assimilate the information generated by TCAS correctly. The TCAS TA received on traffic 500ft below was thought by Members to almost certainly be the TL2000, which carried Mode C, but it seems that AC3 crossing ahead from R to L was acquired visually and erroneously correlated to the TCAS contact. With the known inaccuracies in azimuth, particularly at close ranges, Members agreed that it was imperative for pilots to use the relative height element of the TCAS system, which is known to be accurate, for effecting some vertical separation from the TCAS traffic until it has been positively established that the TCAS contact is definitely the ac seen visually. As it was, the MD902 pilot, having initially stopped the descent, was satisfied that the ac seen was not in conflict and had recommenced the descent. However, the TL2000 was still on a conflicting flightpath converging from the L, which the MD902 pilot then spotted in the 8-9 o'clock position 100m away, a late sighting and part cause of the Airprox. The Board recognised that the MD902 pilot's view from the RH seat, across cockpit, was undoubtedly degraded; however a pilot's lookout scan should take this into account and mitigate any risk by moving ones head or the ac's nose to clear the area concerned. A similar situation existed for the TL200 pilot, seated on the L, looking across to the front R quarter towards the converging helicopter. For his part, the TL2000 pilot had, after passing clear of Burn G/S, turned L towards Full Sutton but did not see the approaching helicopter until it was in his 4 o'clock passing 50-100ft behind, effectively a non-sighting and the other part cause of the Airprox.

Although the MD902 had right of way under the RoA Regulations, these rules only work if pilots see each other's ac in order to comply with them. The radar recording shows that from 1min prior to the CPA, there was ample opportunity for both crews to visually acquire each other's ac. It was only at the very last moment that the MD902 pilot caught glimpse of the TL2000 as it closed rapidly from the L. Although a max rate L turn was executed, Members believed that this had been actioned too late to ensure an adequate safety margin leaving the Board in no doubt that an actual risk of collision existed during this encounter.

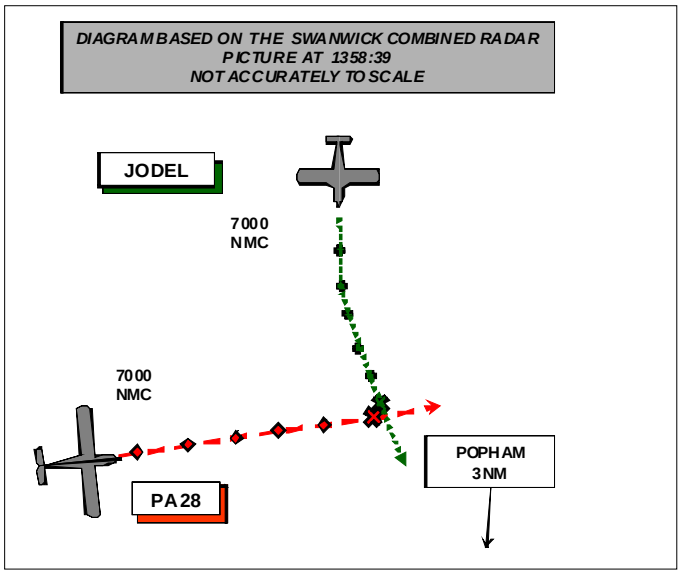
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the TL2000 pilot and a late sighting by the MD902 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 2012025

Date/Time:	26 Feb 2012 1359Z (Sunday)	
Position:	5115N 00113W (3nm N Popham - elev 550ft)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Jodel D105	PA28
Operator:	Civ Pte	Civ Pte
Alt/FL:	2200ft	2200ft
	QNH (1029hPa)	QNH (1027hPa)
Weather:	VMC CLBC	VMC
Visibility:	10nm	NK
Reported Separation:		
	10ft V/0m H	200ft V/0m H
Recorded Separation:		
	NR V/<0.1nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JODEL D105 PILOT reports flying solo in a white ac with black stripes and no lighting, on a VFR private flight. He was in a level cruise, about 5nm N and inbound to Popham, heading 180° at 90kt in receipt of an A/G service and was squawking 7000 with Mode C but TCAS was not fitted when he suddenly became aware of blue and white single-engine low-wing ac, about 100m away in his 2 o'clock and about the same level. At the time he thought it was at the same height but with hindsight he thought it may have been slightly above him. He immediately dived and saw the ac pass directly above him and then continue straight and level. He thought that the other pilot did not see his ac, assessed the risk to be high and reported the incident on landing.

THE PA28 PILOT reports flying a blue, white and gold ac on a private flight to Maypole Farm (Kent). When just to the W of Basingstoke he was in the process of changing frequency from Thruxton to Farnborough requesting a BS when he had an Airprox with a Robin or Jodel ac. He had no warning of any ac in close proximity on his PCAS and no indication from ATC of any ac in close proximity.

They were approaching the Farnborough Zone with the intention of following the railway to the N of Farnborough in order to keep clear of their airspace and he was keeping a constant lookout ahead (out-of-sun) and to both sides of the ac through a more or less 180° arc in near perfect flying conditions.

It was a relatively busy afternoon and there was the possibility of gliding activity in the area, of which ATC had warned him, and he thought was NOTAMed, in addition to other ac. The first time he saw the other ac was when it appeared below in close proximity from a NW'ly direction – probably separated by around 300ft laterally and 200ft below and coming from their rear at an angle of around 140°.

Given the angle from the rear from which the ac came, the only way he could have spotted it earlier would have been for him to have turned and actually been 'looking at an angle to the rear'. From the angle the other ac came however, they should have been visible [to its pilot] from a considerable distance, particularly given the visibility on the day and avoidance action could and should have been taken by the other pilot.

His initial reaction, apart from anger and alarm, was that he would file an Airprox report himself but pressure of work initially prevented him from doing so.

Also he thought that the other ac had most likely not been using a transponder as there was no warning of him on his PCAS and he considered that identifying the other ac would be difficult so there was no urgency to making his report.

It was a close encounter and one which he considers could and should have been avoided had the other pilot been keeping a good look out.

ATSI reports that the Airprox occurred at 1358:40, in Class G airspace, 2.7nm N of Popham Airfield, between a Jodel DR105A (DR105) on a VFR flight from Hinton in the Hedges to Popham (EGPO), and a Piper PA-28R-200 Cherokee Arrow (PA28) on a VFR flight from Thruxton (EGHO) to Maypole (EGHB).

CAA ATSI had access to Farnborough RT and area radar recordings together with written reports from both pilots and the FPS for the PA28 provided by Farnborough. Both ac were equipped with Mode S.

The Farnborough Weather was:

METAR EGLF 261350Z 240/5KT 210V360 9999 FEW029 11/05 Q1028=

At 1355:50, radar recording shows the distance between the two ac was 8.6nm on converging headings. The DR105 is shown, 7.1nm N of Popham, squawking 7000 without Mode C level reporting, tracking S. The DR105 pilot's report indicated that he was in communication with Popham (A/G) but not in receipt of an air traffic service.

The PA28 is shown 7nm WNW of Popham, squawking 7000 without Mode C level reporting, tracking E. The PA28 pilot's written report indicated that the pilot was in the process of changing frequency from Thruxton (A/G) to Farnborough and therefore not in receipt of an Air Traffic Service at the time.

The two ac continued on their respective tracks and at 1358:40, radar recording shows them in close proximity. The PA28 is shown in the DR105's 1 o'clock at a range of 0.1nm, crossing from right to left. The written reports from the pilots indicated that both ac were at an altitude of 2200ft.

[UKAB Note 1: The incident took place between sweeps on Swanwick combined radar recording, immediately after the sweep at 1358:39 (shown above). The horizontal separation is projected as being 0 at about 1358:43; neither ac is displaying Mode C information but both show elementary Mode S].

At 1359:50, after the Airprox had occurred, the PA28 pilot contacted Farnborough LARS W and reported approaching Basingstoke at an alt of 2200ft but he did not mention the close proximity of another ac. Farnborough allocated a squawk of 0431 and agreed a BS. At that point the DR105 is shown overhead Popham and 4.5nm SW of the PA28.

Neither of the two ac was in receipt of an Air Traffic Service. CAP 774, UK Flight Information Services, Chapter 1, Page 1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment. The Class F and G airspace environment is typified by the following:

- It is not mandatory for a pilot to be in receipt of an ATS; this generates an unknown traffic environment;
- Controller/FISO workload cannot be predicted;
- Pilots may make sudden manoeuvres, even when in receipt of an ATS'.

The Airprox occurred when the DR105 and PA28 ac came into close proximity within Class G airspace. Neither ac was in receipt of an Air Traffic Control Service. Pilots operating in Class G airspace are ultimately responsible for collision avoidance.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controller involved and reports from the appropriate ATC authorities.

Members noted that this incident took place in a busy area of Class G airspace to the N of Popham where 'see and avoid' is the principal method of collision avoidance. Members discussed whether the PA28 pilot had routed too close to Popham but it was agreed that 3nm is reasonable, particularly if the risks are mitigated by the use of a radar service; in this case however, the pilot was attempting to establish a BS which would not have provided him with traffic information. A Member observed that the pilot may have been 'heads-in' selecting a new frequency, in which case his lookout would have been curtailed. Since the Jodel was squawking (albeit the radar recording showed, without Mode C), Members were surprised that the PA28 pilot's PCAS did not provide him with any warning of the presence of the Jodel.

It was curious that both ac reported squawking with Mode C but neither showed on the radar recording; Members agreed however, that this had not been a factor in the incident.

The Jodel pilot did see the PA28, albeit at a distance of 100m and although he dived his ac immediately, due to the short distance (time) this had probably only had a limited effect. The PA28 pilot reported first seeing the Jodel almost below, therefore too late to take avoiding action. The radar recording verified that the ac were in a 90° crossing situation with relatively low groundspeeds and, barring the constraints of the respective ac wings and canopies, they should have been visible to each other's pilot for some time. Both pilots had an equal responsibility to see and avoid other aircraft and, under the Rules of the Air the Jodel, having the PA28 on its right, should have given way to it; in the event however, the pilot did not see it so he was unable to react.

Since the separation was small, the PA28 pilot did not see the Jodel until after the CPA and the Jodel's avoidance had limited effect avoidance, the Board agreed that normally accepted safety margins had been eroded.

PART C: ASSESSMENT OF CAUSE AND RISK

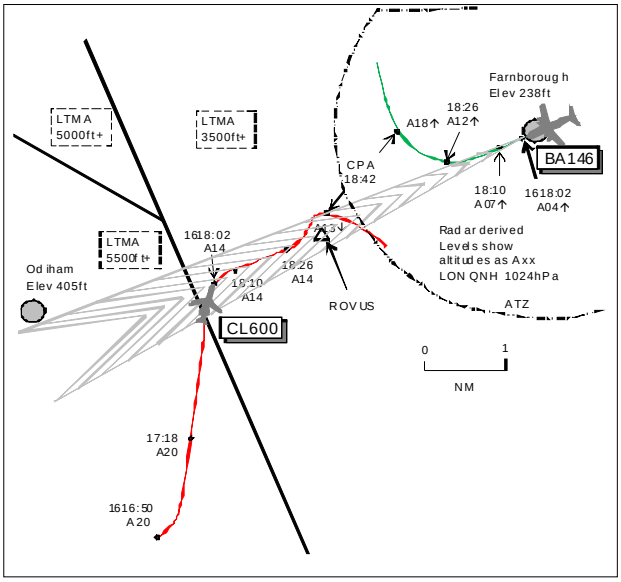
Cause: Effectively a non-sighting by the PA28 pilot and a late sighting by the Jodel pilot.

Degree of Risk: B.

AIRPROX REPORT No 2012026

AIRPROX REPORT NO 2012026

Date/Time:	2 Mar 2012 1619Z	
Position:	5116N 00050W (2nm WSW Farnborough - elev 238ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	BA146	CL600
Operator:	Civ Comm	Civ Exec
Alt/FL:	1300ft↑	1200ft↓
	QNH (1023hPa)	QNH
Weather:	VMC CLBC	IMC HZBL
Visibility:	5000m	2nm
Reported Separation:		
	200ft V/4·5nm H	800ft V/2nm H
Recorded Separation:		
	500ft V/1·4nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BA146 PILOT reports outbound from Farnborough, IFR and in communication with Farnborough Approach on 134·35MHz, he thought, squawking 6020 with Modes S and C. The visibility was 5000m in VMC and the ac was coloured white/blue; ac lighting was not reported. On taxying out they were issued with a departure clearance of 'climb on RW heading to altitude 2400ft and at 2·5DME turn R heading 285°, squawk 6020. They were then cleared for take-off RW24. About 1·5nm SW of Farnborough heading 244° into sun at 150kt, climbing through 1300ft QNH 1023hPa, they switched to Radar, he thought [actually still with Tower], and were instructed to make an immediate R turn for avoiding action onto 360°, which they executed. On looking at their TCAS display they could see an ac about 5nm ahead and closing, about 200ft above. TCAS then issued a TA but no RA was generated. Once clear of the traffic they were turned back onto heading 270°. He assessed the risk as medium. Had the controller not been able to contact them immediately as they changed frequency then the 2 ac were heading directly towards each other and he would have then assessed the risk as high.

THE CL600 PILOT reports inbound to Farnborough, IFR and in receipt of a DS from Farnborough Approach on 134·35MHz, squawking with Modes S and C. The visibility was 2nm between cloud layers in IMC and the ac was coloured white/gold; lighting was not reported. While established on the ILS RW24, he thought [actually RW06] they were cleared for the approach after reporting "established on LOC". Upon descending on the G/P at 160kt at about 1200ft QNH they were told by the controller to make a hard L turn onto 120° [actually 330°]. After complying with the instruction they were then told to make a hard turn onto heading 300° [actually R 180°] so the FO, PF, disconnected the AP and complied with the instruction. While breaking R they saw an ac on their LHS turning to its R about 800ft above climbing at a very steep angle and 2nm away. After they were clear of conflict they were given a parallel course to the LOC and were asked to climb to 3000ft before being vectored back to the ILS. Neither a TCAS TA or RA was generated during the encounter and he assessed the risk as high.

THE FARNBOROUGH ADC reports he took over the position at 1610Z following a RW change and started the process of cancelling the safeguarding that was in force. The BA146 flight had been given start approval by the outgoing controller. During the process of making telephone calls on the check list to cancel safeguarding several vehicle drivers called to enter RW24 which was the outgoing RW. Owing to the RW designator strip still indicating RW24 he cleared the vehicle drivers to enter and vacate accordingly. The BA146 flight called for taxi at 1615Z during his phone calls to the various parties needing to know about safeguarding being cancelled. Owing to him being distracted by the phone calls he cleared the BA146 flight to taxy for holding point 'W' for RW24 while observing the RW designator strip, and issued departure instructions for a RW24 CPT departure and then instructed the flight to enter and backtrack the RW. He observed a CPT inbound, the CL600, on the ATM passing

5000ft S'bound towards the ROVUS direction with about 5nm to run to ROVUS so he called Radar for a release on the BA146, which was given. He then saw the CL600 turning E a few miles S of Odiham onto what he thought would be a downwind leg [RW24]. The BA146 flight was cleared for take-off. His attention was taken away from the ATM as he was watching the RW and the departing BA146, which was airborne at 1618Z. He watched the BA146 climb as it passed the aerodrome boundary and was about to transfer control to approach when he noticed the CL600 establishing on the RW06 ILS with about 5nm to run. He gave the BA146 flight avoiding action immediately with a R turn onto heading 360°. He called Radar to advise that the BA146 was taking an avoiding action R turn and he heard the Radar controller also issue an avoiding action R turn. He confirmed with the BA146 crew that they were turning R onto 360° and advised the crew to report the heading to Radar on 134·35MHz.

THE FARNBOROUGH APR reports having taken control of the position towards the end of a Flight Check for RW24 ILS. Once the check was completed, in consultation with the Air controller, after 1 last RW24 departure [not the BA146], a RW change was completed in accordance with the local procedures to RW06 due to the E'ly wind. The first arrival for RW06, the CL600, was seen approaching CPT shortly afterwards. At this point, planning ahead, he saw a 3650 squawk SW of CPT tracking towards Odiham indicating 3000ft. He telephoned Odiham Approach to agree a course of action regarding the ac squawking 3650 and the CL600, which was still under the control of LTC. The Odiham controller told him the 3650 was a CH47 and it was carrying out a COPTAC/ILS to RW27 and it had commenced the procedure. He asked if the Odiham controller could delay the CH47 by some means but this was not accepted. On closing the line he pointed out to the Watch Manager, plugged in beside him, that he felt that this was somewhat inflexible given that the CH47 was making an approach to the non-duty RW, the CL600 was much faster and would be significantly delayed by this action. He re-contacted Odiham Approach and, after some protracted negotiation, it was agreed that the CL600 would be No 1 for the approach and the CH47 would complete 1 hold. He contacted LTC to arrange for the CL600 to be transferred on heading 180° keeping clear of the CH47. When the CL600 crew called on frequency the flight was instructed to descend to 2000ft QNH immediately and was given the aerodrome details. It was quickly apparent that it would be necessary to take the CL600 through the LOC and vector the ac in from the S so the crew was informed of this. Shortly after this the ADC rang and asked for the BA146 to be put 'on request'. The CL600 passed through the FAT at about 7nm and, after a short period, was turned L onto heading 010° to intercept the LOC. This was quite a severe turn with the intention of intercepting the LOC at about 5nm to stay ahead of the CH47. As the CL600 was approaching the LOC and was within the final approach quadrant, he descended the CL600 to 1400ft QNH to assist with the approach as he felt the whole approach had been rushed. This was an error on his behalf as it should have been 1500ft. At about this time the Air controller rang and requested release on the BA146 which was given. The CL600 established on the LOC at about 4·5nm and he was just about to transfer the flight to Tower when an SSR contact popped-up on the radar display O/H the aerodrome, directly ahead of the CL600. He realised immediately the BA146 was departing off RW24 and gave the CL600 flight an avoiding action L turn just as the ADC telephone line rang. He immediately answered the call to hear the Air controller apologising and at the same time he observed the BA146 turning R. He immediately stopped the CL600's turn and instructed the crew to turn hard R. The CL600 crew complied with his instructions and reported visual with the BA146. He estimated separation as 1·5nm. The BA146 flight eventually came on frequency and was given a service before transfer to LTC. The CL600 was vectored away to the S and delayed against the CH47 before landing.

ATSI reports that the Airprox occurred in Class G airspace within the Farnborough ATZ, at 1618:40UTC, between a BA146, which had just departed from RW24 at Farnborough Airport and a CL600, which was established on the ILS at 3nm from touchdown for RW06 at Farnborough. The Farnborough ATZ is a circle radius 2·5nm centred on the longest notified RW (06/24) 511631N 0004639W, except that part of the circle N of the M3 motorway from SFC to 2000ft aal, aerodrome elevation 238ft.

The CL600 was on an IFR flight from Berlin-Schöenefeld to Farnborough and was working Farnborough Approach on 134·350MHz.

The BA146 was on an IFR flight departing Farnborough for Warton and was in receipt of an Aerodrome Control Service from the Farnborough Tower Controller on 122·5MHz.

ATSI discussed the incident with ADC (A), who had previously handed over, and ADC (B) on duty at the time of the incident, and had access to radar recordings of the incident and RT from the Farnborough Tower and Approach frequencies.

The Farnborough METARs are provided for 1550 and 1620UTC:

METAR EGLF 021550Z 06008KT 4900 HZ FEW021 11/07 Q1023=

METAR EGLF 021620Z 07008KT 4900 HZ FEW022 10/06 Q1023=

Prior to the incident, although the wind had favoured use of RW06, RW24 was in use in order to facilitate flight calibration of the ILS on RW24. Safeguarding was also in place due to marginal Wx conditions and to assist in the protection of the ILS as required during calibration.

At 1605:30, following completion of the calibration, ADC (A) and the APR had a conversation regarding changing the RW in use. ADC (A) had 1 ac to depart which was given a radar release by the APR and an agreement was reached that after the departure the RW in use would change to RW06.

At 1608:10 ADC (A) broadcast that RW06 was now in use. The ATIS was broadcasting information 'S' which gave the RW in use as RW24.

At 1608:30 Fire 1 called the Tower to request to enter RW06 at A1 for a RW inspection which was approved. ADC (A) used the Tower RW change checklist to complete the RW change procedure but did not change the RW designator strip, which was not on the checklist. ADC (A) later stated that he felt that the existing checklists were often cumbersome and distracting and involved some tasks that were not appropriate to the ATCO role and were carried out by the ATSA. While ADC (A) was completing the checklist another controller, ADC (B), arrived to give ADC (A) a break.

At 1610:10 the BA146 called for start having received information 'S' and the outgoing Tower controller, ADC (A) gave start-up clearance. After this transmission the ATIS was changed to reflect the RW change to RW06 but the designator was not changed and remained 'S'.

As part of the handover the outgoing Tower controller, ADC (A), used the PRAWNS checklist and stated that RW06 was in use on a number of occasions. The oncoming Tower controller, ADC (B), recalled being told that RW06 was in use several times. Neither controller noticed that the RW designator strip still showed that RW24 was in use.

ADC (B) was nearing the end of a day shift which had been fairly standard, working both in the tower and on radar. RW24 had been in use for the previous part of the day due to the ILS calibration.

At 1612:10 a call was received from Tech 3 requesting clearance into the cleared and graded area for RW24 which was approved by ADC (B).

At 1612:50 ADC (B) started the procedure to cancel safeguarding. While ADC (B) was making the telephone calls required by the checklist the BA146 flight requested taxi and was given taxi instructions to holding point Whiskey for RW24 followed by departure instructions, *"(BA146 c/s) after departure runway two four climb straight ahead to two point five D M E then a right turn heading two eight five climb to altitude two thousand four hundred feet squawk is six zero two zero"*; this was read back correctly. ADC (B) stated that he referred to the RW designator strip which showed RW24 in use before giving taxi instructions. ADC (B) also stated that the operator of the BA146 regularly requested RW24 for departure. ADC (B) telephoned the Approach controller to cancel safeguarding and to give a departure warning on the BA146 on course for Compton (CPT). During this conversation neither controller specified the RW in use.

At 1614:10 the CL600 flight contacted Farnborough Approach descending to 5000ft on a heading of 180°, W of Farnborough, which had previously been coordinated with TC due to conflicting Odiham traffic. The CL600 was descended to 2000ft with a request to expedite descent and informed that it would be vectors for the ILS RW06. The APR anticipated that, constricted by the position of the Odiham traffic, the CL600 would have to be vectored through the FAT and re-positioned from the S in order to lose sufficient height for the approach and informed the pilot of the CL600 as such.

ADC (B) stated that he looked at the ATM to ensure that there was sufficient gap to depart the BA146 and assumed that the CL600 was being vectored for a standard LH radar cct for RW24. The unit advised that Farnborough receive strips for inbound traffic that are worked by TC prior to Farnborough approximately 30min before arrival. The Farnborough Manual of Air Traffic Services Part 2, Annex B, states that in the VCR position:

'If an aircraft is planned to utilise the non-duty RW e.g. will be using the 'new' RW after a RW change or carrying out an opposite end approach, the RW to be used is to be recorded in the Heading and Level box and circled. This is to be done for both departure and arrival fps until any RW change has been completed.'

The VCR fps for the inbound CL600 was not made available to ATSI but both controllers stated that the fps was not marked with the new RW to be used and it was unclear if this procedure was regularly followed.

ADC (B) instructed the BA146 flight to enter RW24 via Whiskey to backtrack and line-up and advised the pilot that there was a vehicle to vacate ahead.

At 1614:10 ADC (B) initiated a phone call to Ively Gate to cancel safeguarding. Whilst the phone was ringing Fire 1 reported, "*vacated RW06 at A1, RW surface inspection result for 06, the RW is dry, dry, dry.*" During the transmission from Fire 1 the phone call was answered and ADC (B) asked the recipient to standby. The Tower controller replied to the vehicle driver, "*Fire 1 roger, copied, dry, dry, dry*", before continuing with the phone call.

At 1615:10 ADC (B) broadcast that safeguarding was cancelled. A call was then made to the Tower from Tech 3, reporting, "*vacated the 24 critical area*".

At 1615:40 the APR instructed the CL600 to turn L onto a heading of 010° in order to position the traffic onto R base.

At 1616:10 ADC (B) initiated a phone call to the APR requesting a radar release on the BA146. Neither controller specified the RW in use. At the time the release was agreed, radar recordings show the CL600 still S of the extended C/L tracking S.

At 1616:50 ADC (B) instructed the BA146 flight, *"(BA146 c/s) runway two four clear for take-off…*".

[UKAB Note (1): At 1617:16 the APR transmitted, *"(CL600 c/s) descend to altitude one thousand four hundred feet and you are closing the localiser from the right report established"* which was read back correctly. The CL600 crew reported established on the ILS at 1618:00 and was cleared to descend with the G/P which was acknowledged.]

ADC (B) stated that he watched the BA146's take-off roll and did not look at the ATM again until the BA146 was airborne. When the BA146 was airborne ADC (B) saw the CL600 on final at approximately 5nm, opposite direction to the BA146. ADC (B) instructed the BA146 flight, at 1618:10, *"(BA146 c/s) avoiding action turn right immediate, turn right immediately heading three six zero degrees*". This was read back correctly. TI was not given. At 1618:10 the CL600 was indicating altitude 1400ft and the BA146 was indicating altitude 700ft climbing in the opposite direction, 3·6nm apart.

At almost the same time the APR instructed the CL600 flight to contact the Tower advising the crew "*there is departing traffic just airborne ahead of you*" (as the APR had just released traffic from, as he believed, RW06). As the CL600 crew read back the instruction the departing BA146 just airborne from RW24 became visible on radar and the APR immediately gave avoiding action to the CL600 flight, at 1618:20, *"(CL600 c/s) avoiding action hard left hard left heading three three zero departing traffic coming off the reciprocal runway"*. This was read back correctly.

Following a brief conversation with ADC (B) the APR changed the avoiding action, at 1618:26, to the CL600 flight, to turn hard R onto 180°. The CL600 crew reported having the BA146 in sight. The CPA occurs at 1618:42, the BA146 turning R through heading 330° and climbing through altitude 1800ft with the CL600 1·4nm to its SW, having turned sharply R onto a SE'ly track descending through altitude 1300ft, 500ft below.

The avoiding action given by both controllers resolved the situation and the CL600 was subsequently re-vectored for the ILS.

ADC (B) returned from a break in order to relieve the previous Tower controller, ADC (A), and prior to that had spent the day working on RW24 which may have predisposed him into a subconscious bias towards the use of RW24.

Where normally the prevailing wind at the time of the incident would have acted as a prompt to indicate that RW06 was in use, ADC (B) had spent the majority of the shift prior to the incident operating against the prevailing wind.

Although the ADC (A) clearly stated to the oncoming Tower controller, ADC (B), that RW06 was in use, neither controller changed the RW designator strip to RW06. Changing the designator strip was not on the checklist and, as the oncoming controller had arrived, the need to conduct a handover is likely to have interrupted ADC (A)'s thought process. Although other equipment in the Tower also has displays that indicate the RW in use (IRVR, ILS, Met display system, lighting panel) they are visually indistinct and are not sufficiently obvious to draw attention to any difference in information to that displayed by the RW designator strip.

The first call made to ADC (B) after he took over was from a vehicle requesting to enter RW24. This action may have prompted the thought process that led ADC (B) to believe that RW24 was in use.

ADC (B) then started the procedure to cancel safeguarding – a procedure that had remained in place to assist in the calibration of RW24. This may have further reinforced the controller's mindset that RW24 was in use.

The BA146 was the first ac movement after the RW change. The ATIS 'S' received by the BA146 gave the RW in use as RW24. As the designator letter did not change with the RW change there was no indication to either the controller or the pilot that the information received was out of date.

The BA146 was operated by a company that regularly request RW24 for departure.

When ADC (B) called the APR to give a departure warning on the BA146 and then to subsequently request a release the RW in use was not stated by either controller.

When ADC (B) called for a radar release on the BA146 the inbound CL600 was S of the extended C/L for RW06 and looked as if it was being positioned downwind LH for the standard radar cct pattern for RW24. There was no indication on the CL600's fps that it would be landing on RW06.

Although Fire 1 called vacating RW06 ADC (B) was in the middle of a phone call so his full attention was not on the report from the vehicle. The controller read back the RW state but not the RW in use. When Tech 3 called vacated from RW24 ADC (B) had finished the phone calls required to cancel safeguarding so it is likely that he devoted more attention to this transmission than the one made by Fire 1.

Having judged that there was a sufficient gap to backtrack and depart the BA146 ahead of the CL600, which he believed to be landing on RW24, the Tower controller had no further need to consult the ATM until the BA146 was airborne and the position of the CL600 became clear. When the Airprox became evident both controllers took immediate and appropriate action to re-establish separation.

The Airprox occurred after ADC (B) mistakenly departed a BA146 from RW24 bringing it into confliction with a CL600 established on final approach for the correct RW in use - RW06.

Contributing factors were considered to be:-

The RW designator strip, as the most visually dominant indication of the RW in use, still displayed RW24.

The first call received after ADC (B) took over was from a vehicle referring to RW24.

The controller was distracted by the cancellation of safeguarding (which had remained in place partly because it assisted in the calibration for RW24).

The company that operated the BA146 often requested RW24 for departure.

The ATIS received by the BA146 stated that RW24 was in use and the designator letter did not change with the RW change.

The inbound fps for the CL600 was not marked to indicate RW06 and the vectoring pattern looked appropriate for RW24.

There is no procedure in place to specify the RW in use for departure on release or departure warning following a RW change.

Recommendations:

ATSI recommend that the ATSU review their procedures for changing RW, in particular the procedures for the first arrivals and departures following a RW change and including the procedures for display and marking of fpss.

ATSI further recommend that the ATSU review their equipment and consider integrating a more prominent visual indication of the RW in use either as part of their existing layout or during any future equipment changes.

ATSI further recommend that the ATSU review their checklist procedures to ensure that they are appropriate to the task being discharged.

BM SAFETY MANAGEMENT reports this Airprox was between a BA146 outbound, IFR, from Farnborough (FBO) on RW24 and a CL600 inbound, IFR, to FBO on RW06. BM SM have been invited to investigate RAF ATM involvement in this incident after it was alleged that Odiham (ODI) APP had been "inflexible" in coordinating an IFR CH47 inbound to ODI with FBO's IFR inbound. The CH47 was operating IFR, in receipt of a TS from ODI APP, conducting a COPTAC 272 approach (see Figure 1).

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The incident sequence commenced at 1610:31 when FBO APP contacted ODI APP to advise them of the CL600 inbound to FBO. Whilst this landline exchange was protracted, the agreement reached was that the CH47 would maintain the COPTAC hold, permitting FBO's IFR traffic to route ahead and conduct an ILS to RW06. At the conclusion of this landline exchange at 1612:59, the CL600 was 13nm NW of FBO at 6000ft; the CH47 was 10·6nm WNW of ODI, tracking ESE, indicating 2700ft.

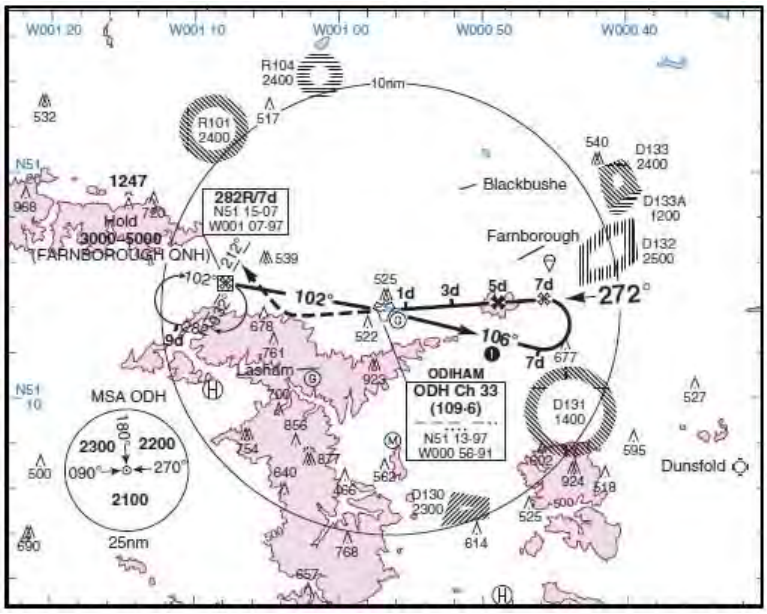


Figure 1. Odiham COPTER TAC 272 Procedure Plate

At 1615:27, FBO contacted ODI APP and advised them, "*okay, what I'm going to do is I'm going to come back in from the south as soon as I can and keep it fairly tight*." ODI APP approved FBO to transit the ODI ATZ to conduct the ILS to RW06. At this point, the CL600 was 6·5nm WSW of FBO and 0·4nm N of ODI, tracking S, descending through 3300ft; the CH47 was 7·4nm W of ODI in a RH turn passing through W, at 3000ft.

At 1617:43, the CH47 crew reported, "…*approaching the initial approach fix for the procedure*" and ODI APP authorised the CH47 flight to route towards the ODH, instructing them to, "…*report beacons outbound*." At this point, the CL600 was 5·1nm SW of FBO, tracking NNE, descending through 1800ft positioning for the ILS; the CH47 was 8·8nm WNW of ODI, tracking ESE, at 3000ft.

At 1618:11, the BA146 first paints on radar 0·5nm SW of FBO, climbing through 500ft. The CL600 was 4·2nm SW of FBO at 1400ft on the ILS. The CH47 was 7·9nm WNW of ODI at 3000ft routing towards the ODH.

At 1618:11, as the BA146 became airborne, the CH47 was not a factor to either FBO ac. Whilst the initial landline exchange between ODI and FBO APP was protracted, ODI APP offered and agreed to delay their traffic to facilitate an expeditious recovery to FBO for the CL600. Moreover, that agreement occurred over 5min prior to the CPA. BM SM contends that ODI APP demonstrated flexibility in offering FBO a number of options to resolve the potential confliction and did not play a causal or contributory role in this Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

A controller Member expressed concern that during the time leading up to the incident, the ADC position was busy with 2 checklists being actioned (RW change and safeguarding/LVPs) and a position handover. This had undoubtedly distracted the ADCs and resulted in the absence of the clues that would normally have alerted and reminded ADC (B) about the in-use RW. First, the ATIS information serial should have changed when the RW in use was changed, as this is an important indicator for controllers and pilots that a change has occurred. Second, the RW designator strip should have been changed by ADC (A) when RW06 was declared as the duty RW and should have been picked up by ADC (B) during the PRAWNS checklist at the handover, even though it was not included in the RW change checklist. Third, the annotation of the BA146 fps with the RW to be used, following a RW change, should have prompted the ADC but his mindset was apparently firmly set that RW24 was the duty RW. Neither ADC (B) nor the APR mentioned the RW to be used when safeguarding was cancelled, or when ADC (B) warned the APR of the impending BA146 departure and again when the radar release was requested. It was noteworthy that the inbound CL600 was not established at the usual range from touchdown, its flightpath under vectoring by the APR appearing to place the flight through the extended C/L towards the downwind leg for RW24. Usually the inbound would have been established on final approach at about 8nm and transferred to the Tower frequency. Without the requirement for the APR to give the ADC a range check on inbound traffic or for the ADC to monitor the APP frequency, SA on the traffic situation was reduced. Although any one of a number of these factors could have broken the chain of events leading up to the Airprox, in the end, none did. This left Members in no doubt that, in the cold light of day, the cause of this Airprox was that the ADC cleared the BA146 to depart from the non-duty RW into conflict with the CL600 approaching the duty RW.

Looking at the risk element, it was noted that the BA146 flight was in a critical phase of flight, close to changing configuration to accelerate after take-off with limited manoeuvrability. Also, the CL600 was in its final descent phase, when TCAS RAs are inhibited below 1100ft agl (rad/alt), such that no resolution guidance would be generated. These two elements lead CAT pilot Members to believe that safety had been compromised. Other Members thought that ATC team had acted well, once the situation had become evident, and had resolved the conflict before safety margins were compromised. Upon seeing the CL600 established on final for RW06, the ADC had quickly issued the BA146 flight an avoiding action turn to the R before telephoning the APR to inform him of his actions. Meanwhile, the APR was in the process of transferring the CL600 flight to Tower when he saw the BA146 pop-up on radar ahead of the CL600 and issued the CL600 flight a hard L turn onto a NW'ly heading and gave TI. As he was speaking to the ADC on the telephone, the APR saw the BA146's R turn begin to take effect and reversed the avoiding action given to the CL600 flight by turning it hard R. The BA146 crew had reacted promptly to the R turn issued and, although TI had not been given, their SA was enhanced as they saw the approaching CL600 on TCAS ahead and above before a TA was generated. The CL600 crew had also reacted promptly to the their L turn issued and again when the turn was reversed to the R, during which they visually acquired the BA146 about 2nm to their L, turning sharply away and 800ft above climbing. The radar recording shows both flights reacting to the turn instructions given, in particular the CL600 crew's robust R turn after having already started to turn L. In the end, Members could not agree a risk unanimously which prompted the Chairman

to call a vote. This resulted in a majority decision that the combined action taken by all parties had been effective such that the risk of collision had been removed.

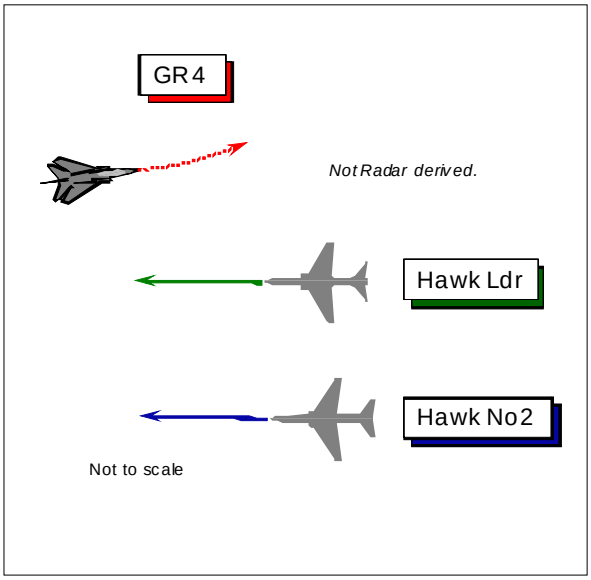
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ADC cleared the BA146 to depart from the non-duty RW into conflict with the CL600 approaching the duty RW.

Degree of Risk: C.

AIRPROX REPORT NO 2012027

Date/Time:	1 Mar 2012 1357Z	
Position:	5545N 00230W (6nm NW Charter Hall - [13nm SW of SAB])	
Airspace:	UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T1	Tornado GR4
Operator:	HQ Air (Ops)	HQ Air (Ops)
Alt/FL:	750ft agl	300ft agl
Weather:	VMC NR	VMC CLBC
Visibility:	15km	15km
Reported Separation:	500ft V/200m H	500ft V/800ft H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe HAWK T1 PILOT reports he was leading a pair of Hawk ac operating autonomously within LFA16 on a 2v1 low-level evasion sortie for a Weapons System Operator (WSO) student. Heading W at 420kt approaching a position 6nm NW of Charter Hall light ac strip, during evasion he 'kicked' to put the fighter in his 6 o'clock to action a bomb-in-face (BIF) tactic. To simulate this he wing waggled and climbed to a height of about 750ft. As he resumed straight and level flight his wingman called 'tally' on a GR4 ahead on his nose. He acquired the GR4 visually himself at a range of about ¼nm, which then passed down his RH side 200m away and about 500ft lower than his ac. No avoiding action was taken as he assessed the GR4's flight path would keep the ac clear of each other and the Risk was 'low'. He stated that, as the Airprox occurred in the middle of a 'bounce', his lookout was focussed on the ac executing the bounce.

His ac has a black colour scheme; the HISLs and landing lights were on. A squawk of A7001 was selected with Modes C and S on; TCAS is not fitted.

THE TORNADO GR4 PILOT reports he was operating as a single GR4 in the LFS as his wingman was delayed on the ground. He was monitoring the LFS common frequency and was squawking with Mode C. TCAS is not fitted.

Flying at low-level at a height of about 300ft and approaching the location of the Airprox heading 080° at 420kt, he became 'tally' with a single Hawk in his 12:30 position at a range of about 3-4km. The Hawk was assessed as flying at a height of 1000ft, with L to R movement in the canopy. To avoid the black Hawk he manoeuvred 10° left and maintained level flight at 300ft keeping tally on the ac. At this point he and his navigator started to scan for a potential wingman. Assessing the horizontal displacement at the closest point to be in his 3 o'clock at about 800-1000ft, it did not appear that the Hawk pilot had seen his GR4. Just before the lead Hawk passed abeam, displaced some 800-1000ft horizontally to starboard and 500ft above his GR4 at the closest point, the No2 Hawk was seen in battle formation to port of the lead Hawk. At no stage did he feel that there was a risk of a collision and stated the Risk was 'low'.

His ac has a grey colour-scheme but the HISLs were on.

HQ AIR (OPS) comments that the Airprox occurred within Class G airspace at low level. The Hawk No2 ac acquired the GR4 (as would be expected from the formation SOP-defined lookout sectors) and called the 'tally' to the lead Hawk pilot. The lead Hawk pilot used this information to gain visual on the GR4, albeit at fairly short range. The benefits of flying in tactical formation and combining lookout sectors for an improved chance of detection are clearly illustrated. The GR4 pilot had previously gained tally on the lead Hawk and as a sight line rate existed,

which demonstrated that the GR4 and lead Hawk were not on a collision course, he sensibly did not manoeuvre hard to increase separation on the lead Hawk until he had thoroughly scanned the surrounding airspace (for the expected wingman).

UKAB Note (1): The Airprox occurred outwith recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and comment from the appropriate operating authority.

It was apparent to the Members that the GR4 pilot saw a single Hawk first, in his 12:30 position at a range of about 3-4km and evidently the lead Hawk ac. Although he recognised that there would be some lateral displacement when the lead Hawk was first spotted, Members noted the GR4 pilot wisely manoeuvred gently left to ensure a wider berth as he maintained level flight at 300ft agl whilst keeping a watch on the lead Hawk and scanning for a No2, which was subsequently spotted before the ac passed abeam.

It appeared that the No2 Hawk crew spotted the GR4 slightly later but promptly warned the lead Hawk pilot about it, who saw the GR4 from a range of ¼nm. The Board noted that although he was able to do so, the lead Hawk pilot saw no need to take avoiding action as he assessed the GR4's flight path relative to his own would keep the ac clear of each other. The GR4 subsequently passed some 200m clear to starboard from his perspective, broadly in agreement with the GR4 pilot's estimate of about 240m. Taking all these factors into account, the Board concluded that this Airprox had stemmed from a conflict in the UKDLFS that had been resolved by the GR4 pilot.

Although the lead Hawk pilot had initiated his climb to 750ft agl as part of his evasion exercise, fortuitously, this had the added affect of increasing the vertical separation at a critical juncture and he wisely maintained this height as the GR4 passed abeam some 450-500ft below him. Despite the high closing speed of 840kt, the lead Hawk and GR4 pilots were visual with each other's ac in reasonable time. This coupled with the reported separation, led the Board to conclude, unanimously, that any Risk of a collision had been effectively eradicated.

PART C: ASSESSMENT OF CAUSE AND RISK

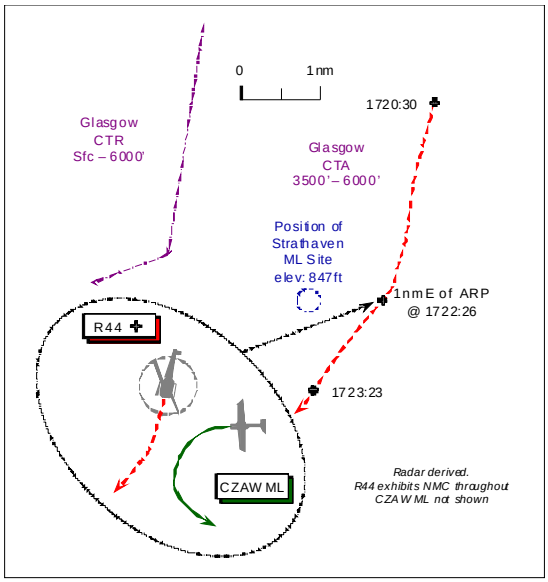
Cause: Conflict in the UKDLFS resolved by the GR4 pilot.

Degree of Risk: C.

AIRPROX REPORT No 2012028

AIRPROX REPORT NO 2012028

Date/Time:	1 Mar 2012 1722Z	
Position:	5541N 00405W (~1nm E of Strathaven Microlight Site - elev 847ft)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	CZAW ML	R44
Operator:	Civ Pte	Civ Pte
Alt/FL:	400ft↓	NR
	aal	NR
Weather:	VMC CLBC	NR NR
Visibility:	3-5km	NR
Reported Separation:		
	50ft V/50m H	NR
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CZAW SPORTCRUISER MICROLIGHT (CZAW ML) PILOT reports he was inbound to Strathaven ML Site as the first of three ac on a delivery flight from England and listening out on the SAFETY COM frequency of 135·475MHz.

The weather had necessitated a routeing via Kirkbride N to the W Linton area, then W to Strathaven. The weather was clear to the N and E as far as the M74 – some 5nm E of Strathaven – with a cloud base of 2000-2500ft and an inflight visibility of >20km. To the W, the visibility was 3-5km worsening towards the airfield; however, it was improving.

On final, heading 270° at 65kt about 700m E of the threshold to RW27 descending through 400ft aal – about 1250ft ALT – he spotted a helicopter heading S in his 1 o'clock about 100-150ft away crossing from R – L, 50ft above his ML. To avoid the rotor wash from the helicopter – a blue R44 – he immediately turned L where the ground is lower into a LH orbit as the helicopter passed 50m away and 50ft above his ML with a 'high' Risk of collision.

The ML has a red and white colour-scheme and the tail strobe and landing light were both on. A squawk of A7000 was selected with Modes C and S on, he thought.

THE ROBINSON R44 PILOT reports that he was in transit from Cumbernauld to a private HLS at Palgowan under VFR. He was in communication with Glasgow ATC and the assigned squawk was selected. The ML flown by the reporting pilot was not seen.

THE CZAW SPORTCRUISER MICROLIGHT OPERATOR comments that the same helicopter flew directly over the centre of the airfield earlier that afternoon heading for Cumbernauld at a height of about 500ft agl. Due to weather, there was no traffic at the airfield at that time, so there was no risk of an Airprox. No call was made on the SAFETY COM frequency.

This is the third Airprox involving a helicopter at Strathaven in about 12 months.

UKAB Note (1): The ML Operator also expressed his concern that little appears to be possible at unlicensed aerodromes to provide a measure of protection to cct traffic against ac transiting close to the site. An unlicensed A/D operator could develop a case for the establishment of an ATZ for consideration, subject to the provision of an Aerodrome Flight Information Service (FISO) (see DAP comment below).

ATSI reports that the R44 departed Cumbernauld for a VFR flight to Palgowan, Dumfries and Galloway.

The R44 pilot called Glasgow APP on 119.1MHz at 1712:14, flight details were given and a BS agreed. The R44 pilot stated that he would route via Strathaven. APP requested the R44 pilot report if a level above 2000ft was required, a squawk of A2602 assigned and the ac identified by the controller as it routed S, 14nm E of Glasgow Airport. The R44 pilot confirmed that no Mode C altitude reporting was available.

At 1720:30 the recorded radar data shows the R44 southbound about 3nm NNE of the notified position of Strathaven ML site. The CZAW ML pilot reported that, whilst on final approach to RW27, the R44 was observed in the ML pilot's 1 o'clock position, range 100 – 150ft and 50ft above.

The radar data shows the R44 passing 1nm E of Strathaven at 1722:26 on a SW'ly track and thence 1.1nm S of the ML site at 1723:23. There was no recorded radar data to indicate any other ac in the vicinity of Strathaven as the R44 passed by.

At 1723:40 the R44 was instructed to squawk A7000 and transferred to Prestwick TOWER.

The Glasgow 1720Z METAR: 08004KT 040V110 9999 SCT025 BKN031 11/10 Q1023=

Given the lack of recorded radar data for this Airprox [showing both ac] no ATSI Analysis or Conclusion will be given.

Further to the two Airprox at Strathaven in 2011 (2011011 and 2011063) ATSI made the following recommendation:

The CAA [Aeronautical Information Management Regulation] should determine whether or not the entry for the Strathaven Microlight Site in the UK AIP should be amended to include details of the vertical limits of activity at the site.

Therefore:

(a) On 9 February 2012 the UK AIP ENR entry for Strathaven was updated to include more detailed information on activity at the site.

(b) The Scotland VFR 1:500,000 chart is due to be updated in June 2012 to depict Strathaven as an area of 'Intense Microlight Activity'.

(c) Other activities are also being progressed with wider applicability to ML flying in the UK in general and ATSI are aware that the operator at Strathaven and the local ATC unit have entered into a dialogue following recent events.

UKAB Note (2): The U.S. Naval Observatory archive astronomical data gives Sunset at Strathaven as 1752UTC and the end of Civil Twilight as 1829UTC.

DAP comments that any aerodrome operator may apply for an ATZ to be allocated to provide a degree of protection for ac operating in the immediate vicinity of the aerodrome; ATZ dimensions are set out at Article 258 of the ANO 2009. However, notwithstanding the ANO amendment to allow flying training at unlicensed aerodromes, the level of Air Traffic Control (ATC), Aerodrome Flight Information Service (AFIS) or Air Ground Station that an aerodrome requires to support an ATZ remains unchanged (RoA 2007 Rule 45).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a transcript of the relevant RT frequency, radar video recordings and a report from the appropriate ATC authority.

The Board recognised that although the R44 pilot was in receipt of a BS from Glasgow APP and had advised the controller he was transiting via Strathaven, APP would have no knowledge of specific cct activity at the site nor any responsibility to question the helicopter pilot's VFR routeing or dictate to him how close he flew to the ML site, which was entirely a matter of airmanship. The R44's assigned squawk was evident on the radar recording as the helicopter transited 1nm E of Strathaven and therefore slightly further E than reported by the CZAW pilot. No Mode C was shown by the R44 so it was not possible to determine the helicopter's altitude at that point; however, the

R44 pilot's brief report makes it clear that he did not see the CZAW ML as he flew past. The Board noted the difficulties associated with the ML site's geographic location; Strathaven's elevation of 847ft beneath the Glasgow CTA base of 3500ft, coupled with the Glasgow CTR to the NW, the relatively large town and windfarm to the E with the Edinburgh CTR further E, means it is situated in a potential choke-point for VFR traffic in transit between the CTRs. The HQ Air Ops fast-jet pilot Member commented that this was also a common transit route for jets. Notwithstanding the previous Airprox reported in the vicinity of Strathaven, the consensus amongst the Members was that it was not unreasonable for transit traffic to be encountered 1nm E of a ML site, but it was incumbent on transit pilots to maintain a careful visual scan for site activity and circuiting ac. The CZAW ML, despite its size and slow speed was there to be seen and the R44 pilot plainly had a responsibility to see and avoid other ac in Class G airspace. The Board agreed, therefore, that part of the Cause was a non-sighting of the CZAW ML by the R44 pilot.

The concern expressed by the Strathaven Operator about the apparent lack of protection afforded to unlicensed A/D cct traffic against other ac transiting close to the site was noted. The Chairman postulated a theory that because Strathaven is marked as a ML Site and not as an A/D on charts, it did not achieve the requisite impact and is not accorded the same level of significance by other airspace users; however, removal of ML designation would entail removal of the location from AIP ENR 5.5 (Aerial Sporting and Recreational Activities. Whereas Rule 12 to the RofA was generally applicable, in a practical sense pilots might view the intensity and nature of operations differently if it was shown as an A/D and might therefore accord it a wider berth if they could. The Board discussed the expanded information on Strathaven's activity recently promulgated in the UK AIP and the chart amendment about to be implemented. The former had little time to take effect before the Airprox occurred, but the Board noted the imminent inclusion of the 'intense microlight activity' warning at the next update to the CAA VFR 1:500,000 chart, which should prove beneficial. It was up to the ML Site Operator to ensure that operations from this location were well-known to other operators and GA Members recognised the importance of good liaison locally. The topic of an ATZ was raised but the CAA Policy and Standards Advisor observed that many busy locations operate safely without an ATZ; he cited Popham as a busy GA A/D and one of many small aviation facilities across the country that operate successfully with only an A/G Station. The DAP Advisor emphasised the requirements for establishing an ATZ around Strathaven include the Operator providing the appropriate level of control/communication commensurate with Rule 45 of the RoA. The use of SAFETY COM did not fulfil such criteria and the Board recognised the importance of compliance with the provisions of Rule 45 to the RofA to enhance safety and the implications of the provision of the various levels of control/communication. Members agreed that an ATZ might not be the answer here, but closer liaison with Glasgow ATC would be helpful. The main point was that an ATZ should not be seen as a 'brick-wall' that was impenetrable by other airspace users; the provision of the minimum levels of communication was essential to ensure the safety of those operating within it and those that desired to transit that airspace.

The CZAW ML was not shown on the radar recording, which was surprising to some Members because the pilot reported that he was also squawking the conspicuity code of A7000 with both Modes C & S on. Members could only conclude that the CZAW ML was not shown because it was slightly lower than the R44 and therefore beneath coverage, or possibly that the pilot had inadvertently not switched it on. Members emphasised the importance of selecting SSR with Mode C whenever airborne and the benefits that accrue from the enhanced electronic conspicuity provided to ATC radar units and TCAS-equipped ac.

The R44 helicopter's small size can make it difficult to see; a virtually head-on aspect with little crossing motion to draw attention to it would increase this difficulty. Despite this the CZAW ML pilot saw the R44, albeit only a mere 100-150ft away. Under the RoA the CZAW ML was equally responsible for seeing an avoiding other ac, but here he was also responsible for 'giving-way' to ac on his right. This he did successfully albeit somewhat later than ideal. The Board agreed, therefore, that a late sighting by the CZAW ML pilot was the other part of the Cause.

The absence of recorded radar data on the CZAW ML did not allow the actual separation between the two ac to be gauged independently. Nevertheless, the CZAW pilot reports that after he saw the R44 he immediately turned L before the helicopter passed 50m away and 50ft above his ML. A controller Member commented that the approaching Sunset – 30min after the Airprox - might have made sighting difficult and perceived that an actual Risk of collision had existed here as the R44 pilot evidently remained unsighted on the ML, however, this was a solitary view. Others opined that although the CZAW pilot had spotted the R44 at a late stage, he had seen the helicopter in time to ensure that he was able to take effective avoiding action against it, thereby ameliorating any Risk. However, the majority view prevailed that whilst the CZAW pilot's robust manoeuvre had removed the actual risk of a collision, at these close quarters the safety of the two ac involved had indeed been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

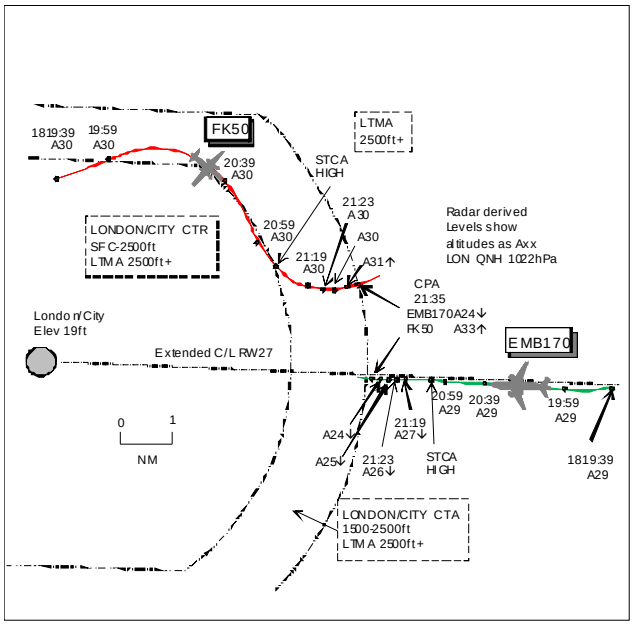
Cause:A non-sighting by the R44 pilot and a late sighting by the CZAW ML pilot.

Degree of Risk:B.

AIRPROX REPORT No 2012029

AIRPROX REPORT NO 2012029

Date/Time:	5 Mar 2012 1821Z	(Night)
Position:	5131N 00014E (6·5nm E London/City - elev 19ft)	
Airspace:	LFIR/LTMA	(Class: A/G)
Reporter:	London/City ADC	
	1st Ac	*2nd Ac*
Type:	EMB170	FK50
Operator:	CAT	CAT
Alt/FL:	3000ft QNH	3000ft QNH
Weather:	VMC CLBC	VMC CLBC
Visibility:	10km	>10km
Reported Separation:	700ft V/5nm H	Nil V/3nm H
Recorded Separation:	900ft V/1·8nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LONDON/CITY ADC reports that the EMB170 flight established RT contact at about 9nm on approach RW27. When the ac reached approximately 7nm from touchdown Thames Radar called on the priority phone line and told him to descend the EMB170 flight immediately to 2000ft, which he did. While doing so he observed and passed TI on the FK50 which was N of the final approach, tracking S at the same altitude as the EMB170. Having received the read back he then instructed the EMB170 crew that this was an avoiding action descent. The EMB170 was then seen to descend and he was aware of Thames Radar issuing a turn for avoiding action to the FK50. He thought the ac were about 4nm apart when he issued the descent instruction.

THE THAMES RADAR CONTROLLER reports that the sector was split and a Coordinator was in place. He had just plugged-in and almost immediately there was a go-around by the FK50 owing to crosswinds at London/City. There was traffic on the RW27 ILS at about 7DME (the EMB170) which had already been transferred to Tower. He noticed the FK50 appear to turn past what he thought it should have been tracking owing to the strong N'ly wind so he issued a further turn to the L of 060°. The FK50 then kept turning R, pointing at the EMB170 on the ILS which was also at 3000ft. He then issued an avoiding action turn to the L but the ac didn't seem to be turning L. He rang the Tower on the priority line and told them to expedite the EMB170 down to 2000ft. At this point STCA was flashing red [high severity alert] and the FK50 was in the L turn so he passed TI to its crew on the EMB170 on the ILS and then climbed the FK50 to 4000ft. He queried with the FK50 crew if they had navigational problems before he turned the flight R onto the LOC.

THE EMB170 PILOT reports inbound to London/City, IFR and in communication with City Tower on 118·075MHz, squawking 7407 with Modes S and C. The visibility was 10km flying below cloud in VMC and the ac's nav, strobe, taxi, landing and tail logo lights were all switched on. About 6-8nm E of London/City during their approach to RW27 while level at 3000ft, heading 295° at 160kt and established on the ILS LOC prior to GP capture, they were given immediate descent to 2000ft. A later transmission was given as "avoiding action" which was received while they were in the descent. They saw a high-wing twin-engine ac in their 0130 position with strobe, nav and landing lights on about 7nm away estimating it passed about 700ft above and 5nm clear on their R. During this encounter a TCAS TA was received and he assessed the risk as low. This was their 2nd approach after a wind-shear go-around.

THE FK50 PILOT reports inbound to London/City, IFR and in receipt of a RCS from Thames Radar on 132·7MHz squawking with Modes S and C. The visibility was >10km flying 2000ft below cloud in VMC and the ac's strobe,

nav and landing lights were all switched on. Following a go-around from RW27 they were following vectors from Thames Radar for a new intercept for a 2nd approach into London/City. The go-around was called out and made by the FO, PF, owing to windy conditions (up to 15kt) and changing wind direction (from NW to NE) during the 1st approach. The Capt, PNF, contacted ATC to confirm the go-around and was given vectors which he confirmed, a heading of 060° [levelling at altitude 3000ft QNH at 180kt]. The Capt then communicated with the cabin crew about the go-around while ATC communication was with the FO. The FO initially turned towards a different direction, heading 080°, which they believed was given by ATC. They were flying on this heading for <1min before ATC asked what heading they were on. As the Capt, now back in RT communication with ATC, answered ATC told them to fly heading 060°, which they did. It only took a couple of seconds to pick up the heading. ATC then told them to climb to 4000ft in order to avoid flying close to other traffic, which they could see both on TCAS and visually; a TCAS TA was then received. The separation at the CPA was estimated as 3nm at the same level. Once level at 4000ft and heading 060° the controller asked them if their heading was indeed 060° which it was, according to their indications. Before transfer to Tower ATC told them that a report would be filed concerning their late turn. He assessed the risk as medium to low.

After landing the crew discussed the incident and thought that maybe a mis-communication about the initial radar vector, before they turned back onto heading 060°, was part of the reported late turn. At that particular time the workload of the FO became more intense which might have played a part in this mis-communication. However, as soon as the wrong heading was acknowledged by the crew it was corrected immediately following the ATC instructions, both navigation and communication wise.

UKAB Note (1): The Secretariat contacted the FK50 Capt to ascertain whether the ac turning through its assigned heading had been due to equipment failure or human factors. The Capt confirmed that the FO was flying the ac at the time and talking to ATC whilst the Capt was talking to the cabin crew. There was a mis-communication between the crew as the Capt confirmed the given vector but the FO understood a different heading; however, this was not assimilated by the crew at the time. As soon as the FO realised the situation the ac was turned away onto the given heading.

UKAB Note (2): Sunset was 1749Z.

UKAB Note (3): Met Office archive data shows the 3000ft wind as between 350° and 020° 45-50kt.

ATSI reports that the Airprox occurred in the London TMA (Class A) airspace, 6·5nm E of London City Airport, between an EMB170 and a FK50.

The EMB170 was on an IFR flight from Edinburgh to London City and was in receipt of an Aerodrome Control Service from London City Tower on frequency 118·075MHz.

The FK50 was on an IFR flight from Rotterdam to London City and was in receipt of a RCS from Thames Radar on frequency 132·7MHz.

ATSI had access to radar recordings of the incident and RT from the London City Tower and Thames Radar frequencies.

The London City METARs are provided for 1750 and 1820 UTC:

EGLC 051750Z 33016KT 300V360 9999 –RA SCT030 BKN045 08/M01 Q1021= and EGLC 051820Z 32014G24KT 9999 BKN040 08/M01 Q1021=

At 1814:40 UTC the EMB170 flight was instructed by Thames Radar to turn R heading 075° to reposition downwind following a go-around from RW27 due to the strong winds.

At 1815:40 the FK50 crew reported to London City Tower that they were going around.

At 1817:40 the EMB170 flight, which was maintaining 3000ft, was instructed by Thames Radar to turn onto a heading of 145° to reposition on to R base for RW27.

AIRPROX REPORT No 2012029

At 1818:00 the FK50 flight contacted Thames Radar in the missed approach procedure and requested another approach. Thames Radar instructed the FK50 crew to fly radar heading 060° and climb to maintain 3000ft.

At 1819:40, as the EMB170 was establishing on the ILS, the FK50 flight was instructed to, *"…turn right heading zero eight zero degrees"* to position downwind RH. The crew read back *"Zero eight zero (FK50 c/s)"*.

At 1820:00 the EMB170 crew was instructed to contact London City Tower on 118·075MHz.

At 1820:40 the EMB170 was on a 9nm final at 2900ft and the FK50 was N of the final approach track, tracking SE, having turned through the heading of 080°. Thames Radar instructed the FK50 crew to turn L immediately heading 060°. The controller immediately restated the instruction *"(FK50 c/s) avoiding action start a left turn now start a left turn now (FK50 c/s)".* The pilot of the FK50 replied, *"Turning left (FK50 c/s)* followed immediately with, *"And turning to zero six zero (FK50 c/s)"*.

The Thames Radar controller telephoned the London City Tower controller and instructed them to descend the EMB170 to 2000ft. The London City Tower controller instructed the EMB170 flight to descend immediately to 2000ft and gave TI on the FK50. The EMB170 crew read back the instruction and the London City Tower controller then upgraded the instruction to avoiding action.

By 1820:59 the FK50 had turned further to the R and was tracking approximately 160°, at 3000ft, on a conflicting course with the EMB170 which was at 2900ft. The 2 ac were 4·6nm apart. The Thames radar controller again instructed the FK50 flight, *"(FK50 c/s) avoiding action turn left immediately"* which was read back as *"Turn left immediately (FK50 c/s)".*

The Thames radar controller then instructed the FK50 crew to, *"…climb to altitude four thousand feet traffic one o'clock same level two miles"*. This transmission was not acknowledged so Thames Radar transmitted at 1821:20, *"(FK50 c/s) traffic one one o'clock two miles same level climb to altitude four thousand feet"*. The FK50 crew replied, *"Four thousand feet (FK50 c/s)"*. At this time the FK50 was in the L turn at 3000ft, 2·3nm from the EMB170 at 2600ft. At the CPA, 1821:35, the FK50 passed down the RHS of the EMB170 at a range of 1·8nm climbing through 3300ft while the EMB170 was descending through 2400ft.

Following the incident the Thames Radar controller checked the track of the FK50 against the heading reported by the crew and the two appeared to correlate. No Mode S heading information was available from the FK50.

No report from the crew of the FK50 has been received by ATSI therefore it is unknown why the crew turned significantly through the heading of 080° instructed by the Thames Radar controller.

The Thames Radar controller issued a heading of 080° to the crew of the FK50 which was read back correctly but not followed. The FK50 turned through the heading issued by the controller and flew into conflict with the EMB170. An avoiding action L turn was issued to the FK50 flight at 1820:40 but the FK50 continued to turn R until 1821:00.

Both the Thames Radar controller and the London City Tower controller took prompt, appropriate action to resolve the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

A CAT pilot Member said that although missed approaches are relatively rare events, pilots routinely enter/select the relevant procedures in the ac FMS to minimise the cockpit workload in the event of a go-around. Both pilot and controller Members confirmed that it was rare for the published missed approach at London/City to be flown, with flights being issued with vectors, after the initial part of the procedure, to ensure that ac do not turn back into conflict with other departing flights or with inbound traffic. It was clear that, for whatever reason, the FK50 crew did not follow their assigned heading after being instructed to turn from 060° onto 080°, a part cause of the Airprox. The Capt reported being 'off air' for a period while the ac was under radar vectors. However pilot Members agreed that during unusual situations, priorities should be established on the flightdeck to ensure that disruptions to SOPs are kept to a minimum. The cabin crew should have been aware, from the flight profile flown, that the ac had gone-

around and would have been responsible for informing the pax of the situation; the Capt normally updates the pax later on. Although the crew reported the heading of 080° was confirmed internally, there appeared to be a missing cross-check in the cockpit to ensure the heading was flown. Moreover, from correlating the RT transcript and radar recording, Members agreed that the FK50 crew, although acknowledging the avoiding action issued by Thames Radar, were slow to respond to the instructions given, which resulted in the ac flying into conflict with the EMB170, the other part cause of the Airprox.

Although Thames Radar had done well in recognising the developing conflict early, before STCA activated, he was undoubtedly concerned that the FK50 flight was not turning away from the EMB170's projected flightpath as quickly as he expected. He had then telephoned London/City and told the ADC to descend the EMB170 flight, which was actioned immediately, the ADC showing good SA in passing TI to its crew on the FK50 and upgrading the descent instruction to avoiding action. Eventually both the EMB170's descent and the turn/climb of the FK50 took effect which resulted in the ac passing each other separated by 900ft and 1·8nm. Both crews had also seen the developing situation on their TCAS equipment and acquired each other's ac visually while following ATC instructions. Taking all of these elements into account, when combined, the Board was able to conclude that any risk of collision had been effectively removed.

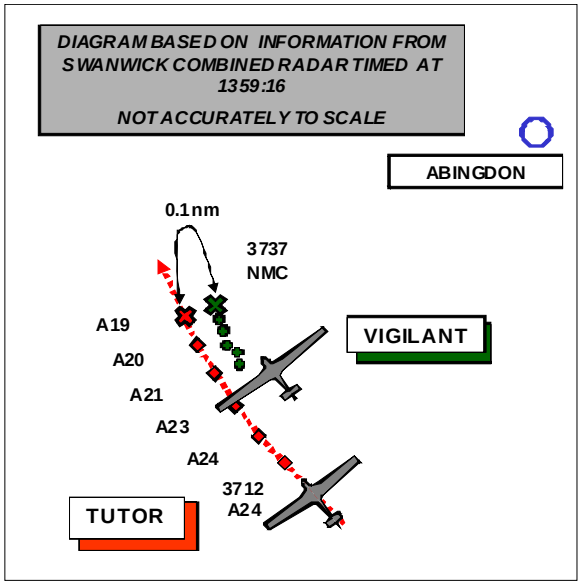
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The FK50 crew did not follow their assigned heading and were slow to respond to avoiding action, resulting in their flying into conflict with the EMB170.

Degree of Risk: C.

AIRPROX REPORT NO 2012030

Date/Time:	10 Mar 2012 1359Z (Saturday)	
Position:	5138N 00122W (3nm SW Abingdon)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Vigilant	Grob Tutor TMk1
Operator:	HQ Air (Trg)	HQ Air (Trg)
Alt/FL:	1700ft	2500ft
	QFE	QNH
Weather:	VMC CLBC	VMC CLBC
Visibility:	40km	30km
Reported Separation:		
	0ft V/100m H	0ft V/ 0.25nm H
Recorded Separation:		
	NR V/0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB VIGILANT PILOT reports flying a white and orange ac squawking 3737 with no Modes C or S available on a local instructor training sortie from Abingdon; he was listening out on Benson DIR frequency but no TCAS was fitted. While in a low workload situation, flying straight and level at 1700ft on the local QFE, heading 280° at 60kt, an unknown white Tutor ac appeared from the rear sector about 100m away on their port side on a parallel track, at the same alt, in a rapid overtake. Shortly afterwards, when about 200m ahead of them, the Tutor commenced a port wingover manoeuvre, climbing more than 300ft above its initial level, and it then departed to the S. Another Vigilant in the vicinity reported that a Tutor ac was also seen in the same vicinity and time conducting aerobatic manoeuvres. The Airprox was immediately reported to the Duty Instructor, who then informed RAF Benson ATC.

No avoiding action was possible and he assessed the risk as being Medium.

THE GROB TUTOR TMK1 PILOT reports he is an experienced civil and military pilot detached from the AEF at RAF Cranwell to RAF Benson. He conducted an area familiarisation flight at RAF Benson in Nov 2011, has flown there regularly since and was aware that gliders from Abingdon operate in the same area.

On the day of the incident he flew cadet Air Experience sorties in the Tutor in 'the Vale' from 2000-5000ft amsl while under a TS from Brize Norton in accordance SOPs. On return from the sortie concerned he was informed by the AEF Cdr that he had been involved in an Airprox with a glider flown by an examiner. The description of the event given was similar to part of one of the sorties he had flown where he overtook a glider while pointing it out to his cadet for training purposes; he therefore concluded that that must have been the incident reported and the timing and location passed confirmed this. He reported that if this was the incident, he had had full situational awareness of the glider and that there had been no risk of collision.

It appeared to him that the detail of the event had been poorly described by the glider pilot and it was his initial impression the glider pilot had low SA at the time. Later, he was informed that it was alleged that he had been conducting low level aerobatics. He was not aware of any RT report having been made.

Part of the ground training that the cadets receive prior to flying is to be responsible for looking out for other ac and for reporting them to the pilot. On the sortie in question, he was initially working at about 4500ft doing general handling and teaching the cadet, who was on his first flight, the effects of controls. He was working above a scattered cloud layer (3000-3500ft) but was over a large hole in the layer and was in sight of the surface. As part of his lookout routine he saw a Vigilant at about 3nm away working the same area, but below the cloud layer; he tried to point it out to the cadet but the cadet did not see it. Occasionally he was directly above the glider and it

appeared to be flying on a N-S racetrack to the SSW of Abingdon or the NW of Didcot power station and was working in a similar area above him. He correlated the ac with his TAS which occasionally showed a 'solid white diamond' with no alt readout. He had previously been taught that is was how Vigilants manifested themselves on the TAS display because they were not fitted with Mode C. During this time Brize Radar called a contact with "no height information", which correlated with the Vigilant; he replied that he was visual and there was a "glider down there". He used the opportunity to explain to the cadet that ops in VFR airspace are deconflicted by the use of lookout, TAS and a TS, but the cadet could still not see the glider. He decided to exercise the cadet's ground training by flying towards the glider until he could see it and practise reporting it to him by using the clock code. He started in the glider's 7 o'clock at about a mile and 2000ft above. As the glider was heading roughly N at the time, he thought that it might be on recovery to Abingdon, so he was careful to assess his alt and distance from the Abingdon ATZ and resolved to break off the manoeuvre early if he perceived a risk of penetration of the ATZ. He accelerated his ac to about 140kt by descending in order to expedite the exercise and remain to the S of the ATZ.

He overtook the Vigilant about 300m to its L, on a parallel heading, and co-altitude, and proceeded to overtake it until he was in its 10 o'clock position; finally the cadet saw it and was able to report it.

At no stage did he have a crossing flight path and at no stage did he lose visual contact with it. He expected that the glider, being occupied by military pilots, would also not perceive a risk of collision during the pass; he would not have done this had it been a civil ac. In any case, he took care to keep adequate separation in order not to alarm the other crew by his proximity, and ensure that there was no risk of collision should the glider unexpectedly manoeuvre. He had also kept sufficient energy to escape upwards should the glider manoeuvre unexpectedly but it appeared to take no avoiding action.

As soon as the training objective had been met, he climbed and turned left away from the glider in order to increase separation and reposition for further training; he made a positive break away manoeuvre as one would when leaving formation in order to indicate to the Vigilant that he was leaving, although he was unsure whether the pilot had seen him.

BM SAFETY MANAGEMENT reports that the incident took place 2.7nm SSW of Abingdon, between a Vigilant and a Tutor, both operating VFR; the Vigilant pilot reported that they were in receipt of a "listening watch" from Benson DIR and the Tutor was in receipt of a TS from Brize Radar (RAD).

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated. RAD's report was submitted approximately 7 weeks after the incident.

While the Vigilant pilot reported being in receipt of a "listening watch" from Benson DIR, this was not the case. The Vigilant's operating unit was found to be utilising the VHF attributed to Benson DIR as a "quiet" freq whilst operating off circuit. Benson ATC does not monitor the freq at the weekend and was not aware that the Vigilant's unit utilised their freq.

HQ 22 (Trg) Gp Order 2307 for EFT states that:

"Aircraft Commanders **should** make all practicable use of RT and Air Traffic Services when operating in Class G airspace" and that "except where sortie profile and/or instructional content make it impracticable, [instructional and SCT] sorties **should** be conducted under a Traffic Service or higher."

RAF Benson is unable to provide a surveillance-based ATS to stn-based Tutor ac at the weekends due to manning constraints; consequently, Brize provides a LARS to RAF Benson AEF/UAS Tutor movements at weekends. Given the time that elapsed between the Airprox and RAD filing their report, and that nothing untoward was mentioned on freq at the time, RADs recollection of the incident was understandably vague; however, analysis of the tape transcript has shown that at the time of the Airprox they had at least 7 ac on freq, including 5 ac in receipt of a TS and they were attempting to sequence 2 para-dropping ac against a BZN inbound.

At 1348:47 the Tutor freecalled LARS was identified and placed under a TS. The incident sequence commenced at approximately 1353:53 when RAD passed TI to the Tutor on traffic, "*similar type er twelve o'clock, three miles, manoeuvring, indicating two thousand five hundred feet above*". Based on the radar replay, the subject of this TI is an unrelated Tutor 3.9nm SW of the incident Tutor, in its left 11 o'clock. The Vigilant was 3.1nm W of the incident

Tutor in it's 12 o'clock and was not displaying SSR Mode C; RAF Vigilant ac are not equipped with Mode C capable transponders.

From 1353:53 until the CPA at 1359:16, the Tutor and Vigilant continued to manoeuvre within 1.2nm of each laterally. This accords with the Tutor pilot's report, stating that they became visual with the Vigilant 'at about 3 miles, working the same area as him but below the cloud layer'.

RAD passed TI to the Tutor on the Vigilant at 1357:53, stating "*pop up traffic, east-south-east, half a mile, slow moving, no height information*". The radar replay showed the Vigilant to be ½nm WSW of the Tutor, tracking NNW, with the Tutor in a right turn, descending through 3600ft. The Tutor pilot reported that they correlated this TI with a contact on his TCAS and with the Vigilant that they had previously sighted, replying to RAD that they were, "*visual with Vigilant now*". Notwithstanding the controller's use of the term 'pop-up traffic', given the altitude of the Vigilant and that it had maintained a constant track, it is unlikely that the ac had not previously 'painted' on radar and more likely that his scan had not previously detected the Vigilant.

At 1358:41 the Tutor, descending through 2900ft, rolled out on a WNW'ly track 0.8nm SE of the Vigilant. At 1358:52 the Tutor, descending through 2600ft, turned onto a NW'ly track, 0.6nm SE of the Vigilant. At 1359, having passed through the Vigilant's 6 o'clock and descending through 2400ft, the Tutor turned onto a NNW'ly track that paralleled that of the Vigilant; lateral separation was 0.4nm.

The CPA occurred at 1359:16 as the Tutor, indicating 2000ft, passed 0.1nm W of the Vigilant; the Vigilant pilot reported that the Tutor was co-altitude with him at the CPA.

The Tutor pilot reported that they manoeuvred their ac deliberately to teach their AEF cadet about lookout and that they maintained visual contact with what they believed to be adequate separation from the Vigilant throughout.

From the Vigilant pilot's perspective, notwithstanding their responsibility within Class G airspace to 'see and avoid', given the geometry of the incident they were unlikely to have been able to see the Tutor much earlier than they did. Notwithstanding the timing of the TI to the Tutor on the Vigilant, the Tutor pilot was visual with the Vigilant throughout the incident sequence and reported as such 1min 15sec prior to the CPA. Moreover, the Tutor pilot reported that having seen the Vigilant, his flight profile was considered and deliberate. On that basis, while the issues concerning the ATS provision by RAD are worthy of consideration, they were neither causal nor contributory to this Airprox (but have been addressed separately with SATCO Brize Norton).

HQ AIR (TRG) comments that while the Tutor pilot justifies in detail his logic for his actions, it was not necessary to get so close to the Vigilant in order to achieve his stated aims and such actions have since been discouraged but not prohibited by HQ 22 Gp and 3 EFTS. HQ Air agrees that in this case there was no risk of collision because of the relative energy states and aircraft performances, but does not condone the unplanned and unroofed closing on any other ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board agreed that although the Tutor pilot had displayed questionable airmanship, they concurred the HQ Air comment above, also agreeing that there had been no risk of collision. Without condoning the deliberate closure of one ac on another without the pilot's knowledge or acquiescence, the Board observed that had the Tutor pilot overtaken on the right iaw the rules of the air (and afforded the cadet a better view of the Vigilant) or waggled his wings indicating that he had seen it, then perhaps the Vigilant crew would not have filed. Further, although the Tutor pilot reported that he left sufficient room for the Vigilant to manoeuvre, one Member disputed this based on the radar showing the ac as being separated by only 180m; in his opinion this was insufficient room for anything other than a gentle turn.

PART C: ASSESSMENT OF CAUSE AND RISK

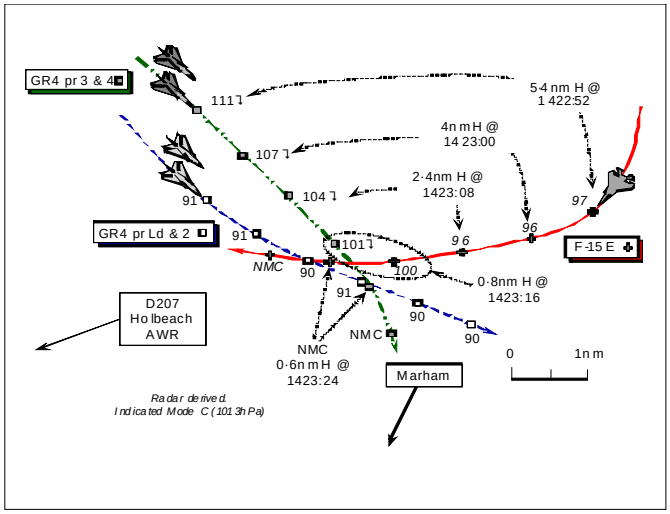
Cause: The Tutor pilot flew close enough to the Vigilant to cause its crew concern.

Degree of Risk: C.

AIRPROX REPORT No 2012031

AIRPROX REPORT NO 2012031

Date/Time:	12 Mar 2012 1423Z	
Position:	5257N 00044E (20nm NNE Marham)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4 pr	F-15E
Operator:	HQ Air (Ops)	USAFE-UK
Alt/FL:	↓FL100	FL100
Weather:	VMC CLOC	VMC CLOC
Visibility:	30km	Unlimited
Reported Separation:		
	Nil V/ ~200ft H	<500ft msd
Recorded Separation:		
	100ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports he was flying as the No3 and leader of the rear section of a 4-ship GR4 formation on recovery to Marham from the N on a stepped descent at FL100 in VMC. Nos 3 and 4 were in loose arrow trailing the Ldr and No2 by about 2nm, to facilitate a formation split for pairs GCAs. They were in receipt of a TS from London MILITARY and the assigned squawk was selected with Mode C.

About 30nm N of Marham, heading 140° at 350kt, London MILITARY called manoeuvring traffic 5nm to the E at FL100 and he became 'tally' with a single F-15E 5nm away. The aspect of the F-15E was initially difficult to judge, but after a few seconds it became clear that it was turning R through W towards his rear pair. No immediate collision risk was apparent so no avoiding action was taken, but the closure rate quickly increased and a call was made by the No4 that the traffic was closing from the L. The crew of No4 initiated a break to the L and the F-15E passed down their RH side, whilst he, flying No3, initiated a roll inverted and pulled. The F-15E crossed from L – R at a minimum distance of about 200ft from his pair with a 'medium' Risk of collision. It was unknown at the time whether the F-15E crew were visual with his pair, but it appeared that they took avoiding action at a similar time.

THE F-15E PILOT reports that the planned mission was a 2-ship close air support sortie to Holbeach Range in support of air-to-ground operations school training. The F-15E flight lead 'ground aborted' his ac for a mechanical reason and the No2 subsequently departed as a single-ship. There was a broken/overcast layer from 500 to 2000ft agl but clear above with unlimited visibility. Departing initially under a DS with Lakenheath DEPARTURES, once VMC above he climbed to FL100 and proceeded to the Wash hold point under VFR. Radar service was terminated and a squawk of A7000 selected with Mode C. Upon reaching the Wash hold at FL100, he turned onto a heading of 105° outbound and switched to the Holbeach Range ICF. After reviewing the ac's armament status and weapons delivery programs prior to range entry, they switched to the Holbeach RANGE PRIMARY and initiated a level R turn back towards Holbeach Range onto about 285° at 350kt. Clearance to join the range was issued, and he was passed the altimeter setting and advised to squawk A7002 [Danger Areas – General]. As he completed the 180° turn inbound, he visually acquired two GR4s off the L side of the nose, slightly low. For deconfliction, he checked the ac to the R [offset the ac's flightpath R] and initiated a slight climb. As the initial pair of GR4s passed on the left side, the Weapons System Operator (WSO) spotted another pair of GR4s on the nose and level with the horizon. About 2sec later – he quoted a time of 1423:28, but probably moments before this - the pilot visually acquired the trailing pair of GR4s and to avoid them immediately pulled straight back on the control stick forcing an abrupt pitch-up into an aggressive climb straight ahead. The trailing GR4s themselves initiated an aggressive manoeuvre away and down. He called out 'the merge' on Holbeach RANGE PRIMARY, who reported they were not aware of any outbound traffic. After the Airprox he continued inbound to Holbeach Range and completed the mission uneventfully.

Based on visual estimations, it appears that the ac passed within 500ft of each other and he assessed the Risk as 'Medium'. After landing, the Airprox was reported to the Squadron Operations Supervisor with details of the event. His ac has a dark grey colour-scheme; the position lights and anti-collision lights were on.

THE LATCC (MIL) LJAO NE TACTICAL CONTROLLER (LJAO NE) reports she was screening a trainee controller on E/NE. A formation of GR4s was recovering to Marham from the N under a TS, and the leader requested a split into 2 pairs for recovery about 30nm N of Marham. At the time, there was an ac executing general handling to the NE of Marham – the F-15. At that point it was no factor but the trainee elected to provide TI to the GR4 formation. Her trainee then split the formation vertically, instructing the first pair (Ldr & 2) to descend to FL90, and the second pair (Nos3 & 4) to descend to FL100. The trainee then called Marham to effect a radar hand-over of both pairs. During the handover, the previously called traffic that was general handling - the F-15E - turned onto W at FL100 and was heading towards the two pairs. The trainee interrupted the handover and called the traffic [the F-15] to both pairs. The handover was then completed and both GR4 pairs instructed to contact Marham APP.

THE LATCC (MIL) SUPERVISOR (SUP) reports that he received a call from a GR4 pilot who was part of a 4-ship formation on recovery to Marham that had experienced an Airprox. He noted the details and requested a radar replay of the event to investigate the circumstances. On reviewing the incident the following was observed.

The Tornado was recovering to Marham from the North in the descent to FL100 under a TS. Approximately 35nm NW of Marham they requested to split into 2 pairs for recovery. The LJAO controller instructed the second pair – [C/S] No3 - to squawk for identification. Meanwhile TI on an ac transponding A7000 and indicating FL100 Mode C was passed to both pairs of GR4s and acknowledged by the crews. At the time when the TI was initially passed the conflicting ac – the F-15E - did not pose a significant threat. The controller then instructed the leading pair to descend to FL90 to execute the split, before initiating a handover to Marham APP. During the handover the conflicting F-15E had turned and was closing on the formation, so it was called again to both pairs of GR4s. Shortly afterward the F-15's contact was observed merging with the rear pair and then indicated a descent to FL78, but this did not appear to be noticed by the LJAO controller. Neither of the two GR4 pairs reported an Airprox at the time on the LJAO frequency before they were transferred to Marham APP.

THE HOLBEACH RANGE SAFETY OFFICER reports that an F-15E was inbound to Holbeach Range on RANGE PRIMARY. The crew was given a joining clearance, then called a 'merge' with a formation of Tornados GR4s at 1425 before they entered the Range. At no point did the F-15E pilot report an Airprox.

BM SAFETY MANAGEMENT reports that this Airprox occurred about 10nm S of airway Y70, between the trailing pair of a 4-ship formation of GR4s recovering to Marham under IFR in receipt of a TS from LJAO NE, and an F-15E operating VFR in the Holbeach AWR hold, in communication with Holbeach Range.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated. Unusually, the investigation was able to utilise HUD recordings from the No3 GR4.

As the Holbeach AWR controllers do not have access to a surveillance radar, they had no way of affecting the outcome of this Airprox; consequently, this investigation has focussed on the ATS provided to the GR4 formation.

Analysis of the LATCC (Mil) and Marham tape transcripts showed that they were 11 and 3-secs slow respectively. Timings have been amended to reflect the radar replay timings.

LJAO NE report that they were mentoring a trainee at the time of the Airprox. Unfortunately, they did not submit a DASOR for the occurrence until almost 6-weeks after the event; consequently, their recall of events and the level of detail contained within the report has suffered.

The GR4 formation was operating as 2-pairs in a "loose trail," with the subject pair trailing the leading pair by 1.2nm, routeing S to Marham. At 1417:30 the GR4 formation was placed under a RCS having entered Y70. The trailing pair of the formation exited CAS at 1421:09; LJAO NE omitted to amend the type of ATS from a RCS. Prior to entering Y70, the formation had been in receipt of a TS and reported that they were in receipt of a TS at the time of the Airprox. Moreover, LJAO NE's subsequent actions suggest that their mental perception was that the formation was operating under a TS.

The incident sequence commenced at 1420:59, as the lead pair of the 4-ship of GR4s left CAS. LJAO NE passed TI to the GR4 formation Ldr on the F-15E stating "*traffic 12 o'clock..8 miles, crossing right-left, flight level 1-0-0*." This TI was acknowledged by the 4-ship formation leader. At this point the GR4 formation was descending to FL100; the F-15E was 9.3nm SE, squawking A7000, indicating FL101, in a right hand turn passing through NE.

At 1421:12, LJAO NE amended the lead GR4 pair's descent instruction to descend to FL90 and then, at 1421:44, re-confirmed with the subject trailing GR4 pair the instruction to descend to FL100. At 1421:27, LJAO NE transmitted a request to unrelated traffic to restrict their manoeuvring for coordination with civil traffic outbound from Norwich.

At 1422:04, LJAO NE commenced a radar handover of the lead GR4 pair with Marham, however, it is clear from the subsequent landline conversation, that LJAO NE believed that they were handing over both pairs of the formation. During the handover, at 1422:39, Marham APP pointed out the F-15E traffic to LJAO NE as, "*traffic left..11 o'clock, 5 miles, crossing left-right, flight level 1 hundred, non-squawker*." At this point, the F-15E was 6.5nm E of the lead GR4 pair, indicating FL98, in a right hand turn passing through SW. LJAO NE replied that, "*that traffic has been called*" however Marham APP asked, "*to both flights has it*?" LJAO NE then passed TI on the F-15E to the subject GR4 pair at 1422:53 stating, "*traffic east 5 miles manoeuvring indicating flight level 1 hundred*." The leader of the subject GR4 pair replied 5sec later that, "[No3 GR4 pair C/S] *flight is looking,* "[No3 GR4 pair C/S] *flight is levelling flight level 1-0-0*." At this point, the subject GR4 pair was descending through FL107, with the F-15E 4.3nm ESE indicating FL96, continuing the right hand turn through WSW. LJAO NE informed Marham APP that the, "*traffic had been called and he* [the subject No3 GR4 pair] *is levelling flight level 1 hundred*." Marham APP replied at 1423:05, "*okay,* [GR4 formation C/S] *are you handing him over as well*?" LJAO NE then repeated the previously passed handover details and was involved in the handover until 1425:12. No further TI was passed by LJAO NE to the GR4 formation.

Following receipt of the TI, the crew of the subject No3 GR4 pair can be heard on the HUD tape discussing the TI on the intercom and had visually acquired and identified the F-15E. The GR4 crew reported that 'there was no immediate collision apparent…but the closure rate quickly increased.' At this point at 1423:11, as the subject GR4 pair descended through FL104, one crew member said, "*he's coming right for us*." The F-15E was 2.4nm ESE, indicating FL096, turning through W. None of the GR4 crews reported to LJAO NE that they were visual with the F-15.

At 1423:16, the F-15's SSR code changed to A7002 and the ac had climbed to FL100. The subject GR4 pair was 0.8nm WNW of the F-15E at FL101. Based upon the F-15E pilot's report, it is likely that the climb to FL100 accords with the 'check right and slight climb' that they referred to in their report having gained tally on the lead GR4 pair. The next sweep of the radar at 1423:24 displays the F-15E with no Mode C and it is likely that this was as a result of the 'abrupt climb' that was initiated having sighted the trailing GR4 pair. This suggests that the F-15E initiated the climb at about the CPA, which accords with the GR4 pilot's report. The CPA occurred, in between sweeps, at about 1423:20 with the incident GR4 pilot reporting 200ft lateral separation.

From the F-15E crew's perspective, they appear to have visually acquired the lead pair of GR4s relatively late (approximately 0.8nm lateral separation) and acquired the subject trailing pair very late. From the GR4 formation's perspective, they were able to utilise the generally accurate TI at 1422:53 to visually acquire the F-15E reasonably early. An aggravating factor in the timeliness of the GR4 formation's avoiding action was the high closure speed of the 3 ac, which resulted in reduced safety margins.

From an ATM perspective, the handover between LJAO NE and Marham APP had become protracted and, arguably, this distraction led to LJAO NE not providing a further update to the TI to the GR4 formation. However, they had previously provided TI at 1420:59 and 1422:53, which the GR4 pair had utilised to become visual with the F-15. Notwithstanding that LJAO NE was unaware that the GR4 formation was visual with the F-15E, the lack of a further update between 1422:53 and 1423:20 was consequently neither causal nor contributory to this Airprox. Moreover, given the closing speeds of the ac, any additional update to the TI would have occurred very close to the time of the CPA and would therefore arguably have been of nugatory value. That said, given LJAO NE's response at 1422:50 that, "*that traffic* [the F-15] *has been called*" it appears reasonable to argue that they had not planned on providing updated TI, despite the changed geometry between 1420:59 and 1422:53. On that basis, it may have been the intervention by Marham APP that caused the updated TI to be passed at 1422:53, facilitating the subject GR4 pair's visual acquisition of the F-15.

THE GR4 PILOT'S UNIT commented that following the Airprox a meeting was convened to follow-up initial information exchange of the incident. The aim of the meeting was to identify 'quick wins' that could be implemented locally which might reduce the risk of a similar incident occurring.

It is recommended that the following is briefed locally to provide 'quick win' risk reduction:

F-15E ac utilise a hold based on CGY 105/27-32 2000'-8000' (above airspace previously designated as PMR 225B). Ac squawking A7000 in this hold are likely to be preparing to enter PMR 225 or D207 and switching RT between LATCC (Mil)/Lakenheath and Holbeach AWR Control. Aircrew and controllers are to be aware that traffic in this hold may not be under a radar service and crews are likely to be task focussed on pre-range entry procedures.

F-15E ac regularly use Wash ATA (N) and ATA(S) for BCM prior to recovery to Lakenheath. These areas represent areas of high intensity activity as they lie on the recovery track from the North for Marham RW24 and climb out North from RW06. Additionally, AARA 8 also lies within this airspace. Aircrew and Controllers are to be aware that there is regular activity in ATA (N) and ATA(S) and that radar contacts may be engaged in high energy manoeuvres below airway Y70.

It is recommended that 1 Gp STAR task relevant agencies to investigate the following:

Current weapon release profiles for both GR4 and F-15E require ac to operate outside the protection of D207 and D307. This currently results in ac conducting high energy manoeuvres in Class G airspace without an ATS. This puts GA traffic at risk as they transit close to D207 and D307. It also conflicts with regular routeings of both GR4 and F-15E traffic transiting N/S to and from respective airfields. It is recommended that dimensions of D207 and D307 are re-examined and changed to better reflect weapon profiles for Holbeach and Donna Nook AWR. Consideration of RAF Marham IFR patterns (including TACAN hold) must be included. Initial discussions suggest a staggered 10nm upper radius would provide protection.

Confirmation is required whether London Mil can provide and operate a discreet frequency for ac positioning or operating in D207 and or D307, that will allow them to monitor a Traffic Service for factor traffic. F-15E ac are able to utilise up to 3 radio frequencies simultaneously which will allow them to use AWR, in-house tactical and LATCC (Mil) frequencies. GR4 are unable to utilise more than 2 frequencies simultaneously. Investigation and analysis is required to establish if formation range profiles can be managed using the AWR frequencies for in-house tactical and Range Control aspects whilst maintaining a listening watch on a LATCC (Mil) discreet frequency.

HQ AIR (OPS) comments that the incident occurred in Class G airspace in the vicinity of the Wash Air Weapons Range Danger Areas. TI from the LATCC (Mil) controller allowed the GR4 crews to gain visual with the F-15E in good time, although they did not initially react which probably caused the Airprox to be more severe than if they had taken earlier action.

Of further note, Marham Ops Sqn inititiated an investigation into this incident; the report has been made available to the UKAB. The report gives details of extra deconfliction measures that have been put in place since this incident which should reduce the likelihood of re-occurrence. HQ Air supports the recommendations made in the report.

USAFE-UK comments that Lakenheath ac routinely hold prior to using Wainfleet on CGY 105/27-32 or, in the event of an adverse sea state, over land to the S of that position. Notwithstanding the TI that LATCC (Mil) passed to the GR4s, the decision to keep the second element of the GR4 formation at FL100 in the vicinity of unknown traffic orbiting at the same level is surprising.

USAFE-UK supports the recommendations made as a result of the meeting between Marham and Lakenheath.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of the No3 GR4 and F-15E, transcripts of the relevant RT frequencies, radar video and HUD recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Whilst the reporting No3 GR4 pilot was plainly part of a 4-ship formation the Board considered this Airprox to be between the Nos 3 and 4, ie the rear pair, and the F-15.

For their part, the F-15E crew were operating VFR in an unofficial hold in Class G airspace without the benefit of a ground-based radar service, but equipped with a capable AI radar. However, having been cleared to enter D207 and preparing for air-to-surface weapon events, they were probably focussed on their pre-range entry procedures and may not have been operating their AI radar in an air-to-air mode. The F-15E crew were plainly relying on the principle of 'see and avoid' to fulfil their responsibilities to remain clear of other traffic but the Board noted that the F-15E crew changed their SSR code to A7002, which was displayed on the radar sweep recorded immediately before the Airprox occurred. This was barely moments before the contacts merged and perhaps indicative of at least one of the crew being heads-in at a critical moment. The F-15E pilot's comprehensive account reveals that his attention had been captured by the leading pair of GR4s as they crossed ahead and cleared to port and the HQ Air (Trg) Member perceived that he had concentrated on avoiding the leading GR4 pair whilst at that point oblivious to the greater threat posed by the trailing pair. Noting that the F-15E crew were responsible under the RoA to 'give way' to the GR4s to their R, it was apparent from the pilot's laudably frank report that he had gained visual contact with the trailing GR4 pair approaching from his starboard side at a late stage, moments after his WSO had spotted them and so had immediately pulled straight back forcing an abrupt climb to avoid them. The Board considered that this was an occasion when the WSO should have directed the pilot into avoiding action rather than providing information. Nevertheless, the Board agreed that this late sighting by the F-15E crew was part of the Cause.

The LJAO trainee first passed TI on the F15E to the GR4 formation as, "*traffic 12 o'clock..8 miles, crossing right-left, flight level 1-0-0*", whilst the F-15E crossed ahead, in a right hand turn passing through NE and on the northern half of its orbit as it turned out. Whilst some thought the controller could have been more descriptive in his TI - perhaps emphasising that the unknown ac was in a R turn could have been more helpful – it did generally paint a satisfactory picture and no update was requested. The Board discussed the apparent lack of appreciation by LJAO NE that the F-15E was holding waiting to enter D207. Controller Members recognised that the F-15E was an unknown unpredictable contact squawking the general conspicuity code of A7000 and operating in Class G airspace. Without local knowledge, it was not until the F-15E crew selected A7002 [Danger Areas General] moments before the Airprox occurred that LJAO NE might have perceived that this was traffic about to enter D207. Had the LJAO controllers known that the A7000 squawk was an aircraft holding before range entry they might have appreciated that it would remain at FL100 and avoid using this level for the GR4s. As it was, when the GR4 formation was split into two pairs, the trainee controller elected to stop-off the rear pair at FL100 – the same level indicated by the F-15. At that stage LJAO NE should have detected that the F-15E was in a RH turn but the direction it would subsequently take back toward the formation would not have been clear. With the clarity of hindsight, it might have been appropriate to have continued the descent to FL80 and FL90 respectively, but the LATCC (Mil) Area controller Member emphasised the general demarcation between area control and terminal ATC of FL100. LJAO NE would have been keen to hand-off the GR4s to Marham as quickly as possible as they descended into the realms of terminal ATC airspace where Marham would have a much better grasp of the traffic at these levels. Conversely, Marham ATC was undoubtedly making sure that LJAO NE had called all the relevant traffic in the area before they accepted control of the two pairs, but the handover was far more protracted than the norm, increasing the controllers' workload and lasting over 3min. BM SM noted that the updated TI was passed at the request of Marham ATC. This TI on the F-15E to the subject GR4 pair was passed about 28sec before the merge, "*traffic east 5 miles manoeuvring indicating flight level 1 hundred";* the range given was undoubtedly accurate at 5·4nm but in one pilot's view the phrase "*manoeuvring"* did not help the two GR4 crew's appreciate what the F-15E was doing and did not 'paint' a complete 'picture', which is important. Nevertheless, it should be remembered that area radar controllers are usually viewing a 120nm range display with a data update rate of 6-8secs and a wide traffic split across the country, therefore it can be difficult to determine what is happening at close quarters. The Board accepted that under the TS being provided to the No3 & 4 GR4 pair, LJAO NE had fulfilled their responsibilities to call in TI on other observed traffic and it did ensure that the GR4 crews were looking in the right direction enabling them to spot the F-15E at a range of 5nm, the No3 pilot reports.

Pilot Members pointed out the high closure-rate, with the interval from the No3 pilot's acknowledgement of the TI to the merge little more than 25sec. The radar recording did not show clearly the relative juxtaposition of the GR4 and F-15E at close quarters, with no Mode C shown for several sweeps afterwards because of the robust avoiding action undertaken by all concerned, however, the Board had the added benefit of the HUD recording helpfully provided by the No3 GR4 pilot. This was viewed by the Board and provided graphic evidence of this encounter; the recorded RT/intercom reveals that both the No4 and No3 crew had seen the F-15E, but in the Board's view

they had not immediately assimilated the 'threat' or how close it was. The No3 GR4 pilot had commented on this aspect himself stating that no immediate collision risk was apparent so no avoiding action was taken until the relative aspect and geometry became clear. When the No4 crew recognised the F-15E was heading towards them they broke away. Recognising the No4 would be looking towards his leader in formation, fast–jet pilot Members were surprised that a crewmember was not instructed to 'padlock' the F-15E, thereby ensuring that it was monitored continuously. Following the No3 pilot's realisation the F-15E was heading straight towards them at close quarters, the HUD recording revealed that the conflict was 'broken' by the No3 jinking L before breaking R and down away from the F-15E as the latter climbed straight ahead. However, the HUD recording showed the F-15E pilot's climb was only taking effect as it crossed through the No3 GR4's nose and it was the No3 GR4's L turn that was most effective at close quarters. Debating these points at length the Board finally concluded that the other part of the Cause was late avoiding action by the F-15E crew and the No3 GR4 crew. Whilst the HUD recording only showed the F-15E for a very short period as it crossed ahead and above, it was of great assistance to the Members in their assessment of the inherent Risk where the Board was fairly evenly divided. Some Members perceived that at close quarters at these speeds the safety of the three ac involved had not been assured and listening to the RT and intercom on the HUD recording in isolation certainly supported this view. The Board debated whether earlier avoiding action could have been taken and noted the HQ Air (Ops) comment that the No3 and No4 GR4 crews did not initially react which probably caused the Airprox to be more severe than if they had taken earlier action. However, the HQ Air (Trg) fast-jet Member emphasised that the GR4 crews had seen the F-15E and taken effective avoiding action, the No4 breaking away before the No3 turned L to 'break' the conflict. Other civilian pilot Members accepted this view and by a majority vote it was narrowly concluded that the No3 GR4 pilot's avoiding action had effectively removed the actual Risk of a collision.

The Board was encouraged by the proactive stance of the crews' Units in calling a meeting to discuss the Airprox and their desire to quickly learn from this occurrence. The HQ Air (Ops) Member reported that a meeting had been convened to follow-up the recommendations made to HQ 1 Gp STAR including an examination of the dimensions of the AWRs. However, it was important to stress that look-out was the lesson here, not further segregation of airspace in a benign training environment that does not reflect current scenarios in operational situations.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the F-15E crew and late avoiding action by the F-15E and No 3 GR4 crews.

Degree of Risk: C.

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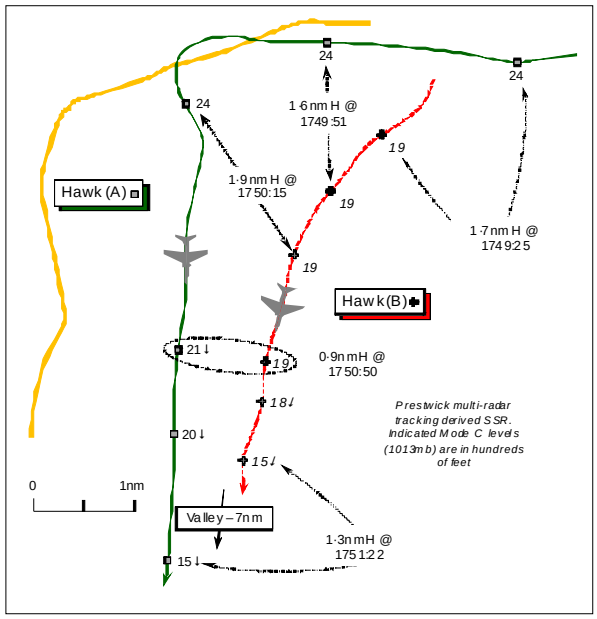
Date/Time:	6 Mar 2012 1750Z	
Position:	5322N 00431W (7nm finals RW19 at Valley - elev 36ft)	
Airspace:	Valley AIAA/FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk2	Hawk T Mk2
Operator:	HQ Air (Trg)	HQ Air (Trg)
Alt/FL:	↓1600ft	2000ft
	QFE (1018hPa)	QFE (1018hPa)
Weather:	IMC In Cloud	IMC In Cloud
Visibility:	100m	50m
Reported Separation:		
	100ft V/0.9nm H	NK V/0.9nm H
Recorded Separation:		
	200ft V @ 0.9nm Min H	
	Nil V @ 1·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF HAWK T Mk2 (A) reports that on completion of a local radar training sortie in the Valley Aerial Tactics Area (East) operating as a pair, individual recoveries were initiated as RW19 was in use. The flight lead ac – Hawk (B) - was vectored ahead for a radar to PAR and was placed under a DS. As the PIC, but PNF, he elected to perform a radar-to-initials recovery, which was flown under a TS from DIR, who vectored them behind the lead ac at 2500ft QFE onto the live side of the extended centre line of RW19. A further descent was then issued by DIR to 1600ft QFE. Hawk (B) on PAR ahead had been called to them and they had the ac displayed on their TCAS, but neither a TA nor RA was received. Heading 190° further descent would have resulted in them descending through Hawk (B)'s height within 1nm so the PF elected to stop the descent at 2200ft until they had passed the instrument traffic on TCAS. Once they had passed Hawk (B), the descent was recommenced and the A/D acquired visually at 1500ft QFE, from which the ac was repositioned onto the dead side and a visual run-in and break flown followed by a cct to land. Minimum separation was 0·9nm [AMPA replay facility] and the Risk assessed as 'medium'.

The assigned squawk was selected with Modes C and S on; the ac is coloured black with white HISLs on and navigation lights set to bright flash.

THE PILOT OF HAWK T Mk2 (B), a QFI, reports that on completion of a 1v1 radar sortie the Hawk pair recovered individually to Valley. Hawk (B) recovered first and elected to perform a PAR recovery, whereas Hawk (A) who was further from Valley elected to recover via a radar-to-initial approach. Flying level at 2000ft QFE (1018hPa), in cloud heading 190° at 160kt, after being handed over to TALKDOWN under a DS, he observed a contact that he assumed was Hawk (A) closing on TCAS from his 7o'clock position 500ft above his ac; TCAS was set to TA. The contact – Hawk (A) - then proceeded to pass behind his ac before turning onto a parallel track at a range estimated on TCAS to be less than half a mile. The track was then seen on TCAS to descend to an indicated 100ft above his ac overtaking to starboard. Approaching the point of descent, alarmed by the apparent extremely close proximity of Hawk (A) whilst passing and that ac's position on the live side, he called Hawk (A) on the Squadron common frequency to their flight conditions, as he in Hawk (B) was still IMC. The pilot of Hawk (A) replied that they were also still IMC and level at 2000ft - the same height as Hawk (B). Consequently, he in Hawk (B) executed a 'flinch' descent to 1800ft QFE in an attempt to provide a last chance vertical separation as TCAS still showed Hawk (A) at +01 – 100ft above his ac. At no point did the crew of Hawk (A) or (B) become visual with each other. He assessed the Risk as 'medium'.

The assigned squawk was selected with Modes C and S on; the ac is coloured black with white HISLs, navigation and formation lights on.

Post flight analysis using the Hawk T2 AMPA replay and debrief facilities shows the vertical separation was around 100ft and 0.9nm laterally as Hawk (A) overtook Hawk (B) on its RH side. Both ac were IMC at the time and Hawk (A) had been instructed by DIR to descend from 2500ft to 1600ft, which took it through Hawk (B)'s level. The combination of TCAS in both ac warning of traffic and Hawk (B)'s call to Hawk (A) on Squadron Common meant that Hawk (A)'s crew also became aware of the apparent lack of separation and they decided to stop their decent and call their level to Hawk (B). This was the point that he in Hawk (B) elected to take a flinch descent to 1800ft. Had Hawk (A) continued the descent, no vertical separation would have existed as Hawk (A) would have descended to 1600ft - through Hawk (B)'s height - within 1nm whilst both crews were IMC.

THE VALLEY APPROACH CONTROLLER (APP) reports he was the initial point of contact for ac recovering to Valley. The Hawk pair free-called APP from VATA East separately; the first ac - Hawk (B) - requested a PAR, the second crew - Hawk (A) - called for a radar-to-initials approach 10-15nm SE of Hawk (B). Both ac were vectored to the N and descended to the Terrain Safe Level (TSL). He advised the crew of Hawk (A) they would be sequenced No4 in the pattern (this was due to their position and DIRECTOR already having 2 ac in the Radar Training Circuit (RTC). The pilot of Hawk (A) questioned this statement and confirmed that he was being fed for a radar-to-initials, but was told he was still No4 for sequencing. Both tracks were handed-over to DIR under TS.

VALLEY DIRECTOR (DIR) reports he was working the 2 Hawk ac under a TS, he thought, in an SSR only environment for individual approaches. The crew of Hawk (B) elected to approach via a PAR to RW19RH and was established on a base-leg from the E at 2000ft QFE. The crew of Hawk (A), also approaching from the E, elected for a radar-to-initial approach as the recovery state had recently changed from Instrument Recoveries Mandatory (IRM) to 'Carry Fuel for Radar' (CFFR). He provided a vector and a decent to 2500ft for Hawk (A) and called the PAR traffic - Hawk (B) - in the standard format; no 'visual' response was indicated by the pilot. Hawk (B) was vectored to 8nm from touchdown and handed to TALKDOWN L of centreline. In order to vector Hawk (A) to gain visual contact with the A/D, he elected to take the ac down the RH side (live side) of Hawk (B) on PAR as the cct was clear and Hawk (B) was L of the RW19 centreline on the PAR. Hawk (A) requested a further descent, which he denied due to the PAR traffic. He vectored Hawk (A) to the rear of Hawk (B) calling the traffic as standard for a second time; Hawk (A) was vectored inbound descending to 1600ft once he was satisfied no risk of collision existed. The faster 'radar to initial' Hawk (A) passed the PAR traffic on the latter's right hand side and he descended Hawk (A) to 1000ft; at 5nm the crew of Hawk (A) reported visual with the A/D and switched to TOWER.

THE VALLEY TALKDOWN CONTROLLER (TD) reports he was carrying out a PAR to RW19RH for Hawk (B). He had called PAR contact on the ac to DIR on the intercom at around the 8nm point and the crew instructed to contact him on Stud 7. Hawk (B) came on frequency at approximately 7nm; after a correct QFE read back he carried out the PAR in a normal manner. During the approach he observed a radar contact crossing from L to R behind Hawk (B). He was informed this ac was to join the visual cct and pass down the RH side of Hawk (B), so he informed the crew about the visual joiner to pass down their RH side. The joining ac – Hawk (A) - passed down the right hand side of Hawk (B) at about 5nm from touchdown and was showing at 2000ft with Hawk (B) started in descent on a 3° glidepath. He judged the traffic to be sufficiently separated against Hawk (B) at all times so continued the approach normally. The rest of the approach continued as normal, although the pilot of Hawk (B) asked if he had priority over cct and joining traffic at about 2 miles, after he had already been given a clearance to land.

THE VALLEY ATC SUPERVISOR (SUP) reports that the majority of station flying was complete, with just 4 Hawk T2 ac left to recover. Weather conditions were poor and the recovery restriction in place was CFFR. Having monitored the most recent recoveries, he suggested to the Duty Authorising Officer (DAO) that they implement IRM. The DAO agreed and IRM was implemented. Shortly afterwards the weather improved slightly and the DAO reverted to CFFR, so he returned to the ACR to monitor the situation. The crew of Hawk (A) called approach for a PAR recovery, was passed the CFFR and elected to recover radar-to-initial. He advised the controller to tell Hawk (A) that he was No4 in the pattern and would be sequenced accordingly. At this point he left the ACR to monitor the situation from the VCR and was only made aware of the close proximity of the 2 Hawk ac the following day when the Airprox was reported to ATC.

UKAB Note (2):

The Valley 1750UTC METAR: 19028KT 9999 -RA FEW017 OVC022 07/06 Q1019 WHT TEMPO 7000 RA SCT014 GRN=

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The Valley 1850UTC METAR: 18027KT 9999 -RA OVC018 07/05 Q1018 WHT BECMG BKN014 GRN=

BM SAFETY MANAGEMENT reports that this Airprox occurred between 2 Hawks; Hawk (A) on a radar-to-initial recovery in receipt of a TS from Valley DIR and Hawk (B) on a PAR recovery whose crew had requested a DS from Valley DIR and TD. Both ac were operating IFR in IMC and in receipt of an ATS that was reduced as Valley were operating 'SSR only' without primary ASR.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The weather was reported by the Hawk pair as OVC at 1200ft with drizzle and both crews were flying in IMC throughout the incident sequence. The recovery state at Valley that afternoon had been changeable, alternating between VFR and IFR, with the DAO changing to a VFR recovery state immediately prior to the start of the incident sequence. The Valley FOB states that 'the minimum weather for the execution of visual circuits is 5km visibility and a 1000ft main cloud base. The normal visual circuit height is 1000ft QFE.' Valley was operating to RW19RH throughout the incident sequence.

DIR reports their workload at the time of the Airprox as medium to low, with low task difficulty, having been on console for 60mins. Their taskload history during that time was medium to high, controlling an IFR recovery wave in mainly IMC, with low to moderate task difficulty. Although the crew of Hawk (B) requested and was provided with a DS by DIR on initial contact, DIR stated in their report that they believed that Hawk (B) was under a TS and treated the ac as such during the remainder of the incident sequence. Subsequent to completing their DASOR, DIR has stated that they could not recall why they might have forgotten that Hawk (B) had requested a DS.

[UKAB Note (3): The crew of Hawk (B) contacted DIR at 1744:23, who responded, *"..identified descending 3 thousand feet Traffic Service".* The crew of Hawk (B) then countered, *"3 thousand feet and request Deconfliction Service* [Hawk (B) C/S]", which DIR agreed at 1744.35, [Hawk (B) C/S] *Deconfliction Service";* this was then read back by the crew.]

At 1745:00, as the crew of Hawk (A) contacted DIR following a handover from APP. At this point, Hawk (A) was 9.6nm ESE of Hawk (B), tracking N'ly at 6000ft QFE; Hawk (B) was heading 360° at 3000ft QFE. The SUP has stated that he went to the VCR immediately prior to Hawk (A) contacting DIR and remained there throughout the incident sequence.

At 1745:11 the crew of Hawk (B) was instructed to descend to 2000ft QFE, reporting level at 1745:47. At 1745:19, Hawk (A) was instructed to descend to 3000ft QFE. At 1745:49, Hawk (B) was instructed to turn onto 270°. At 1746:04 Hawk (A) was instructed to turn onto 310°, at which point, Hawk (A) was 9.4nm SE of Hawk (B), descending through 4200ft. At 1746:30, Hawk (A) was turned onto 270° and, at 1747:15, Hawk (B) was turned onto 220°.

At 1747:27, DIR passed TI to Hawk (A) on Hawk (B) stating, "*traffic right 1 o'clock, 5 miles* [radar replay shows 7.9nm]*, similar heading, 2 thousand feet in the radar pattern*", which was acknowledged by the crew of Hawk (A). Although this was after the point at which Hawk (B) had been turned onto 220°, it was an accurate representation as Hawk (B) did not commence the turn until 1747:28. At 1747:43, DIR instructed Hawk (A) to descend to 2500ft, with the ac reporting level at 1748:01. Shortly after, at 1748:09, DIR updated the TI to Hawk (A) on Hawk (B) stating, "*previously called traffic now 12 o'clock, 4 miles, crossing right-left, 2 thousand feet*", which was acknowledged. Given the visual cct direction, that the visual circuit was known to be clear and that Hawk (B) was positioned to the E of the RW19 centre-line, DIR's intention was to position Hawk (A) to the W of the centre-line, on the live side of the visual circuit.

At 1749:25, the crew of Hawk (A) requested, "*further descent when able*" which was acknowledged by DIR who stated, "*roger, standby in 3 miles*." DIR reported that they delayed the descent to Hawk (A) due to the proximity of Hawk (B); at this point, Hawk (A) was 1.7nm NE of Hawk (B) with 500ft vertical separation indicated between the ac. This tallies with the report of Hawk (B) who stated that they 'observed a contact, assumed to be [Hawk (A)], closing on TCAS from the 7 o'clock position 500ft above.' It is reasonable to argue that Hawk (B) would have been displayed on Hawk (A)'s TCAS display.

At 1749:51, DIR instructed Hawk (A) to turn L onto 190°; Hawk (A) was 1.6nm N of Hawk (B). The turn onto 190° would have seen Hawk (A) parallel the centre-line 0.9nm to the W, with approximately 1.4nm lateral separation

between the 2 ac; however, Hawk (A) initially turned to track approximately 170°, closing the displacement to 0.4nm W of the centre-line, before turning onto 190°. Subsequent to completing their report, DIR has stated that due to the update rate of the SSR at Valley, this 'over-turn' by Hawk (A) was not visible on their surveillance display.

At 1750:15, content that 'no risk of collision existed', DIR instructed the crew of Hawk (A) to descend to 1600ft QFE; Hawk (A) was 1.9nm NW of Hawk (B), who was maintaining 2000ft QFE. At 1750:30, approximately 0.5nm from Hawk (B)'s descent point on PAR and following liaison with DIR, TALKDOWN advised Hawk (B) that there was a, "*visual joiner* [Hawk (A)] *passing your right-hand side*." Hawk (A) was 1.3nm NW of Hawk (B), indicating 600ft above, and approximately 0.6nm W of the centre-line.

The lateral CPA occurred at 1750:50, as Hawk (A) indicating 200ft above Hawk (B) passed 0.9nm W of the latter. After the CPA, Hawk (A) continued to slowly converge with the centreline but was accelerating ahead of Hawk (B). At 1750:59, Hawk (B) appears to have commenced a descent; however, it is unclear whether this was as a result of their "flinch descent" or having commenced descent on the PAR.

The purpose of a radar-to-initial approach is to rapidly recover fast-jet ac in marginal weather through radar vectoring to an initial point, thereby facilitating the pilot's visual acquisition of the airfield such that they can continue VFR. Regulatory guidance for the conduct of radar-to-initial approaches may be found within RA3025 and MMATM Chapter 25 Para 6 which states that:

'When positioning aircraft for this type of approach the...controller **should** consider:

a. Reported cloud base, visibility and weather.

b. Approach lighting aids available.

c. Director's patterns and conflicting traffic.

d. Other aerodromes' traffic patterns.

e. Airspace restrictions.

f. Terrain clearance.

Understandably, this does not provide detailed information on the separation standards to be applied between Radar-to-Initial traffic and other IFR traffic conducting instrument approaches. The RAF Valley FOB does not contain detailed guidance on the conduct of Radar-to-Initial approaches.

CAP 774 Chapter 3 Para 1 states that under a TS:

'Controllers may provide headings and/or levels for the purposes of positioning and/or sequencing; however, the controller is not required to achieve deconfliction minima, and the avoidance of other traffic is ultimately the pilot's responsibility.'

CAP 774 Chapter 4 Para 7 guidance material states that under a DS:

'When aircraft are in the initial stages of departure or on final approach, due to limited aircraft manoeuvrability...deconfliction minima do not apply...and avoiding action is instead aimed at preventing collision...The procedures regarding deconfliction advice to aircraft on...final approach are designed to cater for 'pop up' conflictions over which the controller has no advance warning due to the uncontrolled nature of Class G airspace. Controllers should attempt to co-ordinate and deconflict observed traffic prior to allowing the...final approach of an aircraft that is...receiving a Deconfliction Service.'

RA 3024 and MMATM Chapter 24, Para 43 states that:

'The PAR controller...will provide the pilot with the necessary information to avoid a collision rather than to maintain any specified separation distance.'

Teaching at the CATCS states that within 10nm of the aerodrome, irrespective of the ATS provided to ac on an instrument approach, radar-to-initial traffic may be descended through the level of instrument traffic, if the pilot of the radar-to-initial traffic is visual with the instrument traffic. This descent is given without reference to the pilot of the ac conducting the instrument approach. However, it should be stressed that this is teaching at CATCS and does not represent Policy or Valley local orders.

Insofar as this Airprox is concerned, DIR incorrectly believed that Hawk (B) was in receipt of a TS, rather than a DS and issued an instruction to Hawk (A) to descend through Hawk (B)'s level. This suggests that either the FPS was not amended to reflect the fact that Hawk (B) requested a DS on handover from APP, or that the controller did not check the FPS prior to issuing the instruction and was relying on their memory. Unfortunately, it has not been possible to determine which of these hypotheses is correct. In the respect that DIR believed both ac to be in receipt of a TS, they correctly applied vertical deconfliction minima between Hawk (A) and Hawk (B) until the point where they determined that no collision risk existed and then permitted Hawk (A) to descend through Hawk (B)'s level. However, in accordance with CATCS teaching, DIR did not check that Hawk (A) was visual with Hawk (B) prior to issuing the instruction to descend. However, had both ac been under a TS, as DIR erroneously believed, then, in accordance with CAP 774, there was technically no requirement to deconflict the two ac, other than to avoid a collision. From TD's perspective, in accordance with CAP 774 and the MMATM, the controller correctly assessed that the respective tracks of Hawk (A) and Hawk (B) would not result in a risk of collision and continued the PAR.

An aggravating factor in this incident was the turn by Hawk (A) at 1749:51 that initially tracked 170°, thereby reducing the lateral separation between Hawk (A) and Hawk (B). Whilst neither causal nor contributory in this Airprox, it is worthy of note that Hawk (A) was in receipt of a TS in sustained IMC when a DS was available.

Whilst the Airprox itself is relatively un-complicated, it has raised questions over the interaction between ac executing a radar-to-initial approach - by implication a visual approach - and ac conducting instrument approaches. Specifically, the teaching at the CATCS and in wide use within military ATM that once the radar-to-initial ac becomes visual with the instrument traffic, radar-to-initial traffic may be given descent through the level of the instrument traffic, without reference to the pilot of the instrument traffic and irrespective to that ac's type of ATS. This is suggestive of the operating assumption within Class D airspace that VFR traffic will avoid IFR traffic. Given the speed differential between instrument and radar-to-initial traffic, the application of deconfliction minima would be difficult to implement and would negate the purpose of a radar-to-initial approach to be more expeditious. Moreover, one interpretation of CAP 774 Chapter 4 Para 7 could suggest that once the ac on instrument approach had commenced their descent under a DS, then DIR and/or TD only need to ensure collision avoidance, rather than apply the more stringent deconfliction minima. Consequently, whilst the extant procedure is understandable and pragmatic, BM SM contends that it is reasonable to expect that this modus operandi should be explicitly stated, such that it is obvious to aircrew and ATM personnel alike.

The Airprox was caused by DIR's instruction to Hawk (A) to descend through the level of Hawk (B), caused by their incorrect recollection of the type of ATS to be provided to the crew of Hawk (B). A contributory factor was that DIR had not confirmed that Hawk (A) was visual with Hawk (B) prior to issuing the descent.

RECOMMENDATION

BM SM recommends that RAF ATM Force Cmd examine the findings of this investigation vis-a-vis the interaction between ac under a radar-to-initial approach and ac conducting instrument approaches.

OUTCOMES

The Unit conducted a thorough investigation of this Airprox. Lessons learnt were disseminated to both controllers and aircrew, specifically relating to the conduct of radar-to-initial approaches and the advisability of sustained flight in IMC when a DS is available. Further work is being conducted to review the FOB in relation to radar-to-initial approaches and the weather minima pertaining to them.

HQ AIR (TRG) comments that whilst the controllers did their best to assist the pilots in their collision avoidance responsibilities, the lack of any explicit requirement to confirm that the overtaking pilot is visual and happy to descend through the other traffic's height allowed this situation to develop. As it was, both crews were very aware of each other's proximity through TCAS and were not sufficiently comfortable to follow the instruction. The lack of

any clear responsibility of a controller with respect to collision avoidance under a TS, save the guidance in CAP 774 that they should not vector (or climb/descend?) ac into conflict, may have influenced the pilots' decision not to accept the descent when it was first offered. BM SM's point about operating IMC under a TS is valid. Whilst it can be entirely safe, for it to be so relies on high quality information from ATC about what traffic has and has not been coordinated. Given the need to achieve deconfliction minima, such combinations of approaches might not be compatible under a strictly applied DS. The review of the FOB is welcome and will need to address the particular recovery procedures in place at RAF Valley. Consideration of the compatibility of the various recovery states, weather conditions and ATS applied will be essential. The RAF ATM Force Cmd examination of the issues raised by this Airprox is also welcomed so that any problems identified can be addressed across the RAF, through the Regulator if required.

In summary, believing that no deconfliction minima applied the controller ensured that there was no actual risk of collision, but the crews were concerned by their proximity given that they were in IMC.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Albeit that this was a 'reduced' radar service with Valley operating with SSR only, it was clear that this Airprox report had been submitted principally from the conflict that could have arisen if he had descended in accord with DIR's instructions, coupled with DIR's misperception of the ATS required by the crew of Hawk (B). In this occurrence DIR had agreed a DS with the crew of Hawk (B) before handing the ac to TALKDOWN but then vectored Hawk (A) closer to Hawk (B) than DS minima require. The BM SM investigation also calls into question the responsibilities of controllers when vectoring traffic for recovery under a TS amongst instrument traffic under a DS and *inter-alia*, the applicable policy, procedures and training of controllers.

Irrespective of whether a TS or DS was provided, a Member opined that both crews had a reasonable expectation that they would not be vectored by ATC into close quarters with one another during the recovery. Whilst DIR might not know whether the crews were IMC, he should have asked the pilot of Hawk (A) if he was visual with Hawk (B) before issuing a descent instruction to 1600ft QFE through Hawk (B)'s height of 2000ft QFE, whilst still overhauling within close proximity of the latter. Although the crew of Hawk (A) had earlier requested further descent from 2500ft QFE *"..when able",* the controller recognised that at that point the ac were still potentially in conflict and delayed the descent accordingly. Here, DIR reports, he was applying a TS to both ac and not applying DS minima around Hawk (B). Whilst this might be perceived to be in accord with the guidance contained within CAP 774 Chapter 4 Para 7 where '*...deconfliction minima do not apply...and avoiding action is instead aimed at preventing collision...*', the CAA Policy and Standards Advisor opined that this was not applicable in the context of this Airprox and explained that this point is aimed at balancing traffic avoidance procedures on final approach against the terrain risk at low-level. Nevertheless, the BM SM Advisor emphasised that 500ft vertical separation should have been applied between Hawk (A) and Hawk (B) until the pilot of Hawk (A) had reported visual with Hawk (B) and the latter afforded a DS. The Naval Member perceived that the two ac should have been sequenced and separation maintained; he questioned the ATC Supervisory aspects as it seemed the SUP was 'out of the loop' at a critical point and the difficulties of one person supervising the controllers in both the VCR and ACR in difficult weather conditions was illustrated here. RN Air Stations employ a DATCO in the VCR who also co-ordinates between the O-i-C of Flying and the Radar Supervisor to ensure the recovery state is appropriate, whereas at RAF A/Ds, as here, the recovery state is decided by the DCF in consultation with the DAO.

Some Members were concerned that the crew of Hawk (A) continued to operate under a TS whilst flying IMC, in cloud. This had been addressed within the HQ Air (Trg) comments, who considered it to be entirely safe when high quality TI was available from ATC. Members accepted that a TS could be requested by crews operating IMC in cloud within the provisions of CAP774; whilst it might not be prohibited the guidance within CAP774 suggests it might not be appropriate when other radar services are available and some pilot Members considered it unwise. The HQ Air (Ops) Member opined that the pilot of Hawk (A) had stuck with a TS, perhaps perceiving that he would obtain visual contact with the A/D in relatively short order. Here the lesson for aircrew was to ask for a DS, and for controllers, wherever feasible, to ensure that you provide what is agreed.

The Board recognised that the Hawk ac involved were Mk2 types, which had the benefit of a TCAS fitment. Although provided with TI by ATC about each other, this Airprox illustrates the enhanced SA provided to both fast-jet crews by their TCAS equipment, which enabled them to rapidly appreciate that both ac were in close proximity. A quick call on the RT established that they were both flying in IMC, in cloud, with minimal in-flight visibility. It was clear that this additional knowledge convinced the pilot of Hawk (A) to sensibly delay his descent through Hawk (B)'s height of 2000ft QFE when instructed by DIR so to do. Whilst some Members opined that the pilot of Hawk (B) should have advised DIR that he was not complying with this instruction immediately, the Board agreed that this was a wise decision on the part of the pilot of Hawk (A) and had prevented a more serious situation from developing. Taking all these factors into account the Board concluded that this Airprox had resulted because the crew of Hawk (A) was instructed to descend through the level of Hawk (B) without confirmation that Hawk (A) pilot was visual with Hawk (B). As to the inherent Risk, it was clear that Hawk (A) pilot's decision not to follow DIR's instruction to descend had forestalled any potential for a conflict with Hawk (B) as he overhauled it 0·9nm away to port. Although he could not see it, TCAS plainly told the pilot of Hawk (A) exactly where Hawk (B) was in the vertical plane and, accelerating ahead of it, he descended through Hawk (B)'s level after the range had increased. This, coupled with the pilot of Hawk (B)'s instinctive 'flinch' descent led the Board to conclude that no Risk of a collision had existed in the circumstances conscientiously reported here.

Having determined the Cause and Risk, it was evident from the BM SM investigation that there was an anomaly between the teaching at CATCS, current custom and practice 'in the field' and the regulatory aspects of the provision of a DS to instrument traffic when radar-to visual recoveries were also being sequenced in the radar pattern for recovery in marginal weather conditions. It was apparent that student controllers at CATCS are being taught to descend radar-to-visual traffic through the level of instrument traffic under a DS if the pilot of the radar-to-visual traffic is in visual contact with the instrument traffic, irrespective of DS minima being provided to the ac on the instrument approach. This widely used but undefined procedure allowed DIR to overtake Hawk (B) if visual separation was effected by the crew of Hawk (A). A civilian controller Member opined that as this Airprox stemmed from a singular error by a controller, it might not warrant a recommendation from the Board to review the regulations and Valley were already conducting a review locally. Although the MAA Advisor suggested that the extant ATM Regulations and Acceptable Means of Compliance for individual radar-to-visual procedures were appropriate, the MAA shared HQ ATM Force's concern, expressed through the BM SM report, on the appropriate selection of ATS by aircrew and the local ATC policy on services provided to ac undertaking various recovery procedures in relation to the extant meteorological conditions. Whilst the MAA does not determine Policy, the Authority undertook to engage where a review of policy or change might be recommended by the UKAB. The CAA Policy and Standards Advisor agreed that the investigation of this Airprox had revealed an anomaly between the provisions of CAP774 UK Flight Information Services – the joint civil/military document defining ATSOCAS co-sponsored by the CAA and MAA - wherein the requirements for a DS are specified for military and civilian controllers alike. The BM SM Advisor contended that there is no specific guidance to ATCOs or aircrew when vectoring traffic for a radar-to-initials recovery under a TS amongst instrument traffic under a DS. Moreover, any descent of radar-to-visual approaches through the level of ac conducting instrument approaches under a DS breaches the planned deconfliction minima, which CAP774 does not permit. Whilst this is a technicality, he opined that as long as this common but undefined procedure is followed correctly it is safe. The CAA Advisor agreed that CAP774 does not offer the scope to effect the foregoing. Although the Board might wish to make a Safety Recommendation if the Members considered it appropriate, with the agreement of the BM SM and MAA Advisors present, the CAA Policy and Standards Advisor undertook to liaise with the MAA to establish a suitable 'regulatory enabler' within CAP774 that would allow a defined military specific radar-to-visual procedure to be promulgated, without contravening the requirements of a DS. The Board agreed that this was a pragmatic way forward, thanked the CAA Policy and Standards Advisor for his pre-emptive action, and requested that he keep the Board closely apprised of progress on this topic.

PART C: ASSESSMENT OF CAUSE AND RISK

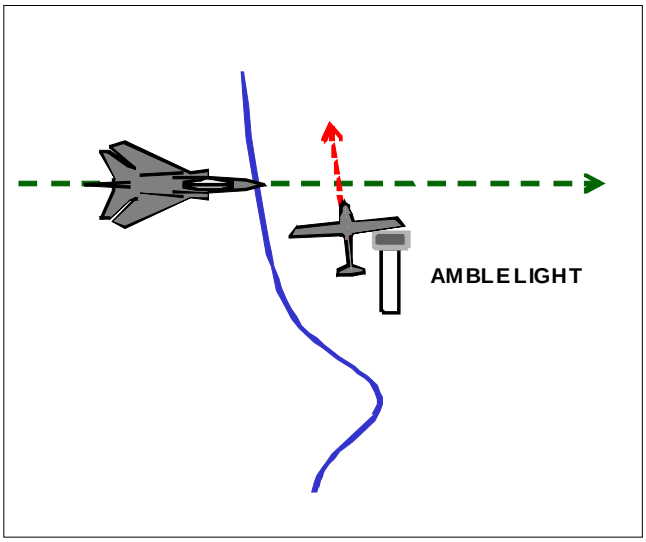
Cause: Hawk (A) was instructed to descend through the level of Hawk (B) without confirmation that Hawk (A) pilot was visual with Hawk (B).

Degree of Risk: C.

Action: CAA AATSD will liaise with MAA to establish a suitable 'regulatory enabler' within CAP774 that will allow a defined military specific radar-to-visual procedure to be promulgated without contravening the requirements of a DS.

AIRPROX REPORT NO 2012033

Date/Time:	14 Mar 2012 1351Z	
Position:	5521N 00132W (Amble Light - elev 41ft)	
Airspace:	UKDLFS/Sco FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Untraced
Operator:	HQ Air (Ops)	NK
Alt/FL:	700ft↓	NK
	RPS (1019hPa)	NK
Weather:	VMC CLBC	NK
Visibility:	8km	NK
Reported Separation:	50ft V/300ft H	NK
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports that he was leading a formation of 3 ac on a tactical low level training sortie, squawking 7001 with Modes C and S but TCAS was not fitted. Following a climb to 'coast out', heading 090° at 420kt, they were in a shallow descent through 700ft Rad Alt when a light ac was seen about 50ft above them and 300ft to their R and crossing for the R to L. The ac, which was not seen prior to that point, appeared to be heading 350°, paralleling the coast just out to sea. The ac had a single propeller, mid-blue over-cockpit wings and a white fuselage and it was not seen to manoeuvre. Due to the lateness of their sighting they were unable to manoeuvre before their flightpaths crossed.

The pilot observed that they were busy rejoining with his wingman and his view in the direction of approach of the light ac was obstructed by the canopy arch.

He reported the incident to Newcastle APR on the RT and assessed the risk as being medium.

UKAB Note (1): Despite extensive radar and procedural tracing action the other ac could not be identified.

UKAB Note (2): The Great Dun Fell radar was not available due to refurbishment and the incident did not show on any other recorded radars.

UKAB Note (3): The position given by the Tornado was taken from the Mission recording system, and is 1nm off the coast.

HQ AIR (OPS) comments that this report highlights the conflicting requirements of an OCU instructor. On the one hand he is required to monitor the actions of his student during a formation rejoin, yet on the other he is still required to perform lookout for the formation. He must divide his priorities carefully to ensure he does not focus on one task to the exclusion of the other.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the Tornado pilot and operating authorities. The Prestwick and Swanwick recordings did not show the event but it did show on the Newcastle Radar which was not (on this occasion) available to the Board due to technical difficulties. However, the assistance of Newcastle ATC and the Eshott Airfield operators in attempting to trace the light ac, albeit unsuccessfully, was appreciated.

An Advisor with knowledge of the local area informed Members that it is not unusual for light ac and microlights to fly up or down the coast in that area as it is very picturesque. Although the Board was not certain of light ac flight details, it appears that both ac were operating legitimately in Class G airspace of the FIR/UKDLFS where 'see and avoid' pertains.

The pair of Tornados was rejoining just after coast-out and the lead crew reported that they were busy rejoining with their No2 and would have been searching for him. In addition, although the crew might have seen the light ac sky-lined prior to pulling up to cross the coast, once they had climbed to above its level it would have been difficult to see against the dark background of the sea. The issue of the Tornado canopy-arch blind spot is a well known problem which pilots should be aware of and move their head or upper body to see round it (this is also an issue in many other ac types including GA and helicopters).

Bearing in mind the proximity of the two ac, Members were surprised that the light ac pilot did not see or hear (apparently) the Tornado and also file a report.

Although there was some separation extant, it was minimal and the Board agreed that in this instance there was a risk that the ac would have collided.

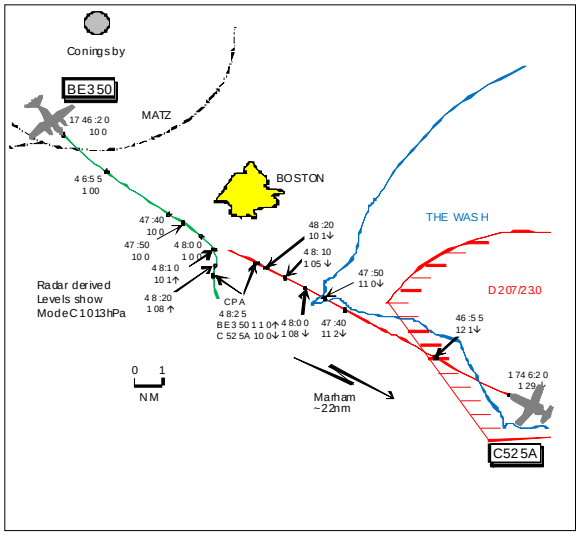
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the Tornado crews and a presumed non-sighting by the light ac pilot.

Degree of Risk: A.

AIRPROX REPORT NO 2012034

Date/Time:	13 Mar 2012 1748Z	
Position:	5256N 00002W (3nm S Boston)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BE350	C525A
Operator:	HQ Air (Ops)	Civ Pte
Alt/FL:	FL100	FL100↓
Weather:	VMC CLAC	VMC NR
Visibility:	30km	>10km
Reported Separation:		
	Nil V/0·25nm H	NR
Recorded Separation:		
	1000ft V/1·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BE350 PILOT reports en-route to Marham and in receipt of a TS from Marham Approach on 233·075MHz, squawking 3660 with Modes S and C. The visibility was 30km flying clear above cloud in VMC and the ac was coloured grey with HISLs, nav, anti-collision and recognition lights all switched on. The flight was transiting to Marham for a PD and instrument approach heading 130° at 220kt and at FL100. A TCAS contact was observed by the PF at range 6nm and both pilots commenced an intensified visual scan. ATC subsequently reported "traffic 12 o'clock 5nm" but the conflicting ac was not visually acquired. They commenced a R turn to deconflict and a TCAS TA was generated with the conflicting traffic seen on TCAS on a reciprocal track 900ft above and descending. A TCAS RA was received when the conflicting traffic was about 300-400ft above descending. They turned R 90° and climbed 1000ft in accordance with the RA instruction to 'climb, climb'. The L wing was then dropped and the conflicting ac was visually acquired by the PF passing approximately 800ft below on a reciprocal track 0·75nm laterally displaced to their L. The PF was unable to positively identify the other ac type. The Marham controller later passed the crew the details of the other ac involved. He assessed the risk as medium.

THE C525A PILOT reports flying solo inbound to Gamston, IFR and receipt of a TS from London Mil, squawking an assigned code with Modes S and C; TCAS 1 was fitted. The visibility was >10km i

n VMC and the ac was coloured white/blue with strobe, nav and recognition lights all switched on. Heading NW'ly at 250kt he recalled that traffic was reported in his 12 o'clock at around FL100 and he agreed to increase his ROD in order to pass below it. He didn't remember whether a TCAS warning was generated. He did see the other ac in his 10 o'clock, well above his level. Even with his good eyesight and excellent ac recognition the other ac was too far away for him to identify its type. At the time he did not consider an Airprox had occurred so did not make a record of the details for reference. He assessed the risk as none.

THE MARHAM APPROACH RADAR CONTROLLER reports the BE350 flight was in receipt of a TS at FL100 and was given TI on traffic 12 o'clock 5nm opposition direction indicating FL110 but descending; the ac was wearing a Lon Mil squawk. The BE350 crew did not declare they could see the traffic but as the other ac arrived in the vicinity the crew took evasive action on advice from his TCAS; they were not happy with its proximity. On enquiry to Lon Mil, the other ac (C525A) had been told of the BE350, its pilot had reported visual and had continued to descend.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a BE350 in receipt of a TS from Marham APP, reduced as Marham were operating SSR only, and a C525A operating IFR, in receipt of a TS from LJAO E/NE.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Both aircrews report VMC, with the BE350's pilot reporting 30km visibility in nil weather with an undercast of CU and SC cloud with tops at 2500ft.

APP reported that their workload and the task complexity at the time of the incident were low, with only the BE350 on frequency. LJAO E/NE did not report their workload nor task complexity at the time of the incident; however, analysis of the RT transcript showed a moderate taskload with 3 ac on frequency.

The C525A at FL210 was identified by LJAO E/NE at 1733:32, exiting CAS at BANEM and was given own navigation en-route to Gamston [D207, Holbeach Range, was not active]. The incident sequence commenced at 1739:37 as LJAO E/NE instructed the C525A flight to descend to FL100. At this point, the BE350 was 54·3nm NW of the C525A, tracking SSE'ly, climbing through FL097. Whilst the provision of a TS to the C525A outside CAS was agreed, it was not applied by LJAO E/NE; this was neither a causal nor contributory factor in this Airprox.

At 1743:45, LJAO E/NE instructed the C525A flight to descend to FL050. At this point, the C525A was descending through FL168, the BE350 was 37·6nm NW of the C525A, tracking N'ly, at FL099. Based upon their report, LJAO E/NE was aware of the BE350 and utilised a predictive level function to assess the C525A's ROD with reference to the BE350, concluding that the C525A would be 'well below' the BE350 as they passed.

At 1746:17, the BE350 flight called APP on handover from Waddington, was identified and placed under a TS that was reduced on the grounds that Marham were operating SSR only. At this point, the BE350 was 19·1nm NW of the C525A, tracking SE'ly under their own navigation at FL100; the C525A was descending through FL129. From this point, until 1747:50, APP was involved in a continuous exchange of RT with the BE350, completing the initial administrative functions required for the BE350 to conduct their PD to Marham.

At 1746:55, LJAO E/NE passed TI on the BE350 to the C525A stating, "*Traffic 12 o'clock, two-zero miles* (radar replay shows 14·1nm)*, opposite direction, at Flight Level 100*" which was acknowledged; the C525A was descending through FL121. LJAO E/NE's decision to pass TI was based upon their further use of the predicted level function, which showed that the C525A's ROD had reduced, introducing a confliction with the BE350. At 1747:42, LJAO E/NE updated the TI to the C525A stating, "*previously reported traffic, 12 o'clock, 9 miles* (radar replay shows 7.3nm)*, opposite direction at Flight Level 100.*" The C525A was descending through FL112. Shortly after, at 1747:49, the C525A pilot acknowledged the TI, stating that he would, "*expedite through Flight Level 100*." The C525A had been descending at around 1200fpm; however, at 1748:00 with 4·2nm lateral and 800ft (indicated) vertical separation existing, the ROD increased to approximately 1700fpm, reaching a maximum of approximately 2200fpm at 1748:20. At 1748:25, following the CPA (1000ft/1·6nm), the ROD began to reduce.

CAP 774 Chapter 3 Para 1 states that, in providing a TS, 'the controller is not required to achieve deconfliction minima, and the avoidance of other traffic is ultimately the pilot's responsibility.' The guidance material for CAP 774 Chapter 3 Para 6 states that:

'When providing headings/levels for the purpose of positioning and/or sequencing or as navigational assistance [to ac in receipt of a TS], the controller should take into account traffic in the immediate vicinity, so that a risk of collision is not knowingly introduced by the instructions passed. However, the controller is not required to achieve defined deconfliction minima.'

The BE350's crew reported that they were first aware of the C525A when it appeared on their TCAS display at a range of approximately 6nm, which caused them to intensify their visual scan. APP subsequently passed TI on the C525A to the BE350 at 1747:50 stating, "*traffic 12 o'clock, range of 5* (radar replay shows 6·1nm) *opposite direction, Flight Level 110 but looks as if it might be in the descent*."

At 1747:59 the BE350's crew acknowledged the TI stating that they were, "*coming right to avoid that traffic*." APP asked the BE350's crew whether they had, "*got it on TCAS?*" to which the BE350 crew replied, "*Affirm* (2sec gap) *500 feet above* (inaudible) *going into him*." During this exchange, at 1748:06, the C525A pilot informed LJAO E/NE that he was, "*visual with that traffic*." At this point, the BE350 was 3·6nm NW of the C525A, with the latter descending through FL107. However, the C525A pilot subsequently reported seeing the BE350 in '*my 10 o'clock and well above my level*' which appears to describe the position of the BE350 at around the point of the CPA.

At 1748:10, APP instructed the BE350 flight to, "*continue right turn heading 210 degrees, he's maintaining a north-westerly heading, just currently left of your nose*." During this transmission, at 1748:14, the BE350's R turn and

climb in response to a TCAS-RA becomes evident on the radar replay. At 1748:26, co-incident with the CPA, APP informed the BE350 flight that, "*the ac is ah now passing down your left hand side, indicating Flight Level 95, descending*." Minimum lateral and vertical separation was 1·6nm and 1000ft. The BE350 crew did not declare on frequency that they had received a TCAS RA until 1749:36.

Through extrapolation of the radar replay, without the BE350's R turn and TCAS RA response at 1748:14, the CPA would have occurred at 1748:30, as the C525A passed 0·2nm down the BE350's port side, indicating 100ft below, descending through FL99. Although the C525A was equipped with TCAS 1, the pilot did not recall whether they received a warning of the proximity of the BE350.

Based upon the available information, the Airprox occurred as a result of a confliction of flight paths within Class G airspace. Whilst the C525A did increase its ROD in response to LJAO E/NE's updated TI at 1747:42, the extrapolation of the radar data suggests that this did not markedly affect the outcome of the Airprox. The confliction was resolved, primarily, by the BE350's turn and response to the TCAS RA.

Marham APP passed timely and accurate TI to the BE350 flight which, alongside the information from their TCAS, allowed the BE350's crew to take decisive action to break the confliction. Marham APP then continued to provide TI to the BE350 to facilitate the maintenance of the crew's SA. LJAO E/NE, informed by the level prediction tool available to them, assessed the ROD of the C525A with reference to the BE350, passing and updating TI accordingly. Notwithstanding that the range information in the initial TI was inaccurate, LJAO E/NE discharged their responsibilities for the provision of TI to the C525A, allowing the pilot of that ac to decide on a course of action to avoid a collision; in this case opting to increase his ROD.

HQ AIR (OPS) comments that the potential for a conflict was spotted early by both controllers and appropriate TI was passed. Both crews actioned this TI as early as reasonably possible and in an effective manner, one by descending and the other by turning. TCAS assisted by providing the initial indication of a conflict to the BE350 crew. As they were in receipt of a TS and the other traffic was descending they sensibly held their lateral avoiding action until the azimuth of the other traffic was confirmed by ATC.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

As the incident occurred in Class G airspace, both crews were responsible for maintaining their own separation from other traffic through see and avoid. Both flight crews had asked for and were provided with a TS and were given timely TI by both ATSUs. LJAO E/NE had used the predictive level function to assess the C525A's ROD, updated the TI and the pilot had reported increasing his ROD. The C525A pilot had then reported on the RT being visual with the BE350, the radar recording showing separation as 3·6nm with the C525A 700ft above. The BE350 crew had seen the approaching C525A on TCAS in a descent and after receiving TI from Marham APP had instituted a R turn to avoid. While turning R a TCAS RA was generated and the guidance was followed, the crew visually acquiring the C525A as it passed down their LHS by 0·75nm and 800ft below. Both controllers had applied the ATS correctly and updated the TI when they both believed that a collision risk existed. One controller Member expressed surprise that neither of the controllers had telephoned the other to determine the intentions of the other flight and to agree coordination if required; notwithstanding that such coordination was beyond the provisions of a TS, he considered it would have been good defensive controllership. However, this was a minority view. Another controller Member opined that there was always the option open to both crews to request an upgrade to a DS if they were unhappy with the service or the situation as it unfolded. At the CPA, the C525 was descending through FL100 and passing 1·6nm E of the BE350, which was climbing through FL110 in response to its TCAS RA. As all parties had acted appropriately during this incident and given the separation distances that pertained, Members agreed that this incident could be classified as a conflict in Class G airspace which was resolved by the crews of both ac.

AIRPROX REPORT No 2012034

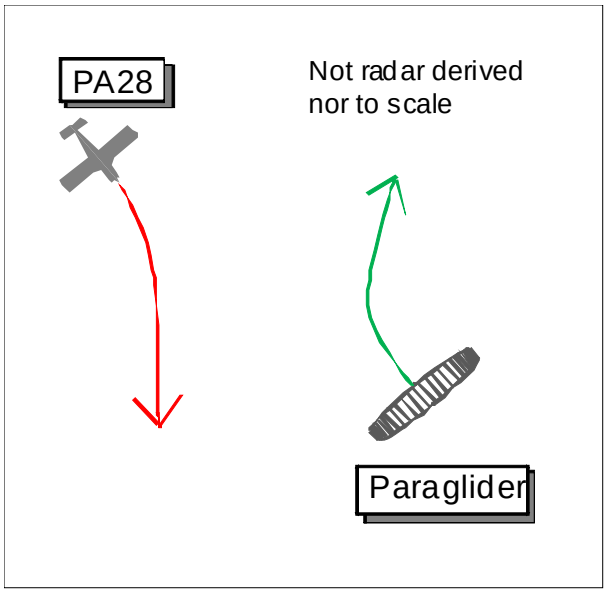
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT NO 2012035

Date/Time:	11 Mar 2012 1043Z (Sunday)	
Position:	5058N 00052W (E Abm S. Harting - elev ~700ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Paraglider	PA28
Operator:	Civ Pte	Civ Club
Alt/FL:	1100ft	1800ft
	aal	QNH
Weather:	VMC CLBC	VMC CLBC
Visibility:	'Good	'5nm
Reported Separation:		
	Nil V/200yd H	500ft V/500m H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PARAGLIDER PILOT reports flying a local sortie from Harting Down, just S of South Harting, [8nm NW Goodwood] VFR beneath a red/white/blue canopy. He had been unable to find his altimeter/vario so all times and heights were approximate. He took off at 1000 and started thermalling straight away and there were 3 other paragliders, he thought, already airborne. He thermalled up, flying all around the local area for something like 45min before the Airprox. As he had never flown to the cloudbase before he was quite surprised, and very pleased, to find himself flying through wispy bits of the base of what was a fairly over-developed and cloudy sky. He flew over another paraglider and asked the pilot his altitude and was told 1100ft above the take-off point. He turned towards Harting and was just 50ft under the cloud but in clear sight of the ground and Harting Down; in flight visibility was 'good'. The cloud was very thick in front of him and it was then he heard the sound of an aeroplane engine getting louder and louder. He did not move and waited for visual contact heading 310° at 25kt. Suddenly, out of what was quite thick cloud, a low-wing single-engine ac, possibly a Piper Cherokee type, appeared about 700ft away, flying straight at him. Both he and the other ac's pilot immediately turned sharply R in accordance with normal collision avoidance procedure, estimating they passed by 600ft (200yd). He assessed the risk as high.

He was in no doubt that if the other pilot had not been looking out carefully there was a high likelihood of a collision as the ac was at exactly the same altitude and it was just off to the L of his course. Another paraglider pilot on Harting Down took a photograph just after the Airprox and, using the printed picture and scaling from his parafoil dimension of 10m, he calculated separation was about 187m at the CPA. The photograph was attached to the CA1094.

THE PA28 PILOT reports en-route from Benson to Abbeville via the Goodwood O/H, VFR and in receipt of a BS from Farnborough, he thought, on 125·25MHz, squawking an assigned code with Modes S and C. The visibility was 5nm flying below cloud in VMC and the ac was coloured blue/white with nav lights switched on. Approximately 10nm NW of Goodwood heading 120° at 110kt and 1800ft QNH he encountered a lowering cloudbase so he made a decision to divert to Goodwood. Another ac appeared out of cloud so he turned L to avoid it. After he turned, he looked down and L and saw 3 paragliders so he took avoiding action by turning R estimating they passed 500ft below and 500m to his L assessing there was no risk of collision.

ATSI reports that the Airprox occurred at 1042:52Z, approximately 0·8nm SE of South Harting village, within Class G airspace, between a Paraglider and a PA28.

The Paraglider was operating VFR together with other paragliders, from the Harting Down paragliding site, which is situated just to the S of the reported Airprox position. Harting Down paragliding site is not promulgated in the

UK AIP or shown on AIS Aeronautical charts. The Paraglider pilot reported operating in the area for approximately 45min prior to the Airprox and provided 2 photographs.

The PA28 was operating on a VFR flight from Benson to Abbeville but diverted to Goodwood due to the descending cloudbase. The PA28 pilot reported in receipt of a BS from Farnborough.

CAA ATSI had access to NATS area radar recordings together with written reports from both pilots. The registration of the PA28 was not determined until after 30 days and no RT recordings were available to ATSI.

The weather for Farnborough and Southampton is provided:

METAR EGLF 111020Z 34008KT 300V360 9999 BKN015 10/07 Q1038=

METAR EGHI 111020Z 34007KT 310V020 9999 SCT020 11/07 Q1038=

The exact time of the Airprox and the identity of the other ac were initially unclear. The written reports from both pilots indicated that the incident occurred at 1030 UTC. Radar recordings did not show any ac in the area at this time.

At 1031:35, radar shows the PA28, to be 14nm NW of South Harting, displaying a Farnborough LARS-W squawk 0433 and indicating an altitude of 1900ft.

At 1038:36, the PA28 is shown 1·7nm NNW of South Harting, commencing a RH orbit, indicating an altitude of 1800ft. The PA28 left the Farnborough frequency at 1039. Farnborough ATSU reported that no en-route frequency was annotated on the fps.

At 1040:22 the PA28 completed the orbit, setting course on a S'ly heading. Radar shows that the ac had retained the Farnborough squawk 0433. It was not known if the PA28 had contacted Goodwood before the Airprox occurrence.

At 1041:04, the PA28 commenced a second RH orbit, 0·6nm NW of South Harting, indicating an altitude of 2000ft, before setting course again at 1042:28 on a track of 160°.

At 1042:35, the PA28 approached South Harting, indicating an altitude of 1800ft. Radar shows the PA28 commencing a L turn to track 120°. The PA28 pilot, in his written report, indicated sighting another ac and turning L to avoid it. The PA28 pilot then reported sighting 3 Paragliders and turning R.

At 1042:52, radar shows the PA28 turn R 40° at a position 0·8nm SE of South Harting village. At the same time the transponder code of the PA28 changed from 0433 to 7000.

The Paraglider pilot thought that there were 3 other Paragliders airborne and reported sighting a Cherokee type ac coming towards him already banking R. The Paraglider pilot also reported turning R.

Radar did not show any other contacts in the vicinity of South Harting. The PA28 continued to Goodwood, landing at 1051 UTC.

An analysis of the prominent features in the photograph provided by the Paraglider pilot, overlaid on a geographical mapping tool, showed that the position of the paraglider correlated with the radar fix of the PA28 at the reported Airprox position at a time of 1042:52.

The PA28 flight left the Farnborough frequency at 1039 prior to the Airprox, probably whilst the PA28 carried out the first RH orbit to the N of South Harting village.

It was not possible to establish the time the PA28 contacted Goodwood. However it was very unlikely that the FISO at Goodwood would have been able to provide information to the PA28 pilot about the paraglider activity.

The PA28 carried out a second orbit prior to setting course for Goodwood. The PA28 pilot then reported sighting another ac and turning L. This may have been the turn shown on radar at 1042:35 and shortly afterwards the PA28 made a R turn shown on radar at 1042:52, to avoid 3 paragliders.

CAP 774 Chapter 1, Page 1, Service Principles, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment. The Class F and G airspace environment is typified by the following:

It is not mandatory for a pilot to be in receipt of an ATS; this generates an unknown traffic environment;

Controller/FISO workload cannot be predicted;

Pilots may make sudden manoeuvres, even when in receipt of an ATS.'

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the appropriate ATC authorities.

As this Airprox occurred in Class G airspace, both pilots were responsible for maintaining their own separation from other traffic through see and avoid. Members questioned the wisdom of flying VFR at the cloudbase as this can reduce the likelihood of pilots visually acquiring other ac early enough to assimilate the situation and then take the appropriate action, particularly if the cloudbase is in any way variable. This was borne out in this incident as the Paraglider pilot reported seeing the PA28, appear out of cloud 700ft away heading straight towards him, and turning R to avoid, estimating separation as 600ft (200yd). Meanwhile the PA28 pilot reported seeing another ac and turning L to avoid it and then seeing 3 paragliders to the L of his ac's nose and 500ft below, before turning R to avoid them by 500m. A GA pilot Member advised the Board that the paragliders were where they might be expected given the wind direction over the ridge. Since paragliders are hard to see, he emphasised the importance of anticipating where paragliders might be encountered during sortie planning. Given the Wx conditions at the time, Members thought that both pilots had seen each other as early enough as they could be expected to. Because of the disparate reporting distances, Members wondered whether the PA28 had seen the reporting Paraglider. This could not be resolved for sure although a photograph provided by the Paraglider pilot taken from the launch site looking N and viewed by Members, showed the PA28 tracking S'ly to pass W of the launch site and passing to the W of 3 paragliders, the W'ly Paraglider being that flown by the reporting pilot. Given that the Paraglider pilot reported seeing the PA28 turning R at the same time as he turned R, Members agreed that both pilots had taken appropriate action to resolve this conflict in Class G airspace and the combined actions had been effective in removing any risk of collision.

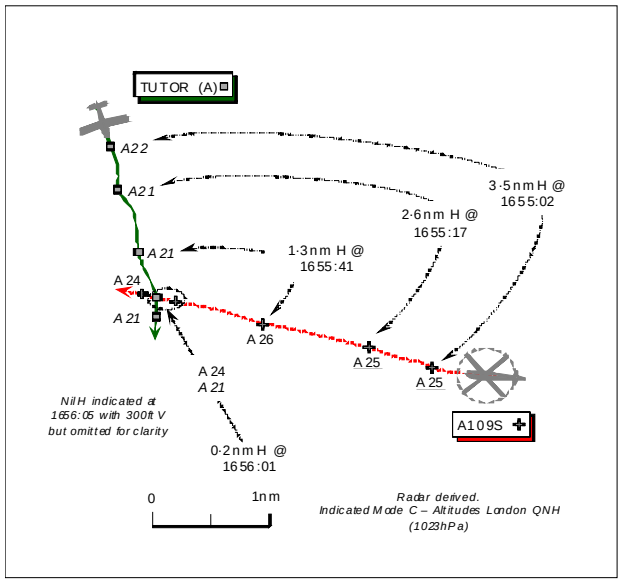
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace resolved by the pilots of both ac.

Degree of Risk: C.

AIRPROX REPORT NO 2012036

Date/Time:	15 Mar 2012 1656Z	
Position:	5148N 00104W (8nm final RW19 at Benson - elev 203ft)	
Airspace:	Benson MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Tutor	Agusta A109S
Operator:	HQ Air (Trg)	Civ Exec
Alt/FL:	1900ft	2500ft
	QFE (1015hPa)	QNH (1021hPa)
Weather:	IMC Cloud/Haze	VMC CLAC
Visibility:	4km	5km
Reported Separation:		
	300ft V/½nm H	Not seen
Recorded Separation:		
	Contacts merged @ 300ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF GROB TUTOR (A), a QFI, reports he was flying an instructional IFR recovery to Benson with a student and in receipt of a TS from Benson APP on 376·65MHz; a squawk of A3611 was selected with Modes C and S on. APP cleared him to descend to 1900ft QFE (1015hPa) and turn R onto a heading of 190° for final prior to the PAR procedure. Flying at 100kt, level at 1900ft QFE, he was flying just above the haze layer with some SCT cloud extending above; visibility was variable as the cloud tops were not clearly defined as his aeroplane transitioned intermittently in and out of the cloud/haze. At about 10nm final approach, whilst awaiting handover to TALKDOWN, conflicting traffic was called approaching from his L and slightly above. He was content to maintain a TS as the reduced visibility was intermittent. Following the first call from APP advising the traffic was about 5nm away, the conflicting ac was not sighted and thereafter on entering reduced visibility he informed APP that he was IMC. Shortly afterwards his aeroplane's Traffic Advisory System (TAS – a TCAS I) notified him of an ac in his 10 o'clock position about 1nm away, indicating +300ft above his aeroplane with an accompanying audible warning. Immediately, he requested a DS and was instructed by APP to maintain his heading of 190°; he spotted an ac over his L shoulder between the cloud tops and haze which then became clearly visible as it passed about ½nm behind from L – R (E to W) about 300ft above his aeroplane. The other ac was identified as an Agusta A109 helicopter, apparently white in colour, with a green longitudinal stripe. ATC was informed that the traffic had passed behind and he was then handed over to TALKDOWN to complete the PAR procedure. He noted that the ATC frequency was 'busy' and he assessed the Risk as 'Medium'. His aeroplane is coloured white with a blue longitudinal stripe; the HISLs and landing light were all functioning.

Whilst taxiing back to the dispersal he requested further information about the traffic. Shortly afterwards ATC were contacted by landline and following the discussion, he elected to submit an Airprox report.

THE AGUSTA A109S HELICOPTER PILOT reports he was in transit to Gloucestershire Airport and flying on track from BNN VOR to the Oxford overhead at 155kt. He had been in communication with Farnborough LARS, but the controller had asked him to contact Benson ZONE as they had traffic. He duly contacted Benson ZONE on 120·900MHz and was placed under a BS. From memory, he was flying VFR in VMC, on top, at 2000ft QNH when he was asked by ZONE to climb an additional 500ft to provide separation against fixed-wing traffic they were controlling on an instrument approach. He happily climbed to 2500ft QNH and transited without incident. He never saw a fixed wing ac, but a passenger in the other front seat saw the aeroplane and didn't consider it very close. His helicopter is fitted with TCAS I and the aeroplane was displayed but no alert was provided. In his opinion there was 'zero' Risk and no safety issues. ZONE took action well in advance to keep his helicopter and the aeroplane apart and at no time did he feel the need to query ZONE or request avoiding action.

His helicopter is coloured beige and green. Anti-collision beacons above and below were on, together with HISLs on both sides of the tail boom. The assigned squawk was selected with Modes C and S on.

UKAB Note (1): The 1650Z Benson METAR: 26005KT 3000 HZ FEW015 11/08 Q1022 YLO1 NOSIG=

THE BENSON COMBINED APPROACH CONTROLLER/DIRECTOR (APP) reports he had 4 ac on frequency, all for radar approaches and all were being provided with a TS. The ZONE controller had seen that the Radar Training Circuit (RTC) was starting to become very busy and called another controller into the approach room, which he elected to use as a second TALKDOWN. The pilot of Tutor (A) was given TI on conflicting traffic when he had approximately 15nm to run. The traffic was SE at a range of 5 miles tracking W 100ft above, which he believed would pass down Tutor (A)'s LH side. The conflicting ac was now squawking A3601 and tracking more westerly and he had heard ZONE call Tutor (A) to the transit traffic – the A109, which ZONE said was VMC, under a BS and climbing to 2500ft QNH to pass between the subject Tutor (A) at 1900ft and Tutor (B) at 4000ft QFE. Whilst continuing to control other RTC traffic the pilot of Tutor (A) requested a DS and this was provided with the instruction 'previously reported traffic left 11 o'clock half a mile crossing L – R 400ft above, maintain heading'. As the primary contacts had now merged, he decided that any turn or change in height would increase the risk of a collision. ZONE then advised that the A109 pilot was now visual with Tutor (A), he thought; almost immediately Tutor (A)'s pilot reported visual with the A109 which was 'passing behind'. The pilot of Tutor (A) then requested a TS before being handed to TALKDOWN.

UKAB Note (2): There is no indication on the Benson ZONE VHF transcript that the A109 pilot reported visual with Tutor (A).

THE BENSON ZONE CONTROLLER (ZONE) did not submit a report.

THE BENSON ATC SUPERVISOR reports that APP and DIR was band-boxed, with 2 ac in the RTC under TS and 2 ac conducting GH also under a TS. The controller was busy, controlling calmly and competently. Normal recovery procedures for Tutor ac are visual joins; however, the weather had deteriorated and instead pilots were requesting instrument approaches to land. He had been in and out of the ACR seeing to other tasks, but when he returned to the ACR, ZONE informed him that the APP was busy and requested an additional controller to man DIR; this was because both Tutor pilots had called for recovery at the same time in addition to the 2 other ac in the RTC. He immediately went to find a DIR. However there was a few minutes delay as he had assumed the controller was in the back of the building when in fact he was in the crew room. On finding the controller he immediately came to the ACR, but APP requested a second TALKDOWN instead of a DIR, which was a wise decision as both Tutor ac had called up in close proximity in an area with little room for manoeuvre. When sitting back at the SUP's console, ZONE informed him of a free-call from a A109 pilot, at a position about 040° Benson 11nm, tracking NW. ZONE had issued the A109 a squawk of A3601, identified the ac, verified the Mode C and applied a BS as requested by the pilot. ZONE said that the pilot had reported at 2300ft QNH (1021hPa) and asked for guidance; he was aware of Tutor (A) on base leg for the PAR at 1900ft QFE (1015hPa), so he told ZONE to climb the A109 to 2500ft QNH to provide some extra separation above Tutor (A). The two ac were about 5nm away from each other and were called by both the APP controller and ZONE controller respectively. He had been monitoring a number of frequencies sporadically as he was also liaising with TALKDOWN regarding the order of recovery and passed TI to APP regarding the A109 climbing to 2500ft QNH. Instructing both controllers to update TI, when he next monitored he saw that the A109 had turned W and was heading toward Tutor (A). The pilot of Tutor (A) then asked for a DS; the ac was heading 170° through the 12 o'clock of the A109. Unfortunately, he misheard the RT and thought that Tutor (B) had requested the DS and he called Brize Norton to co-ordinate. To hear the Brize Norton controller he had to switch off all frequencies, but he remained watching the radar, to see the Mode C of the A109 indicating 023 and climbing and Tutor (A) indicating 019.

BM SAFETY MANAGEMENT reports that this Airprox occurred between the subject Tutor - Tutor (A) - operating IFR in IMC in receipt of a TS and, latterly, a DS from Benson APP and the A109 operating VFR in VMC in receipt of a BS from Benson ZONE.

APP was bandboxed with DIR throughout the incident sequence; this is typical for Benson operations and is based on an accepted assumption that, unless pre-noted, Benson-based Tutors will operate VFR. DIR is planned to be manned for helicopter recoveries when their intention to conduct IF training on recovery is pre-notified to ATC. APP reported that their workload was high to medium.

The pilot of Tutor (A) provided a good description of the weather conditions, stating that at 1900ft Benson QFE, visibility was 4000m just above a layer of haze with SCT cloud at 1400ft occasionally extending above the haze layer. Throughout the recovery phase, the aeroplane 'transitioned in and out of the cloud/haze' and as such 'reduced visibility was intermittent.' Consequently, the PIC of Tutor (A) was 'content to maintain a traffic service.'

The incident sequence commenced at 1649:08 as the pilot of Tutor (A) called APP for an instrument recovery. Up to this point, APP had been providing a TS to 2 ac in the RTC and 2 Tutors - Tutor (A) and Tutor (B) – both conducting GH NW of Benson. At 1649:08, Tutor (A) was 7.3nm NW Benson, tracking N'ly, indicating an altitude of 3600ft ALT London QNH (1023hPa); the A109 was 18.6nm NE Benson, tracking WNW'ly, indicating 2400ft ALT London QNH (1023hPa). At 1649:36, the pilot of Tutor (B) called APP for an instrument recovery. Tutor (A) and Tutor (B) were placed 3rd and 4th respectively in the order of recovery.

At 1652:11 Tutor (A) was turned R onto a heading of 090° then, at 1652:52, was descended to 1900ft QFE, this being the lowest Terrain Safe Height in that area. At this latter point, the A109 was 11.8nm ESE of Tutor (A), tracking WNW'ly, indicating 2400ft ALT. At 1653:08, the A109 pilot free-called Benson ZONE requesting a BS en-route to Gloucestershire/Staverton; a squawk was issued and the flight placed under a BS.

The SUP re-entered the ACR between 1653:08 and 1654:08; cognisant of Tutor (A) on base leg at 1900ft QFE [1015hPa) – equating to 2080ft QNH (1021hPa)], SUP instructed ZONE to request the A109 pilot to climb to 2500ft QNH. The A109s initial altitude of 2300ft QNH (1021hPa) would have provided 220ft separation against the Tutor; the climb to 2500ft QNH (1021hPa) requested by ZONE provided 420ft separation.

At 1654:07, APP turned Tutor (A), indicating 2100ft ALT, onto a heading of 170°. The A109 was 6.7nm ESE of the Tutor indicating 2400ft ALT. Almost simultaneously at 1654:08, ZONE asked the A109 pilot, "*..can you accept flight at altitude 2 thousand 5 hundred feet for separation*?" The A109 replied, "*affirm*" and ZONE thanked them saying, "*thanks, we've just got a couple of aircraft struggling to get visual inbound to Benson*." The A109 pilot replied, "*no problem, I'll climb now altitude 2 thousand 5 hundred feet on 1-0-2-1*."

Although Tutor (A) indicated level at 2100ft ALT on the radar replay at 1653:51, the pilot reported this at 1654:25. At 1654:35, APP passed accurate TI to the pilot of Tutor (A) on the A109 as, "*traffic south-east, 5 miles, tracking west, 1 hundred feet above*." At 1655:02, the A109's SSR Mode C indicated 2500ft ALT, 3.5nm SE of Tutor (A), continuing to track WNW'ly.

At 1655:18, ZONE passed accurate TI to the A109 pilot as, "*traffic right, 1 o'clock, 1 and a 1/2 miles, crossing right-left, 4 hundred feet below, Tutor*." The A109 pilot replied, "*..V-M-C on top and level 2 thousand 5 hundred feet, 1-0-2-1*." Based upon reports by APP and the SUP, it is likely that it was around this point when either ZONE or the SUP (their recollections differ) informed APP that the A109 was 'VMC, under a Basic Service and climbing to 2500ft QNH to pass between [the two] Tutors.'

At 1655:42, the pilot of Tutor (A) reported, "*India Mike Charlie, not visual with that traffic, request Deconfliction Service*." It is likely that this transmission was prompted by the reported 'audible warning' from the Tutor's TAS of traffic 'in the 10 o'clock position, approximately 1nm and +300ft.' At that point, the A109 was 1.5nm SE of Tutor (A) indicating 2500ft ALT, with Tutor (A) indicating 2100ft ALT. APP acknowledged Tutor (A) pilot's transmission stating, "*..roger, Deconfliction Service, previously reported traffic left 11 o'clock* [radar shows 10 o'clock]*, half a mile, crossing left-right, 4 hundred feet above, maintain heading*." The pilot of Tutor (A) acknowledged this instruction and then immediately reported at 1656:02, that he was, "*visual, it's passing behind".* APP reported that at the point where they applied a DS, the radar contacts for Tutor (A) and the A109 had merged and 'any turn or change in height would increase the risk of a collision.' At this point the A109 was 0.3nm E of the Tutor, continuing to track WNW'ly, indicating 2400ft ALT; Tutor (A) was indicating 2100ft ALT. The A109 pilot reports that he did not sight Tutor (A) but that his passenger did and 'did not consider it very close.' Moreover, the A109 pilot reports that whilst his ac is fitted with TCAS and the Tutor was displayed on it, 'no TCAS alert was provided.'

The CPA occurred at 1656:07 as the A109 passed 0.1nm N of the Tutor, indicating 300ft above. Notwithstanding the request by the pilot of Tutor (A) to upgrade the ATS to a DS, the timing of the request was such that APP could do little to affect the outcome of the occurrence from that point. Appreciating the potential conflict between the A109 and Tutor, the SUP/ZONE, prevented a more serious incident by initiating the request to the A109 pilot to climb. Whilst this was not to an altitude that would achieve deconfliction minima, there was no requirement at that stage of the incident sequence to do this. The intention was solely to provide increased separation that was

achieved. The sole remaining ATM issue that warrants examination is that the TI for Tutor (A) on the A109 was not updated until the request for DS at 1655:42.

Although there are 3 gaps in the RT exchanges between APP and those ac in receipt of an ATS between 1654:35 and 1655:42, they are relatively short, each of around 10 secs duration. It must also be borne in mind that these gaps will typically be spent by APP dividing their attention between all those ac in receipt of an ATS – 4 at the time of the Airprox - including the helicopter traffic ahead of Tutor (A) on a PAR – and keeping their logging up to date on their flight strips. Given their traffic loading, BM SM contends that APP could not have updated the TI and that any such argument would be based on hindsight bias. This might suggest that the bandboxing of APP/DIR was a contributory factor; however, in this instance, BM SM does not believe that this was the case. The workload at the time of the Airprox was almost wholly traffic within the RTC and all of APP's transmissions between 1654:35 and 1655:42 related to RTC traffic. Consequently, if the RTC traffic had been controlled by a dedicated DIR, it would have been unlikely that updated TI would have been passed to Tutor (A) before 1655:42.

It is concluded that the pilot of Tutor (A) sighted the A109 very late, arguably too late to have taken effective avoiding action if it had been required; the pilot of the A109 did not sight Tutor (A). The conflict was resolved by ATC at 1654:08, by initiating the request that the A109 pilot climb to a higher altitude to increase separation between the 2 ac.

HQ AIR (TRG) comments that Benson ATC provided a good level of service and resolved the conflict by requesting the A109 pilot to climb. It is also noted that the deconfliction advice was provided to the A109 pilot on a BS but that ATSOCAS presumes against such advice being provided to the Tutor pilot under a TS. This incident is a good example of controllers fulfilling their objective, stated in Regulatory Article 3001, to prevent collisions between aircraft. Considering the lack of an update on the TI, the Tutor pilot was poorly placed to assess the likely proximity of the traffic as there was limited detail in the initial call and it was at considerable range. An earlier request for a DS would have enabled a more effective intervention, although this was less imperative given the earlier co-ordination with the A109. Equally, a more routine use of DS by those on IFR recoveries would ensure controllers were able to provide earlier and more effective assistance to pilots, who hold the ultimate collision avoidance responsibility.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from 2 of the 3 air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board agreed that Benson ATC had been helpful to the pilot of Tutor (A) although he might not have realised it at the time because at no stage was he informed that the A109 pilot was talking to ZONE or that co-ordination had been agreed. When the pilot of Tutor (A) was passed TI about the A109 as "*..south-east, 5 miles, tracking west, 1 hundred feet above*", the apparent conflict would undoubtedly have been of concern to the pilot, especially when he encountered IMC. Therefore Members understood his request for an upgrade to a DS. Meanwhile, ATC had elected to engineer increased separation by requesting the A109 pilot to climb to 2500ft ALT. The A109 pilot acceded to this request without hesitation and quickly climbed his helicopter to the altitude requested. The Board commended the A109 pilot for his airmanship and co-operation as this was a good example of the collaborative way that the ATC 'system' should work to the benefit of all concerned. Here the Benson SUP showed sound appreciation of the developing situation through his instruction to ZONE, which was aimed at preventing further difficulty in the instrument pattern. The BM SM report makes it clear that a climb to 2500ft QNH (1021hPa) only provided 420ft separation against Tutor (A) flying level at 1900ft QFE (1015hPa); this was perhaps somewhat less than the minimum 500ft vertical separation the Tutor pilot might expect later under a DS, and not helped by the A109 pilot's fluctuating Mode C level. Nevertheless, the Board understood the controllers' rationale as APP was not required to effect planned 'deconfliction minima', merely TI at that stage as the Tutor pilot had only requested a TS. Members agreed with the Command perspective that an earlier request for a DS from the pilot of Tutor (A) would have given ATC more scope to achieve the specified deconfliction minima for this form of ATS. However, the pilot had only made this request when the A109 was 1·3nm away and some 23 sec before the contacts merged at 1656:05. APP could not descend Tutor (A) any further at that point because the ac was already level at the lowest terrain safe height for that vicinity, but a further climb for the A109 was still an option, which it seems the pilot would have been unlikely to refuse.

HQ Air (Trg) commented that the ATSOCAS doctrine presumes against deconfliction advice being provided under a TS, although it was provided to the A109 pilot here under a BS. However, the CAA Policy and Standards Advisor disagreed that this was so. The provisions of the TS and DS are in addition to those of a BS. Therefore ATC's request to the A109 pilot to climb was proffered here to facilitate the 'safe use of the airspace' and to that end nothing prevents a controller from co-ordinating a flight under a TS against another similar flight, or a TS versus a DS, if it is appropriate and the pilot is willing to comply. In effect, ATC had resolved the conflict before they were required to do so and although they might not have achieved the ideal minima for a DS, in the Members view, ATC made a reasonable attempt in the circumstances and the time available. Although one Member demurred and perceived there was no conflict at all, this occurrence certainly met the criteria for an Airprox report. The Board concluded, therefore, that this Airprox had been the result of a conflict resolved by ATC.

Although the contacts had merged with 300ft of vertical separation evident, the Tutor pilot was not aware at that stage that the helicopter pilot had confirmed he was in level flight at an altitude clear above Tutor (A). All the Members agreed that there was no Risk that the ac would collide but they debated the classification of the event. One Member considered that because the separation was less than DS minima, the event should be classified as Risk Category C. However, the majority considered that the ATC system had worked as intended and that normal safety parameters had been maintained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict resolved by ATC.

Degree of Risk: E

AIRPROX REPORT NO 2012037

Date/Time:	17 Mar 2012 1451Z (Saturday)		
Position:	5210N 00012W	(3nm SE St Neots)	
Airspace:	Lon FIR	(Class: G)	
	Reporting Ac	*Reported Ac*	
Type:	MD900	DA40	
Operator:	Civ Pol	Civ Pte	
Alt/FL:	1000ft	1300ft	See Below
	QNH (1011hPa)	QNH	
Weather:	VMC CAVOK	VMC Haze	
Visibility:	>10km	4km	
Reported Separation:			
	100ft V/500m H	200ft V/NR H	
Recorded Separation:			
	300ft V /<0.1nm H		

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MD900 PILOT reports flying single pilot in a blue and yellow helicopter with strobes and anti-coll lights switched on, on a local police operational flight from RAF Wyton, monitoring Wyton APP (but not in receipt of an ATS) and squawking 0054 (Cambridge Police ASU) with Mode C; TCAS was fitted. While heading 170° at 120kt he saw a white, low-wing, single-engine ac less than 1000m away just to the left of his nose, just above his height and heading straight towards him; he partially saw the ac registration but did not see any lights and had no TCAS warnings. He immediately initiated a tight right hand avoiding turn through 90° then resumed his track. He assessed the risk as 'close'.

THE DA40 PILOT reports flying a white and blue ac with strobes and nav lights switched on, on a VFR flight from Stapleford to Gamston, a route he is very familiar with, as he regularly visits the Diamond service centre at Gamston; he was squawking 7000 with Modes C and S but TCAS was not fitted. Unusually, on this occasion, Farnborough North had terminated the BS much earlier than he anticipated; his preference is to stay with them until 10nm S of Cottesmore. Once the service was terminated, he selected the Cottesmore frequency (now at Wittering) to maintain a listening watch before requesting a MATZ penetration.

About 2-3mins after Farnborough service terminated, heading 335° at 120kts and while busy making radio calls, he saw a helicopter approaching from the NW (left of his nose) about 200ft below. He saw the helicopter late (4sec before it disappeared below his wing) due to the poor Wx conditions, although there was enough time to react had it been necessary; he considered that it was not required as there was adequate separation and he assessed the risk as being low.

Had Farnborough not terminated the service early then perhaps he would have been given ample warning of the traffic. Also, perhaps if the Helicopter had been in contact with Farnborough, then the other pilot would also have been aware of him. He understands that the other ac was a police Helicopter; if so, TCAS may have been a help to the other pilot.

ATSI reports that an Airprox was reported by the pilot of a MD900 helicopter which came into proximity with a Diamond Star (DA40) in the vicinity of St. Neots.

The DA40 was on a VFR flight from Stapleford Abbotts to Gamston and maintaining a listening watch on the Cottesmore frequency prior to contacting the unit for a MATZ clearance. The MD900 was VFR on an Operational flight over Cambridgeshire and not in receipt of an ATS.

Meteorological Information for Cambridge Airport (approximately 13nm E of the incident):

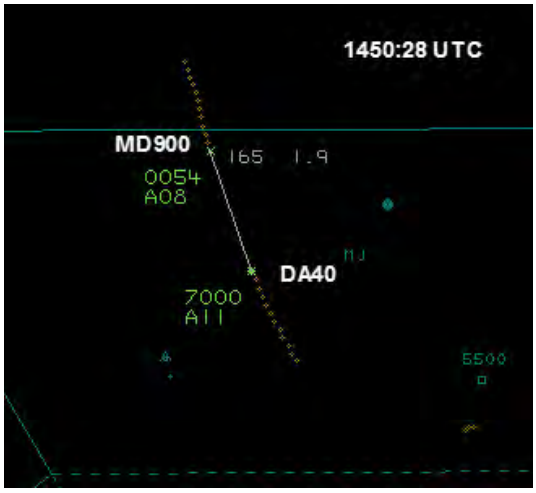
AIRPROX REPORT No 2012037

METAR EGSC 171450Z 20006KT 160V240 9999 FEW010 BKN038 10/09 Q1010=

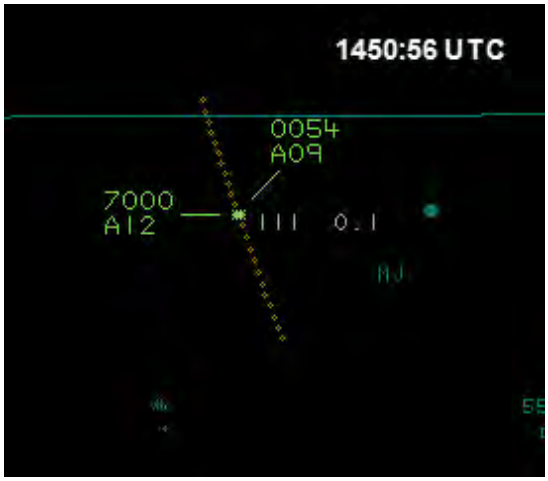
Between 1436 and 1449 the DA40 was in receipt of a BS from Farnborough LARS (North). During this period the ac flew in a general NW'ly direction from its aerodrome of departure at an alt of 1100ft (London QNH 1011 hPa).

At 1448:50 the Farnborough LARS controller informed the DA40, "*...you're leaving Farnborough surveillance coverage shortly squawk 7000 suggest a freecall to London Information on 124.6*". At 1449:00 the pilot replied, "*Squawk 7000 and 124.6."* The Radar replay showed that service termination was co-incident with the notified boundary of Farnborough LARS (North) area of service provision. The DA40's SSR code changed to 7000 at 1449:23 and at that time it was at an alt of 1100ft (London QNH), 6nm SSE of the MD900. The MD900 was on a S'ly track depicted on radar replay at an altitude of approximately 900ft (London QNH). Both ac were in Class G uncontrolled airspace.

The distance between the two ac continued to decrease as each remained in the other's 12 o'clock on reciprocal tracks as shown below. Note: SSR code 0054 is considered unvalidated and unverified.



At 1450:56 the position indication symbols of the ac merged on the radar replay with the MD900 at altitude 900ft and the DA40 at altitude 1200ft (as shown below).



Following the encounter the radar replay showed both ac adjust course to the right of their previous tracks.

The Airprox occurred in Class G uncontrolled airspace between two ac not in receipt of any form of ATS; as such, the avoidance of collision rested solely with the pilot of the ac and in accordance with the relevant RoA.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members noted that this incident took place in a busy area of Class G airspace (below 3000ft) where 'see and avoid' is the principal method of collision avoidance. Both pilots had, they believed, some assistance with this responsibility. The MD900 was TCAS-equipped and, although the radar prints above showed the DA40 to have been squawking with Mode C, no warnings were issued by the TCAS. The DA40 pilot had been in receipt of a BS from Farnborough and seemed to be under the mistaken impression that this would provide him with traffic warnings. As explained in the ATSI report above, controllers are under no obligation to provide traffic information under such a service; should pilots require information on other traffic then either a TS or a DS should be requested. By the time of the Airprox the DA40 had flown out of Farnborough's coverage and both ac were in an area where there is little possibility of obtaining an effective TS at low altitudes. A Member noted that the DA40 pilot reported that he was flying at 1300ft; his selection of this unusual, but in the Board's view sensible, alt had avoided a closer vertical proximity.

The radar recording verified that the vertical separation was about 300ft, greater than either pilot estimated. Further both pilots saw the opposing ac, albeit rather belatedly, and were taking action to maximise the separation. That being the case Members unanimously agreed that there had been no risk that the ac would have collided.

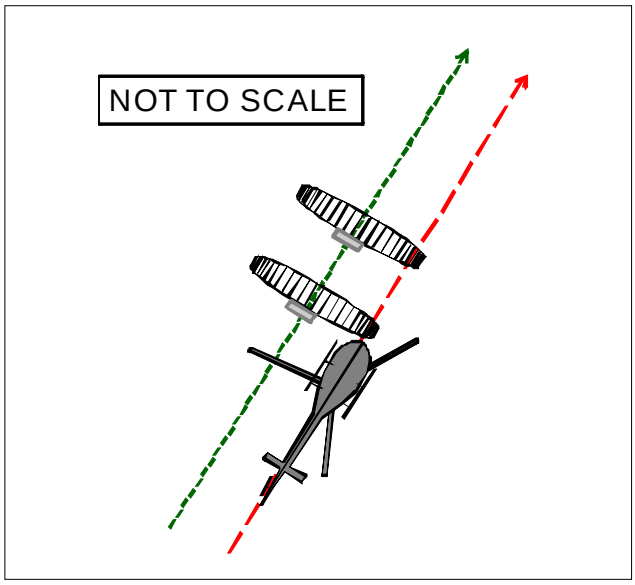
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the pilots of both ac.

Degree of Risk: C.

AIRPROX REPORT NO 2012038

Date/Time:	11 Mar 2012 1442Z (Sunday)	
Position:	5338N 00059W (10nm N Doncaster/Sheffield)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Paramotor	EC120
Operator:	Civ Pte	Civ Pte
Alt/FL:	400ft	1000/1500ft
	QFE	NK
Weather:	VMC NR	VMC NR
Visibility:	10km	>10km
Reported Separation:	200ft V/10ft H	Not Seen
Recorded Separation:	(See UKAB Note (1))	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PARAMOTOR PILOT reports flying an orange and black paramotor with no lights or SSR but he carried a radio. Having taken off from a field into a 5–7mph W'ly breeze he carried out a left turn and proceeded to climb out on a NE heading with the intention of then flying N (parallel with the M18) to Drax Power Station, after he had cleared local farms and houses. During the climb heading 035° at 25kt and at around 400ft agl, he became aware of a fast moving shadow approaching rapidly from behind and at about the same time a pilot on the ground radioed to inform him that a helicopter was behind him. A fellow paramotor pilot was also taking off and was ¼nm behind him and the helicopter passed him slightly to his right with a height clearance of about 250ft.

As the helicopter flew over the top of his wing (about 10ft to his left and parallel to his flight path and about 200ft above him); he felt a slight disturbance similar to that encountered in a thermal gust and braced himself for a sudden deflation however, the wing remained in a stable condition. He was concerned that the helicopter pilot had either not seen the two brightly coloured wings on a clear day or had not altered his flight path to take avoiding action.

The consequences of helicopter down draft affecting flexible paraglider wings would be rapid collapse of the wing with possible fatal results, especially at low level where deployment of an emergency parachute may not be successful.

UKAB Note (1): The Paramotor pilot provided a photograph of the incident taken by a ground observer at the take off point. It showed the identified helicopter passing to the right and above the second paramotor at distances similar to those calculated at UKAB Note (2) below. (Due to the oblique angle of the shot, they could not be estimated accurately).

THE EC120 PILOT provided an incomplete report saying that at the time he was on a private VFR flight with a passenger from a private site near Doncaster, general handling between 1000 and 1500ft agl in good visibility. He did not see any other ac.

UKAB Note (2): The recording of the Claxby radar showed the EC120 throughout. It was positively identified from its Mode S (enhanced) data. During the period the ac tracked 033°, passing 0.32nm (~600m) to the E of the reported position at 1444:38. The position of the incident reported by the paramotor was to 2 decimal places, probably from a GPS and therefore probably accurate; at the time the helicopter was indicating FL002 (Mode C), the Doncaster QNH was 1036hPa and the terrain at the incident position is about 10ft; therefore the EC120 was at 880ft agl. If the Paramotor(s) was/were, as reported at 400ft there would have been about 480ft vertical separation.

ATSI reports that this Airprox was believed to have occurred at 1441:51, about 10nm N of Doncaster Airport in Class G airspace, between a Eurocopter EC120B (EC120) and a Paramotor. The position of the reported Airprox is below the Doncaster Control Area, CTA-5, which has a base alt of 2000ft.

The EC120 was operating VFR from a private site at Edenthorpe 5.6nm NW of Doncaster Airport and the paramotor was operating on a VFR training flight from Wormley Hill, a private site 10nm N of Doncaster Airport.

CAA ATSI had access to the RTF recording, NATS Area Radar recordings and the pilots' written reports. The Doncaster weather was:

METAR EGCN 111420Z 31010KT CAVOK 18/09 Q1036=

At 1441:40 the EC120 helicopter contacted Doncaster Radar and reported leaving CAS from Edenthorpe and heading N; the controller gave the Doncaster QNH 1036, issued a squawk 6160 and agreed to provide a BS outside controlled airspace.

At 1441:57, radar recording first showed the EC120, 5.6nm NW of Doncaster airport, tracking N, indicating minus FL002 (converts to an altitude of 420ft with QNH 1036 and 1mb equal to 27ft). At 1443:50, the EC120 crossed the boundary of CAS, the controller advised the pilot about a gliding site N of the zone and active up to 4500ft and the pilot reported going as far as the M62 before routeing back.

The Paramotor pilot's report indicated that after departing from the field at Wormley Hill, he climbed on a NE'ly heading to a height of 400ft agl. (The elevation of Wormley Hill is approximately 15ft). The Paramotor pilot reported that he became aware of a helicopter approaching from behind and around 200ft above.

At 1444:51, radar recording showed the EC120, passing the approximate position of the reported Airprox, indicating FL002 (820ft). Neither, the NATS area radar recording, nor the Doncaster radar recording showed any other ac in the immediate vicinity.

The EC120 then routed N calling for rejoin at 1451:56 via the Thorpe Marsh power station and reported it to be the last flight of the day. The EC120 pilot did not mention the Paramotor or any other aircraft in his close proximity.

ATC were not aware of the Airprox and no report was received from Doncaster ATC.

The Airprox occurred when the Paramotor and EC120 helicopter came into close proximity within Class G airspace. The Paramotor was not shown on the Doncaster radar display and the Doncaster controller would have been unable to pass any warning to the EC120 helicopter in receipt of a BS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar recordings [the paramotors were not displayed], reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Although Members noted that this incident took place in Class G airspace where the respective pilots had an equal and shared responsibility to 'see and avoid' other ac, since the helicopter was approaching from above and behind the paramotor(s), Members agreed that it would be unreasonable to expect their pilots to see it in time to manoeuvre to avoid it. The paramotor(s) on the other hand, were directly ahead of the helicopter, albeit well below it, and its pilot was in a position to see them and, if he felt it warranted, avoid them by a greater lateral margin. Several Members thought that the vertical separation extant was adequate and the incident had been a 'normal' operation with no risk attached; the same number [five] thought that although there had been no risk of collision, some horizontal separation should have been afforded by the helicopter pilot to positively ensure safety; the Chairman agreed with the latter view. Three Members abstained and another considered that there was not enough information on which to base a decision [Risk D].

AIRPROX REPORT No 2012038

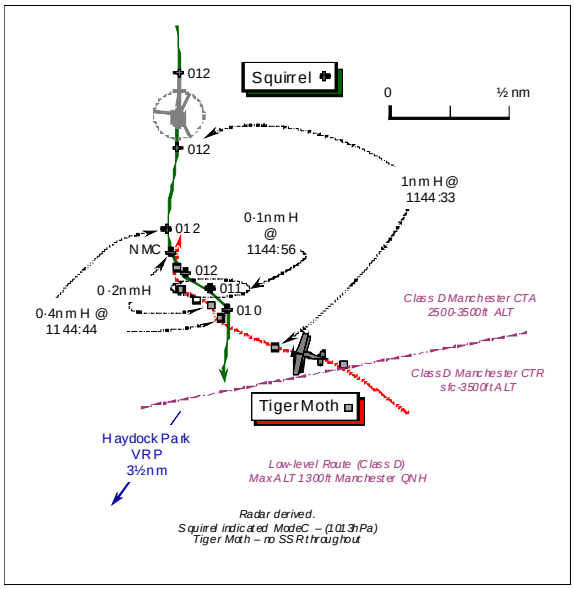
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the EC120 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012039

Date/Time:	16 Mar 2012 1144Z	
Position:	5332N 00234W (3½nm NE of Haydock Park VRP)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Squirrel HT3	DH Tiger Moth
Operator:	HQ Air (Trg)	Civ Club
Alt/FL:	1000ft	↑↓1100-1800ft
	QNH (1015hPa)	QNH
Weather:	VMC CLBC	VMC CLBC
Visibility:	20km	>10km
Reported Separation:		
	50ft V/Nil H	Not seen
Recorded Separation:		
	<200yd H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL HT3 HELICOPTER PILOT reports he was flying a VFR NAVEX returning to Shawbury via the Low-Level Route through the Manchester CTR. He was listening out on the promulgated frequency of 118·575MHz; the Manchester ATC conspicuity code of A7366 was selected with Modes C and S.

Shortly after entering the Low-Level Route in the vicinity of Haydock Park, he thought, [actually just to the N of the boundary] level at 1000ft Manchester QNH (1015hPa), heading 185° at 110kt, a biplane was seen at short range in his 11 o'clock about 150ft away and 50ft above his helicopter, crossing from left to right. Initially the conflicting biplane – with silver wings and a dark green fuselage - had been obscured behind the standby compass on the central cockpit strut; it did not appear to be showing any lights. To avoid the biplane [a DH82 Tiger Moth] he immediately initiated a 60° AOB descending L turn; at this point the Tiger Moth pilot also commenced what seemed to be an avoiding action turn to the R exacerbating the situation still further. Consequently, he increased his ROD to about 2000-3000ft/min in order to avoid the Tiger Moth, whose pilot then reversed the turn to the L thereby passing about 200-300ft overhead his helicopter. The Tiger Moth continued on a NW'ly course, so when clear he climbed back to his transit altitude and regained his track to exit the low-level route to the S via Oulton Park VRP. He assessed the Risk as 'medium'.

His helicopter has a black fuselage with yellow upperworks; all the white HISLs were on together with the landing light.

THE de HAVILLAND DH82A TIGER MOTH PILOT reports he was instructing a student, who was the PF, after departing Liverpool bound for Manchester (Barton). His Tiger Moth has white wings with a green fuselage and he was in receipt of a BS from Barton INFORMATION on 120·25MHz; SSR is not fitted. Whilst conducting general handling (GH), VFR, at the reported Airprox location he was operating between 1100 – 1800ft QNH beneath overcast cloud at 75kt. The Squirrel helicopter flown by the reporting pilot was not seen and he was informed of the Airprox in a telephone call from the RAC at Swanwick.

ATSI reports that the Airprox occurred at 1144:56 UTC, in Class G airspace, 3.3nm NE of Haydock Park VRP and just to the N of the Manchester Low-Level Route, which lies within the Manchester CTR.

The Squirrel HT3 helicopter was operating VFR on a training exercise from Shawbury, squawking A7366 to transit N-S through the Manchester Low-Level Route. The Squirrel was maintaining a listening watch on the Manchester APPROACH frequency in accordance with the UK AIP Page AD 2-EGCC-1-15 (8 Mar 12), paragraph 7, which states that:

'within the Low-Level Route helicopters or aeroplanes may fly without individual ATC clearance…'; and paragraph 8, which states that: 'pilots flying within 5nm of the Manchester CTR and maintaining a listening watch on the Manchester APPROACH frequency may select code 7366' (does not imply the receipt of an air traffic control service).

Manchester ATC confirmed that neither the Squirrel nor the Tiger Moth pilot had contacted Manchester APPROACH.

The Manchester 1120Z METAR: 20012KT 9999 BKN020 11/06 Q1015 NOSIG=

At 1144:15, radar recording shows the Squirrel, squawking A7366 indicating 1200ft Mode C (1013hPa) flying southbound towards the Manchester Low-level route. The Tiger Moth is shown as a primary contact only [no SSR fitted] manoeuvring in the Squirrel helicopter's 11 o'clock at a range of 1.7nm. The Tiger Moth is observed to track broadly NW.

At 1144:50, the two ac are shown as primary contacts only, on reciprocal tracks at a range of 0.3nm. The Squirrel pilot's written report indicated that the Tiger Moth was sighted in his 11 o'clock at a range of 150ft and 50ft above. At 1144:56, radar recording shows the Squirrel, indicating an altitude of 1100ft in a L turn, with the Tiger Moth in close proximity [<200yd. The Squirrel's Mode C then indicates further descent to 1000ft (1013hPa) in general conformity with the pilot's reported avoiding action descent before the helicopter turns S to regain track through the Low-Level Route.]

CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

The Airprox occurred when the Squirrel helicopter and Tiger Moth came into close proximity within Class G airspace. Pilots operating in Class G airspace are ultimately responsible for collision avoidance.

HQ AIR (TRG) comments that based on the Tiger Moth pilot's report, the 'avoiding action' seen by the Squirrel pilot was unrelated manoeuvring by the Tiger Moth. The range of the Squirrel pilot's initial sighting appears from the radar picture to have been about 0.5nm rather than the reported 150ft. The decision to manoeuvre in altitude was sensible, particularly in light of the apparent compensating turns. The incident highlights the known issue with cockpit obstructions in any ac and reemphasises the need to move the head when looking out and/or altering flight path to expose conflicting ac on a collision course that may be hidden behind such obstructions.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, and reports from the appropriate ATC and operating authorities.

It was apparent to the Board that ATC played no part in this Airprox; the Squirrel was operating autonomously, whilst approaching the Class D CTR to transit through the low-level route, where there is special provision for pilots to transit this 4nm wide route under VFR without an individual ATC clearance. The Tiger Moth pilot reports he was intending to land at Barton, having departed from Liverpool, so it seemed that he had not just cleared the route; however, the ac did fly further to the N after the Airprox had occurred. Whilst the Tiger Moth crew was plainly also entitled to be operating in this vicinity, Board Members were surprised that the instructor had chosen the natural choke point of the northern entry point to the route to conduct GH instruction. This seemed unwise and this Airprox was a good example of what can happen when pilots are closely focussed on their individual tasks – perhaps to te detriment of all-around lookout.

As it was, both ac were just outside the northern boundary of the CTR in Class G airspace with both pilots equally responsible to 'see and avoid' other ac in the vicinity. In this situation, however, the Tiger Moth crew had the helicopter to their R and in accordance with the Rules of the Air were required to 'give way' to the Squirrel. The GA Member stressed the poor lookout from the front seat of the Tiger Moth – the rear seat is better – and the difficulties of communicating in an open cockpit, but it is evident that neither the instructor in the Tiger Moth nor

the student PF saw the helicopter at all - possibly as a result of the inherent limitations caused by the biplane's configuration. Given these limitations, and the proximity to the low-level corridor, the GA Member opined that more attention should have been given by the Tiger Moth pilot to clearing their air ahead. The HQ AAC Member emphasised that lookout from the Squirrel helicopter is not particularly good either, and he reinforced the importance of pilots continually moving their heads, coupled with moving the ac, to clear airframe blind spots regularly. Nonetheless, the Command considered that the Squirrel crew might have seen the Tiger Moth a little earlier than the pilot had estimated; this was based on the helicopter's manoeuvre as evinced by the radar recording just as the range between the two ac returns decreased from 0·4 - 0·2nm. The Board was briefed that the weak primary contact of the Tiger Moth did exhibit some 'track jitter' on the recording and the radar data was incomplete with a number of returns missing – which was not surprising from the fabric covered aeroplane - the open white square on the diagram representing a predicted position for the Tiger Moth just before the two ac passed very close indeed, but certainly less than 200yd apart. Although the Squirrel pilot perceived the Tiger Moth's manoeuvres to be avoiding action, the Tiger Moth pilots were completely unaware of the Squirrel. The Board concluded, therefore, that this Airprox was the result of a non-sighting by the Tiger Moth pilots and a late sighting by the Squirrel crew.

While there was no reason to doubt the Squirrel pilot's estimate of 50ft vertical separation, the lack of any Mode C from the Tiger Moth did not enable the vertical separation to be confirmed independently. Fortunately, the Squirrel pilot's robust avoiding action turn and descent proved wholly effective and he was able to remain clear of the other ac despite the Tiger Moth student's manoeuvres. Nevertheless, the Board concluded unanimously that at these close quarters, with only one crew aware of what was happening, the safety of the ac involved had been compromised in the circumstances conscientiously reported here.

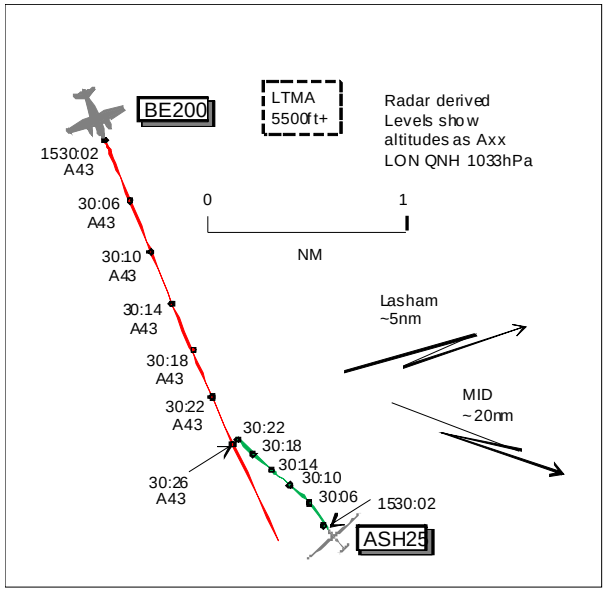
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Tiger Moth pilots and a late sighting by the Squirrel crew.

Degree of Risk: B.

AIRPROX REPORT NO 2012040

Date/Time:	19 Mar 2012 1530Z	
Position:	5109N 00109W (5nm WSW Lasham)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ASH25	BE200
Operator:	Civ Pte	Civ Pte
Alt/FL:	4000ft↓	4400ft
	QNH (1034mb)	QNH
Weather:	VMC CLBC	VMC CLOC
Visibility:	40km	>10km
Reported Separation:		
	100ft V/Nil H	2-300ft
		/0·5nm H
Recorded Separation:		
	<0·1nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASH25 PILOT reports flying WNW following a cloud street at 4000ft QNH 1034hPa and 60kt and listening out on glider common frequency 130·4MHz. The visibility was 40km flying 1000ft below cloud in VMC and the ac was coloured white/blue. There were many others gliders flying the same cloud street in both directions based on visual sightings, FLARM alerts and RT position reporting. He was looking ahead along the cloud street for a glider, which he had seen thermalling ahead but it had temporarily disappeared as it circled, when the P2, seated in the back seat, called, "aircraft to your R". He then sighted a low-wing twin-engine ac in his 2:30 position about 1nm away at the same level, closing very fast. He immediately descended and the other ac passed directly over the top about 15sec later with an estimated separation of 100ft. The other ac was heard on passing and he could read the registration from the underside of the wing; it did not deviate course or altitude. He assessed the risk as high. He contacted Solent on 120·225MHz as he thought they may be handling the ac, given its proximity to the Solent CTA. After giving his position it was suggested that he called Farnborough, which he did, and the controller confirmed that they were working a twin-engine ac in his area. He advised the controller that he had taken avoiding action on that ac and that he would telephone the ATSU after landing. Later he informed them that he would be filing an Airprox and was given the other ac's type (BE200) and c/s.

THE BE200 PILOT reports en-route to Switzerland, VFR [ahead of IFR airways join] and in receipt of a BS from Farnborough on 125·25MHz, squawking an assigned code with Modes S and C. The visibility was >10km in VMC and the ac was coloured white with anti-collision, wing and tail strobes all switched on. Farnborough Radar was unusually busy so he accepted a BS while awaiting airways joining clearance. He discussed with his co-pilot that both crew members would make vigilant lookout, as it was a known busy area, and they would avoid the Lasham O/H and its ATZ (sic). Earlier several contacts were seen and avoided, in addition to the reporting glider, and were discussed between crew members. Cruising at 4400ft QNH and 220kt the reporting glider was first seen in their 11 o'clock at range 4nm and an early small-angle RH turn was initiated to ensure clearance from it. The relative position of the glider translated anti-clockwise towards their 0930 position, remaining in view ahead of their ac's wing leading edge. The glider began a descent so no further RH turn was taken and it was observed continually by the Commander until it was clearly passing 200-300ft below and roughly 0·5nm away to port, diverging; the divergence was owing to his early RH turn undertaken. He assessed the risk as none. As he was flying within Class G airspace on a daytime flight in good visibility, he did as required - see and be seen and avoid as necessary. RoA Regulations adherence should have prompted him to maintain course and speed but in fact he did better by initiating an early RH turn and continually observing the glider. He believed there was no risk of collision as both pilots saw the other ac and each took minor avoiding action to increase separation as befits good airmanship in the open FIR. He thought nothing was gained by Airprox reporting in these circumstances. He is interested to hear whether the filing of this Airprox report adds anything to the safety of GA in UK Class G airspace, particularly

when the majority of gliders neither use transponders nor RT and both crews took early, proportionate and sensible decisions.

THE BE200 CHIEF PILOT comments that in terms of whether any safety is added to GA in Class G airspace, it does serve to highlight the general difficulty in seeing gliders albeit on this occasion both crews saw each other in time to take avoiding action. Gliders are notoriously hard to see yet seldom communicate with ATSUs, fit transponders, anti-collision beacons or carry high visibility markings. He thought that military gliders belonging to cadet corps carry high visibility markings on the wings but with some penalty in terms of structural life. Whilst appreciating the impact conspicuity measures may have on performance/weight/cost, consideration should be given to mandating such measures for gliders should they wish to share the same airspace with other users for whom the same measures are more usually required. Furthermore, gliders should be mandated to carry at least Mode C transponders such that to any TCAS equipped ac the glider becomes more conspicuous.

THE FARNBOROUGH LARS CONTROLLER reports working LARS W during a very busy session when the BE200 flight called en-route to Switzerland. The ac was identified and placed under a BS and, at the request of the crew, he activated the ac's flight plan. When S of CPT the crew requested a heading for MID and, as the flight was under a BS, he offered a steer of 130° which he noticed the flight did not take; instead it continued through an area with multiple contacts. After a number of miles the crew requested another steer and asked if there was any information regarding their flight plan. He advised a new steer of 110° and that his flight plan was activated. He noticed the BE200 flight take the turn and the crew, in a very convoluted way, made it clear that they were intending to join CAS as per their flight plan. By this point he had received a call from the ASH25 pilot who was told to standby. He coordinated an airways join with LTC and transferred the BE200. He went back to the ASH25 pilot who asked if he had been working a light ac N of Popham at approximately 4·5A. He advised the pilot that he had and believed the ac to be the BE200 but as the frequency was busy the ASH25 pilot advised that he would call when on the ground. He asked if the pilot required a service which was declined. Later the ASH25 pilot telephoned and advised that he would be filing an Airprox.

ATSI reports that an Airprox was reported by the pilot of an ASH25 glider when it came into proximity with a BE200 at altitude 4000ft between Popham and New Alresford.

The ASH25 had departed Lasham and was operating VFR along a 'cloud street' with 'many other gliders'. The ASH25 flight was not in receipt of an air traffic service.

The BE200 flight en-route to Switzerland was in contact with Farnborough LARS (W) on 125·250MHz.

ATSI had access to both pilots' reports, LARS controller report, recorded area surveillance and transcription of frequency 125·250MHz. In addition ATSI contacted the BE200 operator to discuss aspects of the flight plan for that day's flight. Due to elapsed time a copy of the flight plan filed was not available. ATSI also discussed aspects of flight planning and activation with Farnborough ATC.

The prevailing weather in the vicinity of Farnborough and Southampton was:

METAR EGLF 191520Z 25012KT 220V280 CAVOK 13/M00 Q1033=

METAR EGHI 191520Z 28006KT 220V310 9999 FEW048 12/M01 Q1033=.

Prior to departure, normal practice for the BE200 operator was to telephone 'London' and request activation of the flight plan. At the same time, 'London' would customarily instruct the pilot to route on track CPT whilst remaining clear of CAS, issue an airways SSR code and pass the London frequency to call for join. On this occasion, 'London' was unreachable via telephone. The pilot decided to depart and call RAF Benson. After a short service from Benson it was suggested that the BE200 flight continue en-route by calling Farnborough LARS.

At 1523:00 the BE200 flight called Farnborough LARS (W). The ac was 9·2nm NE of CPT at altitude 4400ft. Details were passed and the pilot requested activation of the flight plan to Berne. Having confirmed the BE200's time of departure the LARS controller stated that the flight plan would be activated. Farnborough ATC stated to ATSI that having received the details, unit procedure would be for the controller to request the unit assistant to forward the details to Flight Plan Reception and request activation of the plan.

The BE200 continued towards CPT at 4400ft and was allocated SSR code 0433. The LARS controller informed the BE200 pilot that it was a BS; however, this was not read-back.

At 1527:10 the BE200 pilot requested a radar heading for MID. At the time the ac was established on a track of 175°, 7·1nm S of CPT at altitude 4400ft. The LARS controller noted it was a BS and offered a steer to MID of 130°.

At 1530:00 the BE200 pilot called the LARS controller stating that the BE200 was becoming, "…*squeezed by airspace all around us and above us in a minute is there a chance you could er give us a er traffic service and a steer round the airspace on the way towards Midhurst."* The controller replied with a steer of 110°; however the request for a TS made within the exchange was not acknowledged. This was answered by the pilot, "*yeah I know the steer to get there I just wanted to keep us out of controlled airspace we're at flight level correction four thousand four (1530:20) hundred feet at the moment…"*

[UKAB Note (1): The Heathrow/Gatwick radar recordings at 1530:02 shows the BE200 5·2nm W of Lasham at altitude 4300ft on a track of 160°, speed 249kt. 2·7nm ahead of the BE200 in its 11 o'clock is a primary only position indication symbol tracking 325°. Correlating this primary return to the ASH25's GPS data-logger confirms its identity as the ASH25 glider. The 2 returns continue to converge, the ASH25's return exhibiting track jitter, appearing to turn about 10° L onto 315° before it fades at 1530:22 in the BE200's 1130 position range 0·25nm. The CPA occurs during the ASH25's radar fade period as the BE200 is seen on the next sweep maintaining altitude 4300ft QNH and passing abeam the ASH25's last recorded position. Taking into account the ASH25's speed and track, it is estimated the ac pass with <0·1nm horizontal separation. The ASH25 data-logger recorded the gliders GPS altitude at 1530:22 as 4029ft and at 1530:30 as 3980ft.]

The ASH25 pilot reported that the back seat pilot had initially spotted the BE200 'to the right'. After the encounter the pilot initially contacted Solent Radar for details of the other ac. As Solent had no knowledge of the traffic it was suggested that the ASH25 pilot contact Farnborough LARS.

At 1530:30 the BE200 pilot asked LARS, "…*are you working on a plan for us?"* The LARS controller replied that the plan had been activated. The BE200 pilot then asked for an airways joining clearance. The LARS controller replied, "*sorry wasn't clear you wanted to join…"; "yeah flight level two seven zero Midhurst,"* replied the pilot.

At 1531:40 the ASH25 pilot called Farnborough LARS (W) and was instructed to stand-by. The controller then broke the transmission to instruct the BE200 flight to route towards GWC and issued an airways SSR code. Upon receiving the pilot's read back the controller then cleared the BE200 to join CAS and contact London Control.

The LARS controller called back the ASH25 flight at 1533:10 and there followed a conversation whereby the ASH25 pilot enquired as to whether or not Farnborough had been working a light twin in the area. The ASH25 pilot declined any further service and noted that a call would be made to Farnborough once the aircraft had landed.

Both ac were operating in Class G airspace where the responsibility for collision avoidance rests with the pilots.

The identity of the primary position indication symbol cannot be verified as the reporting ASH25 glider; however, the time, location and level of the encounter suggested a strong possibility that the primary symbol is the ASH25.

IFR flight plans, as filed by the BE200 operator, are handled through the European Integrated Initial Flight Plan Processing System (IFPS). Upon activation of the flight plan, the necessary fpss would have been produced across the relevant London sectors. However, Farnborough, not being a unit normally associated with the flight plan route, would not receive full active details of the BE200's flight. Therefore, even though the Farnborough controller took steps to activate the BE200's flight plan the controller would have had no more details about the flight's intentions other than that passed by RT.

The BE200 had been on the Farnborough LARS frequency for 7·5min before it became known to the controller that the BE200 wished to join CAS. It then took only just over a minute for the Farnborough controller to arrange an airway join with London Control. Farnborough ATC stated to ATSI that unit procedures are in place between Farnborough and LTC for flights calling in the FIR and requesting to join CAS.

When providing a BS, controllers have no obligation to pass TI but, should a controller consider that a definite risk of collision exists, a warning may be issued. Farnborough LARS does not have access to the composite multi-

radar surveillance picture used in this investigation. Therefore, it is not possible to say whether or not the same primary symbol observed in this investigation was depicted on the Farnborough LARS (W) situation display.

The Airprox occurred in Class G uncontrolled airspace at altitude 4000ft, 5nm SW of Lasham. The BE200 was under a BS and the ASH25 was not in receipt of an air traffic service. In accordance with the notified procedures for flight in uncontrolled airspace the pilots involved were responsible for collision avoidance.

ATSI elected to follow-up with the operator their procedure for joining CAS on an IFR flight plan. It was suggested to the operator by ATSI, that they might consider including Farnborough as an addressee on their flight plan and, additionally, it was suggested that the operator might consider approaching Farnborough ATC to discuss their operations.

[UKAB Note (2): The RoA Regulations Rule 9 Converging states:-

'(1) Subject to paragraphs (2) and (3) and Rules 10 (Approaching head-on) and 11 (Overtaking), aircraft in the air shall give way to other, converging aircraft as follows:

(a) flying machines shall give way to airships, gliders and balloons;

(b) airships shall give way to gliders and balloons;

(c) gliders shall give way to balloons.

(2) Mechanically driven aircraft shall give way to aircraft which are towing other aircraft or objects.

(3) Subject to paragraphs (1) and (2), when aircraft are converging in the air at approximately the same altitude, the aircraft that has the other on its right shall give way.']

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar vi

The BE200 pilot saw the glider at 4nm and altered course slightly to the R, but believed he did not need to give way and should have maintained course and speed. This R turn, Members noted, was in accordance with the RoA for situations where ac are approaching head-on; however, irrespective of the geometry, the overarching Rule was Rule 9: gliders have right of way over powered ac. The flightpath flown by the BE200 pilot had led the ASH25 pilot to commence a descent to avoid the BE200 when he saw the BE200 at a late stage approaching from his R at about the same level. Owing to the disparate separation distances reported, Members were concerned as to whether the BE200 pilot had seen the reporting pilot's glider, or another one. The geometry described by the BE200 pilot of the ASH25 approaching from his 11 o'clock, moving to his L and commencing a descent were correct; however, the minimum separation of less than 0.1nm shown on radar was far closer than the 0·5nm reported by the BE200 pilot and more in line with the glider pilot's report of having read the BE200's registration as it flew above him. Members agreed that, if he had seen the reporting glider, the BE200 pilot should have given it a wider berth. Immediately prior to and at the CPA the BE200 crew was involved in a lengthy RT exchange with LARS W requesting a TS, a steer around CAS and asking whether Farnborough was obtaining an airways joining clearance which may have been a distraction at the time. Following much discussion, Members were in 2 minds on deciding a cause, depending on whether or not the BE200 crew saw the ASH25. If the BE200 pilot had not seen the ASH25 and was reporting on an encounter with another glider, the cause was a non-sighting by the BE200 crew and a late sighting by the ASH25 pilot. In the end, on the balance of probability, Members believed the BE200 crew had seen the ASH25 but had flown close enough to it to cause its pilot concern.

Turning to risk, the BE200 crew was content that their early turn was enough to provide adequate separation from the ASH25, estimating it passed 200-300ft below and 0·5nm clear to their L. From the ASH25's cockpit, the pilot saw the BE200 late and elected to descend, passing an estimated 100ft below it. Although this had been a close encounter, the actions taken by both pilots were enough to persuade the Board that any risk of collision had been effectively removed.

Members were disappointed that the BE200 pilot questioned the value of Airprox reporting in these circumstances. The value of investigating an incident can only be determined once the investigation is completed and appropriate lessons identified. This incident has served to provide reminders about Rules of the Air and the risks of focussing a visual search on a specific aircraft to the detriment of all-round look-out. It should also be seen in context. There are several Airprox occurrences each year involving gliders that cannot be investigated fully because the glider in question could not be traced and therefore no report was available from the pilot. This represents missed opportunities for identifying lessons and the BGA is seeking to encourage glider pilots to submit reports. This initiative should be welcomed as a positive step in promoting safety and an open reporting culture, to the benefit of all aviators sharing crowded UK airspace.

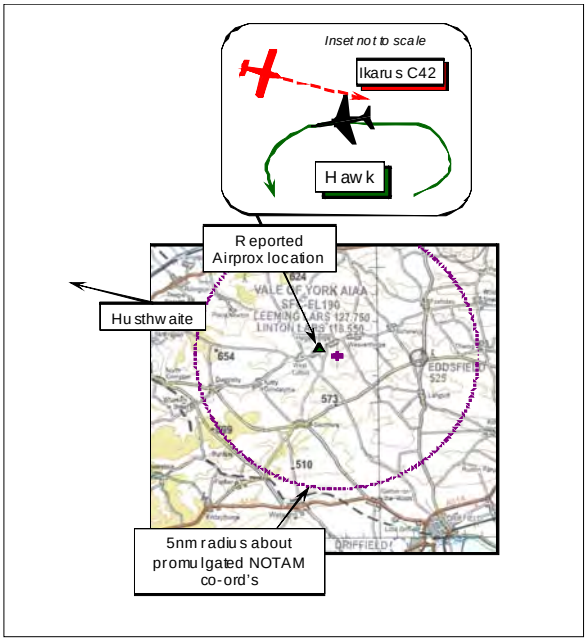
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The BE200 pilot flew close enough to cause the ASH25 pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 2012041

Date/Time:	21 Mar 2012 1335Z	
Position:	5407N 00034W (3½nm W of Eddsfield A/D - elev: 525ft	
Airspace:	Vale of York AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk TMk1	Ikarus C42 ML
Operator:	HQ Air (Ops)	Civ Trg
Alt/FL:	2000ft	2300ft
	RPS (1030hPa)	QNH
Weather:	VMC CLBC	VMC In Haze
Visibility:	10km	7km
Reported Separation:		
	50ft V/500ft H	200ft V/500m H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe HAWK T Mk1 PILOT reports he was flying a dual training sortie for the Joint Forward Air Control (FAC) Training Support Unit (JFACTSU) under VFR in VMC, clear of cloud with an in-flight visibility of 10km. He was not in receipt of an ATS, but in communication with the FAC on 280·725MHz and 137·600MHz.

Flying level at 2000ft BARNSLEY RPS (1030hPa), in a 60° AOB L turn through 250° at 300kt whilst receiving an RT briefing from the ground team for a close air support task, a light ac – the C42 ML - was spotted 500ft away in the RH quarterlight at a similar altitude. The PF immediately rolled wings level as the other ac passed about 50ft above and slightly behind the Hawk with a 'medium' Risk of collision. He estimated the closest horizontal separation was 500ft.

A NOTAM had been issued for the Exercise (Y0964/12), which included contact frequencies for the FAC - C/S JACKPOT CONTROL – on VHF of 137·600MHz and for UHF 335·700MHz. The FAC had not received any calls from the C42 ML pilot and the Airprox occurred towards the centre of the 5nm diameter NOTAM'd airspace. An information RT call was made to the nearby Eddsfield A/D at the start of the sortie, but with no response. A further call was made to Eddsfield after the Airprox without response. The C42 ML was observed departing the area to the E, but it did not appear to make an approach to Eddsfield A/D.

UKAB Note (1): Eddsfield is an unlicensed A/D situated 2¾nm E of the notified NOTAM co-ordinates at an elevation of 525ft amsl. The Eddsfield website indicates that an 800m x 20m grass strip is orientated RW09LH/ 27RH with an A/G Station – C/S Eddsfield RADIO - operating on 134·00MHz.

THE IKARUS C42 MICROLIGHT (C42 ML) PILOT reports he was flying his 2nd solo NAVEX as a student ML pilot with a total of 7 hours solo flying time at that point. Departing from Husthwaite he was inbound to Eddsfield whilst in communication with Husthwaite RADIO on 118·600MHz. The ML is coloured white and the tail mounted strobe was on; no SSR is fitted.

Heading 105°, flying straight and level at about 2300ft amsl and 65kt some 15min into the flight he noticed a Hawk ac in his 11o'clock position >500m away, which crossed his flight path from his 11o'clock to 2o'clock as it banked to port and descended, passing about >500m in front of his ML at the closest point. No avoiding action was necessary on his part, as the Hawk pilot had already taken the necessary action so he carried on and landed at Eddsfield.

UKAB Note (2): The Y series NOTAM Y0964/12 referred to by the reporting Hawk pilot was issued by LF Ops for the benefit of military aircrew. NOTAM H0726/12 was issued by the UK NOTAM Office promulgating the following warning for civilian aviators:

EGTT/QWELW/IV/BO /W /000/190/5407N00032W005
A) EGTT B) 1203210905 C) 1203211635
E) FORWARD AIR CONTROL EXER. A 2 FAST JET ACFT WILL CONDUCT HIGH ENERGY MANOEUVRES WI 5NM RADIUS OF 5407N 00032W (YORK WOLDS, N YORKSHIRE). ACFT MAY OPR OUTSIDE THE GIVEN AREA. MAJORITY OF ACTIVITY 5000FT AGL AND BLW. CREWS WISHING TO TRANSIT THE AREA SHOULD CTC JACKPOT CONTROL 335.700MHZ OR 137.600MHZ. CTC 01677 456161 OR 07785992496 AND 07770855367. 12-03-0332/AS 3 F) SFC G) 19000FT AMSL).

UKAB Note (3): The LATCC (Mil) radar recording does not illustrate this Airprox. The Hawk is shown squawking A7001 and established in a LH orbit within the NOTAM'd airspace. At 1333:12, the Hawk is shown at 1500ft unverified Mode C (1013hPa) - about 2000ft (1030hPa) - turning L through 250° before descending further and tightening the orbit. The Ikarus C42 ML is not shown at all. The reported Airprox location lies on a direct track from Husthwaite to Eddsfield about ¾nm WNW of the promulgated NOTAM co-ordinates.

UKAB Note (4): A subsequent telephone conversation with the C42 ML pilot's instructor revealed that he and his student had reviewed applicable NOTAMs before the flight and were aware of the NOTAM promulgating the FAC training exercise with the contact frequency/telephone number. The Instructor stated that he preferred to maintain continuous contact with his student on the Husthwaite frequency, rather than brief the student to switch to JACKPOT.

UKAB Note (5): Further discussions with the Hawk PIC revealed that the VHF frequency assigned to the Unit to permit air-to-ground co-ordination by non-exercise players is at the very extremity of the air VHF spectrum. Frequency 137.600MHz cannot be accessed by 760 channel VHF sets nor older 720 channel equipments, which has been a continuing source of difficulty for the Unit. Requests for a lower frequency allocation accessible by all commonly used VHF DSB AM radio sets has so far proved fruitless. It was also revealed that there is no formal routine procedure for contacting A/Ds in the vicinity of their notified Exercises – in this case Eddsfield - prior to operating there other than the publishing of a NOTAM, which contains telephone contact numbers and frequencies. However some of the FAC instructors do telephone the A/D on the day of the activity using the contact details on websites etc. and also using the A/D's published frequency. The Hawk pilot advises that other than his own two attempts to contact Eddsfield from the air by VHF during the sortie on 21 Mar, he believes no other attempt to contact them was made on this day. However, subsequent to this Airprox, when using this location the Unit has elected to implement a formal procedure to contact Eddsfield by telephone on the day before and on the actual day of the Exercise.

HQ AIR (OPS) comments that the Hawk crew saw in time to assess any collision risk and take appropriate action, although none appears to have been required in this case. The NOTAM process serves two purposes; primarily, it highlights to other users of the specific airspace the high likelihood of encountering military flying activity in the hope that their awareness is increased and to allow them to minimise their risk by focussing lookout or avoiding the area; secondly it mitigates the slight loss in lookout effectiveness necessitated by the close air support tasking. The ML pilot does not mention any consideration of the NOTAM and does not report attempting to contact the FAC on the frequency provided. Had he done so, a degree of coordination would have been possible in order to reduce the risk of collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings and comment from the appropriate military operating authority.

Notwithstanding the existence of a NOTAM promulgating the Hawk pilot's Exercise, Members understood that each of the pilots involved here was flying legitimately in Class G airspace where 'see and avoid' prevailed. Evidently the Hawk pilot had played his part in trying to contact Eddsfield at the commencement of the sortie; however, Members were concerned that the Exercise had been planned to operate only 3nm to the W of another A/D without prior co-ordination being effected by the directing staff beforehand. Irrespective of whether it is a small

unlicensed A/D or not, Members perceived that a courtesy telephone call to the A/D operator to ascertain the activity at the A/D before the Exercise took place was a helpful prerequisite to mutually safe operations in the Vale of York AIAA. Consequently, the Board was reassured to learn that as a result of this Airprox improvements have subsequently been made to the co-ordination arrangements for FAC training exercises.

It was apparent that, despite the NOTAM advising pilots to contact the FAC on the RT whilst in transit, the Ikarus C42 pilot's instructor wished to maintain RT contact with his inexperienced student throughout the latter's transit to Eddsfield. Some Members understood the instructor's desire to monitor the C42 student pilot closely, which would allow the student to communicate quickly if he encountered any difficulty, although it seemed that the student pilot would have to leave the frequency anyway and switch to Eddsfield RADIO prior to landing. Whilst encountering military ac at low-level in the Vale of York AIAA might be commonplace, and indeed the C42 pilot's base at Husthwaite is close to Topcliffe and Linton-on-Ouse, the Board considered that the instructor could have heeded the advice contained in the NOTAM more conscientiously. However, Members recognised that the NOTAM was advisory in nature and did not compel the instructor to take any action, or that the C42 Student pilot need remain outside the promulgated airspace, so this was entirely a matter of airmanship. Experienced pilot Members were more concerned that the instructor had tasked his student to fly through an area where potentially two fast-jet ac might be encountered conducting high-energy manoeuvres, albeit that only one flew this day. Clearly the 5nm radius around the published co-ordinates had to be penetrated in order to arrive at Eddsfield, but some Members wondered if it might not have been more sensible to dispatch the Student to another A/D this day, where there was not such a high probability of encountering an unpredictable, manoeuvring fast-jet. Alternatively it would have been advisable to liaise with the JFACTSU on the telephone number given in the NOTAM before the flight to determine whether there were suitable periods during the day when the Hawks would not be airborne and/ or to alert the FAC and the Hawk pilots to the planned timing of the Ikarus' flight.

It had not been possible to ascertain if the radio available to the C42 student pilot was capable of selecting JACKPOT CONTROL's frequency, but Members recognised that a student pilot of very limited experience might find calling a FAC a daunting prospect and shy away from it. Furthermore, the Board was concerned that the Unit's allocated VHF frequency was not the most suitable if it was deemed desirable for civilian pilots to have the facility to call JACKPOT CONTROL; the ability of civilian pilot's to contact the FAC was severely impaired by this high frequency outwith the selectable range of a significant proportion of civilian GA transmitter/receivers. The Board was briefed that the JFACTSU supported by HQ AIR Cmd had requested the allocation of a lower VHF frequency to facilitate deconfliction with civil traffic. The DAP Advisor explained to the Board the difficulties of VHF frequency allocation in the UK and that there was a chronic shortage of any spare frequencies within the VHF 'air' band. Therefore this was not an easy problem to solve, but advised that work was continuing with the aim of finding an alternative frequency for use by the Unit.

The Student C42 pilot reports seeing the Hawk manoeuvring – banking to port and descending - at a range in excess of 500m. However, in the Board's view he might well have seen the jet a little later than he estimates as he also states that no avoiding action was necessary on his part as the Hawk crew was already taking action. As the Hawk PIC reports the PF saw the smaller C42 ML 500ft away, pilot Members agreed this was less than ideal and the Board concluded that the Cause of this Airprox was a late sighting by the pilots of both ac. Despite the late sighting by the Hawk PF, he saw the C42 in time to assess the situation and was prepared to take robust action should it have been needed. However, this was not necessary in this case as he rolled wings level whilst the C42 passed above and astern. The Board concluded, therefore, that no Risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the pilots of both aircraft.

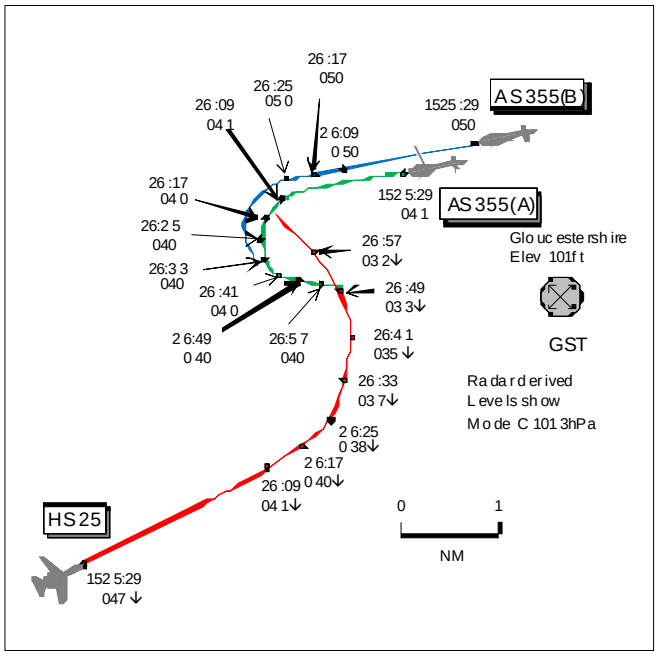
Degree of Risk: C.

AIRPROX REPORT No 2012042

AIRPROX REPORT NO 2012042

Date/Time: 22 Mar 2012 1527Z
Position: 5154N 00214W (2·5nm W GST - elev 101ft)
Airspace: LFIR (Class: G)
Reporter: Gloucestershire APP

	1st Ac	*2nd Ac*
Type:	AS355 (A)	HS25
Operator:	Civ Trg	Civ Comm
Alt/FL:	FL40 QNH	↓2500ft
Weather:	VMC CLNC	VMC NR
Visibility:	>10km	>10km
Reported Separation:	400m H	>500ft V
Recorded Separation:	>700ft V/0·2nm H OR Nil V/2·3nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLOUCESTERSHIRE APP reports that the RW in use was RW09 LH cct and at about 1520Z Filton pre-noted the HS25 inbound, IFR and coordinated at 3000ft QNH 1026hPa; both units were very busy at the time. The subject AS355 (A) was in the GST hold at FL040 whilst another AS355 (B) from the same company was also in the hold at FL050. A fast moving contact was observed on primary radar about 10nm to the SW routeing NE'bound towards the GST. Two blind transmissions were made to the HS25 flight with no success. After a third transmission the HS25 crew replied (approximately 4nm SW of GST) stating they were at FL050 descending to 3000ft. Essential TI was passed immediately to the HS25 flight on the GST holding traffic at FL040 and FL050 to which the crew replied they were visual. Essential TI on the HS25 was also passed to both AS355 flights. AS355 (A) pilot reported that the HS25 had just passed O/H, he thought [actually under], by about 400ft. The pilot was asked if he wished to file an Airprox to which he replied he would call on the ground.

THE AS355 (A) PILOT reports inbound to Gloucestershire, IFR and in receipt of a PS from Gloster Approach, squawking 7000 with Mode C. The visibility >10km in sky clear VMC and the helicopter was coloured blue/gold with anti-collision beacon, nav and strobe lights all switched on. The HP's (student) forward visibility was impaired by IF screens required for IR training. While holding at GST at FL040, heading 094° flying out of sun on the inbound leg at 105kt, separation under a PS was compromised by a HS25 descending through both his level and that of another company AS355 (B) established in the hold at FL050. The HS25 flight was on frequency but not receiving a service. No avoiding action was taken by him or AS355 (B) commander as ATC informed both flights of the approaching HS25 approximately 10sec before both AS355 pilots became visual. The speed of the HS25 and late sighting did not allow for avoiding action but neither he nor the commander of AS355 (B) felt their ac were in danger. The HS25 was descending rapidly, passing through his level about 400m away while it was turning beacon outbound. He assessed the risk as none. As the incident occurred in Class G airspace and involved an ac not receiving a PS, little could be done to prevent such an event by either commander. He opined that the procedure and its execution selected by the HS25 Capt had added to the incident as an ac of this weight and speed would normally fly a DME arc to the FAT and not fly directly to the GST to fly a non-standard join.

THE HS25 PILOT reports inbound to Gloucestershire IFR and in communication with Gloster Approach squawking with Modes S and C. The visibility was >10km in VMC and the ac was coloured white/grey with anti-collision beacon, strobes, landing and nav lights all switched on. Turning L outbound at the GST descending to

2500ft, he thought [actually 3000ft], QNH at 180kt flying out of sun a TCAS TA alerted them to traffic and they saw 2 helicopters, he thought 250m away [see ATSI report], and above his ac by 500ft or more. No avoidance was undertaken owing to the visual sighting and he assessed the risk as none.

UKAB Note (1): The hold is a 1min LH racetrack QDM 094°. The Gloucestershire NDB(L)/DME procedure is outbound GST track 284° (CAT A,B) or 296° (CAT C) at 2800ft descending to 2200ft to GOS 8DME turn L to intercept the FAT 093°. The alternative procedure is to extend the outbound leg of the NDB(L) GST holding pattern descending to 2200ft then continue as the Main Procedure.

ATSI reports that the Airprox occurred at 1526:53 UTC, 2·5nm to the W of Gloucestershire Airport (Gloster), within Class G airspace, between an AS355 helicopter and an HS25.

The AS355 (A) was inbound IFR from Blackbushe (EGLK), operating on an instrument training flight and holding at FL040 at the Gloucestershire NDB (GST). A second AS355 (B) was also holding at the GST at FL050.

The HS25 was inbound IFR from Madrid-Torrejon Airport (LETO) and prior to being transferred to Gloster Approach was in receipt of a TS from Filton Radar. The Filton Radar controller reported traffic levels as medium and workload as medium/heavy. Filton Radar is promulgated to provide a LARS between the hours of 0800 – 1800 (Local) Monday – Friday, excluding public holidays, within a radius of 30nm from Filton up to FL95.

The Gloster Approach controller, who was providing an Approach Control (Procedural) Service from a position in the VCR, reported traffic levels as medium and workload as medium/heavy. The Radar room is situated on a floor below the VCR and the radar system has an additional slaved display in the VCR, which is approved for use as an ATM.

Gloucestershire Airport is equipped with a Primary Radar System, without SSR surveillance capability and limited coverage due to the narrow beam width, tilt mechanism and radar overhead limitations. The AIP entry for Gloucestershire Airport AD 2-EGBJ states:

'Radar services (Primary only) within 25nm below FL80, availability subject to manning. Use of 'Radar' suffix denotes availability only. Provision of a specific radar service is not implied Designated Operational Coverage (DOC) 25nm /7000ft.'

CAA ATSI had access to RT recordings for Gloster and Filton, NATS area radar recording, together with the written reports from the 2 pilots concerned and the Gloster Approach controller. The Gloster Airport METAR was provided:

EGBJ 221520Z 07009KT 9000 NSC 18/02 Q1026= and EGBJ 221550Z 08009KT 040V120 9000 NSC 18/03 Q1026=

Gloster ATC had accepted the 2 AS355s for training. At 1504:02 the first helicopter, AS355 (A) flight, was cleared to the GST at FL040 with no delay and the pilot was instructed to report taking up the hold. This was acknowledged and a PS was agreed. CAP774 Procedural Service, Chapter 4, Page 5, states:

'A Procedural Service shall only be provided by controllers at ATC units with Regulatory approval to provide such a service. Controllers at ATC units that do not have surveillance information available may routinely apply Procedural Service to pilots of aircraft carrying out IFR holding, approach and/or departure procedures without the need to first elicit the pilots' requirements; however, for other flights the type of service required is to be confirmed.'

'A controller shall provide deconfliction instructions by allocating levels, radials, tracks, and time restrictions, or use pilot position reports, aimed at achieving a planned deconfliction minima from other aircraft to which the controller is providing a Procedural Service in Class F/G airspace.'

At 1509:33, the Filton radar assistant contacted Gloster with an inbound estimate (1523) and level (3000ft) for the helicopter AS355 (B). The Gloster controller replied, *"Okay flight level five zero for him please."* This was acknowledged by the Filton assistant.

AIRPROX REPORT No 2012042

At 1510:33, AS355 (A) flight reported entering the hold at FL040 and the pilot was asked to report ready for the approach.

At 1512:00, Cardiff Radar advised Gloster that the HS25 was positioned 5nm S of EXMOR, estimating Gloster in approximately 10min and likely to be working Bristol after Cardiff.

The Gloster controller later indicated that his plan was to keep the 2 training helicopters in the hold at FL040 and FL050, in order to allow the HS25 to make an approach first. The Gloster controller decided to allocate 3000ft for the HS25, with an expectation that Filton Radar would transfer the flight once it reached 3000ft. The controller then intended to offer the HS25 pilot the option to carry out the direct (8DME arc) arrival, which would expedite the arrival sequence.

(Note: The RW09 direct arrival from the SW, when approved by ATC, requires the inbound to cross the IAF GOS D10 at 2800ft and then turn L to intercept the GOS DME 8 ARC arrival).

The Gloster controller had earlier requested information about the HS25 from Filton. At 1516:37, the Filton Radar assistant returned the call and the following telephone exchange occurred:

Gloster controller: "Gloster Approach."

Filton assistant:"Filton Radar Assistant."

[Filton reported that a pre-note had been received on the HS25 from Cardiff]

Gloster controller:"Cardiff told me he was about he was at Exmor I think about

five minutes ago."

Filton assistant:"er yes he's about ten miles northeast of Cardiff at the

moment."

Gloster controller:"Ten miles northeast of Cardiff roger is he going to be working

you."

Filton assistant: "Sorry say again."

Gloster controller:"Is he going to be working you."

Filton assistant:"He will yes."

Gloster controller:"Okay could I have him at altitude three thousand feet then

please."

Filton assistant:"Three thousand feet."

Gloster controller:"My QNH one zero two six."

Filton assistant: "One zero two six for (HS25 c/s)."

Gloster controller:"Ah standby please."

At 1517:40, during the pause in the conversation, the HS25 flight contacted Filton Radar reporting in the descent to FL080 routeing direct to the GST. The Filton Radar controller was not involved in the conversation with Gloster but became aware that Gloster had given an acceptance level of 3000ft. The controller could be heard in the background saying that he thought this was incorrect because he thought an earlier ac had been allocated 4000ft. The telephone conversation with Gloster then resumed:

Gloster controller:"Sorry Filton say again."

Filton assistant:"That's alright can you confirm three thousand feet for the."

Gloster controller:"Altitude three thousand feet please one zero two six."

Filton assistant: "Okay and you gave another one four thousand I think earlier is that right."

Gloster controller:"Er sorry four thousand."

Filton assistant:"Okay."

Gloster controller:"Er no no no er I've got one in the hold at four zero."

Filton assistant:"Right Okay that's alright I just as 4000ft feet had been allocated to an earlier arrival right okay alright I just ???????."

Gloster controller:"Sorry I've got er about twenty aeroplanes calling me at the moment."

Filton assistant:"Okay is there anything further you need."

Gloster controller:"Er no three thousand feet the one zero two six."

Filton assistant:"Three thousand feet one zero two six for (HS25 c/s)."

Gloster controller:"Affirm."

The Filton assistant, having confirmed 3000ft, then annotated the fps with red ink, 3000 Q1026, and handed the strip to the Filton Radar controller. It was not clear if the Filton assistant made the Filton controller aware of the traffic holding at FL040. At 1518:01, the HS25 was 16·8nm WNW of Filton, passing FL086 in the descent with 36·8nm to run to Gloucestershire Airport.

At 1518:55, the AS355 (A) pilot reported ready for the procedure next time over the beacon. The Gloster controller responded, *"…maintain the hold flight level four zero I got airways traffic inbound from the s-er southwest now at three thousand feet."* This was acknowledged by the AS355 (A) pilot.

At 1519:34, AS355 (B) flight contacted Gloster Approach, reporting 6DME to the S and passing FL040 for FL050. The AS355 (A) was in the GST hold at FL040. The Gloster controller instructed the AS355 (B) pilot to report level FL050 and then passed essential TI to the pilots of AS355 (A) and AS355(B) about each other.

At 1521:56, AS355 (B) pilot reported level at FL050 and was instructed to report taking up the hold.

At 1522:42, the AS355 (A) pilot reported inbound to the beacon (FL040) requesting an update. The Gloster controller responded, *"(AS355(A) c/s) er affirm I believe that er the Hawker traffic is now about eleven miles er sorry fourteen miles southwest of the field so er expect to go outbound shortly I'll call you back."* This was acknowledged and the controller added, *"If you go once more round the hold then expect to go erm outbound after that one."* The AS355 (A) pilot relied *"Wilco."*

At 1522:50, the HS25 was 16·3nm SW of Gloucestershire Airport maintaining FL050, having passed over 4 contacts in the area at altitudes 2000ft, 2900ft, 3400ft and 2100ft. A number of other ac are shown in the vicinity of Gloucestershire Airport with 3 SSR labels garbled and overlapping. These contacts were the 2 AS355 helicopters at FL040 and FL050 and, unknown to the Gloster controller, a third contact indicating FL048 is shown

tracking SE through the holding pattern and passing 0·5nm behind the AS355(B) as it approached the GST. (This ac was squawking 3710 and was subsequently traced as a Tucano, believed to be in receipt of a TS from Brize Norton).

At 1523:45, the Gloster controller called the HS25 flight to check if it was on frequency, with no response.

At 1524:08 the AS355 (B) flight reported taking up the hold at FL050 and was instructed to report ready for the approach.

At 1524:25, the HS25 was at a range of 9·6nm from the GST, indicating FL050.

At 1524:41, the Gloster controller again called the HS25 flight, with no response. The controller advised the AS355(A) pilot, *"...there may be a further delay er I haven't actually got the aircraft yet it's still working Filton it's about seven miles southwest I was hoping he'd be doing the direct arrival from the west but er looks like he's routeing to the G S T at three thousand feet.*" The pilot replied (1525:03) *"Okay no problem happy to take a Basic Service and er continue outbound er on my ????? (AS355 (A) c/s)."* The Gloster controller replied, *"(AS355 (A) c/s) roger I'll call you back er once I've figured out what er approach this aircraft wants."*

Meanwhile at 1524:52, the Filton Radar controller instructed the HS25 pilot, to continue descent to altitude 3000ft on Gloster QNH 1026, which was read back correctly by the pilot. The HS25 was then transferred to Gloster on frequency 128·55MHz.

At 1525:21, the Gloster controller again called the HS25 flight. The HS25 pilot responded, *"Gloster Approach good afternoon (HS25 c/s) affirm we are out of five thousand feet for three thousand feet information Tango inbound G S T."* The Gloster controller responded, *"(HS25 c/s) Gloster Approach roger essential traffic in the hold flight level five zero is a twin squirrel and flight level four zero is also a twin squirrel."* The HS25 pilot replied, *"Okay sir er T-looking out."* The HS25 pilot was instructed to report reaching 3000ft and the pilot confirmed the requirement for the full NDB approach.

At 1525:29, the HS25 was passing FL047, 5·5nm SW of the GST. The 2 helicopters were to the NW of the GST, W'bound on the outbound leg of the hold at FL041 and FL050.

At 1526:03, the controller advised the AS355 (A) flight, "…*traffic which is essential to you is a Hawker which is four miles southwest descending from five thousand three thousand."* This was acknowledged by the AS355 (A) pilot. The controller then asked the AS355 (B) pilot if he had also copied that traffic and the AS355 (B) pilot acknowledged, *"Affirm."*

At 1526:17, the HS25 indicating FL040, was 2·6nm from the GST. The AS355 (A) was in the HS25 10 o'clock at a range of 2·3nm at the same level. Both ac had commenced a L turn towards each other.

At 1526:28, the Gloster controller asked the HS25 pilot to report his level. There followed a crossed transmission ending with the AS355 (A) pilot stating, *"….coming straight through my level turning straight towards me straight through the hold."* The distance between the 2 ac was 1·9nm with the AS355 (A) indicating FL040 and the HS25 indicating FL038 in the descent.

[UKAB Note (2): Immediately after the AS355 (A) transmission the Gloster controller replied, *"Roger it was actually pre-noted from Filton at three thousand for exactly that reason."* The AS355 (A) pilot then enquired, *"Er just confirm he's I F R (AS355 (A) c/s)."]*

The Gloster controller then transmitted, *"(HS25 c/s) report your level."* The HS25 pilot reported, at 1526:37, *"(HS25 c/s) is out of four thousand feet three thousand and we have er the above traffic both in sight."* This was acknowledged by the controller. The distance between the ac was 1·5nm with both ac still in the L turn towards each other, with a vertical separation of 300ft. As the 2 ac converged the vertical separation was 500ft at a range of 1nm (1526:41) and 700ft at 0·4nm (1526:49) as the HS25 crossed through AS355 (A)'s 12 o'clock.

[UKAB Note (3): The next sweep at 1526:57 shows the HS25 descending through FL032 and 0·3nm to the NNW of AS355 (A) with a vertical separation of 800ft the ac having passed. It is estimated, at the CPA shortly before this radar sweep, separation was 0·2nm/>700ft.]

The AS355 (A) pilot reported, *"...passing over the traffic er it's at least four hundred feet."* This was acknowledged by the controller who asked the pilot if he wished to file an Airprox. The pilot reported that he would decide when on the ground. The HS25 completed the NDB approach and landed without further incident.

Later the Filton Radar controller indicated that he had asked the assistant to check the 3000ft level allocated. When this was confirmed the assistant annotated the fps in red (3000 Q1026) and the fps was passed to the Radar controller. The Filton Radar controller indicated that the HS25 had contacted him when passing W abeam Filton, about 6min flying time from Gloucestershire Airport. Due to the combination of the HS25's speed, other traffic in the area, workload and the controller handover, this had caused the late transfer of communication to Gloster. The Filton MATS Part 2, Section 2, Chapter 4, Page 61, Paragraph 3.2.6, states:

'IFR traffic inbound to, or routeing within 10nm of the GST will be co-ordinated providing at least 10 minutes before ETA and transferred no less than 5 minutes before.'

The Filton RT and telephone recordings showed that the Filton Radar controller's workload was high and, in addition to the number of ac on frequency, the controller was involved in a radar handover to Brize Norton, coordination of a departure with the Tower controller and a controller handover of the radar position. The radar display was set at approximately 30nm range and showed a number of ac operating in the Gloucestershire area with SSR labels overlapping and garbled. The Filton controller indicated that during the handover to the oncoming controller, he realised that the HS25 was late in being transferred and gave the HS25 descent to the acceptance level of 3000ft and immediately transferred communication of the flight to Gloster. The Filton controller stated that with more time he would have passed generic TI and would have spoken to Gloster Approach about the traffic situation. The Filton controller stated that, had the Gloster controller communicated his plan and requested coordination, he would have either agreed or suggested an alternative plan due to the traffic situation. The Filton MATS Part 2, Section 4, Chapter 3, Page 1, Paragraph 3.3, states:

'Whilst no formal agreements exist, co-ordination is effected whenever possible between Gloucester and Filton, … Filton, Bristol and Brize Norton are tasked to provide LARS, up to FL095 and may, in certain circumstances, be able to assist in the resolution of procedural conflictions…'

Later the Gloster Approach controller indicated his workload was high due to the number of ac on frequency. When questioned, the Gloster controller reported that, whilst there were no local agreements or procedures, Filton Radar often ensured that ac were at the acceptance levels prior to the transfer of communication. The Gloster controller believed that he had in fact coordinated an acceptance level of 3000ft and advised Filton about the traffic holding at FL040. The Gloster controller's expectation was that the HS25 would be levelled at 3000ft prior to the transfer of communication.

The Gloster controller indicated that had Filton not been able to descend the aircraft to 3000ft or if the flight had been transferred from Cardiff, he would have allocated FL060 and an EAT. The controller was asked why EATs had not been allocated to any of the flights when holding was taking place. The controller indicated that he had not issued EATs for the 2 helicopters because he planned to offer the HS25 a 'direct arrival' in order to expedite the approach sequence.

The Gloster controller indicated that more effective coordination with Filton Radar would have prevented the Airprox and the Gloster ATSU reported that it is reviewing the LoA with adjacent units.

Approach Control will normally assign levels at the holding facility to adjacent area or radar units on the basis of 'lowest and earliest'. MATS Part 2, Section 3, Chapter 1, Page 2, Paragraph 14, states:

'Levels at holding facilities shall be assigned so as to permit aircraft to approach in their correct order. Normally the first aircraft to arrive over a holding facility should be at the lowest level with following aircraft at successively higher levels.'

The Gloster Manual of Air Traffic Services Part 2, Section 4, Chapter 2, Page 2, Paragraph 2.5.1, states:

'Whilst no formal release procedures are established for operations outside Controlled Airspace, adjacent units will normally pre-note arrivals, pass an estimate and/or co-ordinate an acceptance level. When an adjacent unit requests an acceptance level, APC is to issue an EAT.'

With traffic holding at FL040 and FL050, the next available level would have been FL060 with an EAT. The Gloster controller, having formulated a plan to expedite the arrival of the HS25, believed that having coordinated an acceptance level "at 3000ft" with "one in the hold at FL040," Filton radar would descend the HS25 to that level before the transfer of communication. The controller believed that this was normal practice between Gloster and Filton. This very likely predisposed the Gloster controller's thinking and belief, that having allocated 3000ft, the HS25 would be descended by radar to be level prior to the transfer of communication. None of the flights had been allocated an EAT.

It was noted that the previous inbound AS355 (B) was pre-noted by the Filton assistant, at a level of 3000ft. Gloster allocated an acceptance level of FL050 without coordination regarding the AS355 (A) holding at FL040. This resulted in a loss of the deconfliction minima when the AS355 (B) reported passing FL040 for FL050, 6nm from the GST.

The Filton assistant was asked by the Filton controller to check that the 3000ft level allocated was correct. The assistant, having checked the acceptance level of 3000ft, then confirmed the level on the controller's fps in red ink. The traffic situation was complex and the Gloster controller did not 'request coordination' or communicate his plan to the Filton Radar controller, who was the person vested with the authority to agree specific coordination. MATS Part 1, Section 1, Chapter 9, Page 5, paragraph 2, states:

'Co-ordination is the act of negotiation between two or more parties each vested with the authority to make executive decisions appropriate to the task being discharged. Co-ordination is effected when the parties concerned, on the basis of known intelligence, agree a course of action. Responsibility for obtaining the agreement and for ensuring implementation of the agreed course of action may be vested in one of the controllers involved.'

The Filton controller descended the HS25 initially to FL050. This was very likely due to the four contacts below the intended track. A combination of factors caused the Filton controller to further delay the descent and transfer of the HS25. The general traffic situation in the Gloster area was complex and labels were overlapping causing a garbling of the presented information. A handover to the oncoming controller probably distracted the controller and delayed his realisation that the HS25 hadn't been transferred. The transfer of communication was late and the Filton controller did not terminate the TS or pass generic TI.

The Gloster controller became increasingly concerned when the HS25 was not on frequency making 2 blind transmissions to the flight. The controller mistakenly assumed the HS25 was at 3000ft and was surprised when the HS25 flight called passing 5000ft for 3000ft. The late transfer of communication gave the Gloster controller little time to resolve the conflict. The controller passed essential TI to the HS25 crew and subsequently to the 2 helicopter flights.

Both controllers were operating with a medium/high workload. CAP774, Chapter 4, Page 5, states:

'High controller workload or RTF loading may reduce the ability of the controller to pass deconfliction advice, and the timeliness of such information. In the event that an aircraft that requires a Procedural Service makes contact with the controller whilst already within the deconfliction minima, controllers shall pass traffic information to all affected aircraft. In such circumstances, it is recognised that controllers cannot guarantee to achieve deconfliction minima; however, they shall apply all reasonable endeavours to do so as soon as practical.'

CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

The Airprox occurred when the Gloster controller allocated an acceptance level of 3000ft, without communicating his plan or requesting coordination to ensure that the 1000ft deconfliction minima was assured. This resulted in the HS25 descending into conflict with traffic in the GST holding pattern and into close proximity with the AS355 (A).

A number of factors were considered to be contributory:

a) The Gloster controller believed that it was normal practice to allocate an acceptance level with an expectation that Filton would climb or descend the inbound aircraft to be level prior to the transfer. This belief very likely predisposed the Gloster controller into believing that the HS25 was at 3000ft.

b) Due to a number of factors the Filton Radar controller transferred the HS25 later than was required by the Filton MATS Part 2.

c) The descent of the HS25 was delayed due to opposite direction traffic.

d) The range setting of the Filton Radar display showed a number of SSR labels in the vicinity of Gloster overlapping and garbled, which did not give the Filton controller a clear picture of the traffic situation at Gloster.

e) The workload of both controllers was high and was likely to have prevented additional discussion to clarify the situation.

Recommendations

CAA ATSI recommends that Gloster ATSU review their procedures for the allocation of levels and EATs to inbound ac in the provision of a PS, ensuring that when additional coordination is required to resolve procedural conflictions, specific coordination is agreed with the appropriate person authorised to make executive decisions appropriate to the task in accordance with the requirements of MATS Part1, Section 1, Chapter 9, Page 5.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The ATSI Advisor informed the Board that Gloucestershire ATC are reviewing the LoAs with adjacent ATSUs regarding level allocation and coordination and any amendments will be incorporated into the MATS Part 2. Controller Members agreed that several assumptions had been made by Gloster APP, which had ultimately led to the HS25 arriving in the Gloucestershire O/H and in confliction with AS355 (A). APP had informed the Filton ATSA that the acceptance level for the HS25 was 3000ft and had assumed the Filton Radar controller would ensure the HS25 was level before transferring the flight. The APP had not conveyed his plan, through coordination, to the Filton Radar controller; coordination may only take place controller-to-controller. Nevertheless, the Filton Radar controller overheard the telephone exchange between Gloster APP and the ATSA and queried the level issued, but the APP had re-iterated that 3000ft was the required level for the HS25. Because APP had not ensured the Filton controller was aware that the GST hold was occupied by 2 ac at FL40 and FL50, there was no compunction on Filton Radar to ensure the HS25 was level 3000ft well before reaching the hold such that deconfliction minima were achieved. It was unfortunate that the Filton Radar controller was busy and that there were several ac in the area which delayed the HS25's descent and he transferred the flight later than required by the MATS Part 2. This late descent and handover resulted in the APP being unable to offer the HS25 flight the DME arc procedure. However, the onus was on the Gloster APP to issue a safe acceptance level (which would have been FL60 in the circumstances) unless precise coordination had been effected, controller to controller, to ensure that the APP's plan would work. By allocating 3000ft, the APP did not ensure that deconfliction minima were achieved between the HS25 and the AS355 (A) and this had caused the Airprox.

Turning to risk, the APP had told AS355 (A) pilot that his approach would be delayed owing to the impending arrival of the HS25 at the intended altitude of 3000ft. The progress of the approaching HS25 was updated twice more to the AS355 (A) flight but each time including its erroneous level. When the HS25 flight finally called descending through 5000ft, Members commended the prompt action taken by the APP when he passed essential TI quickly to its crew on both AS355s. The APP then passed essential TI on the HS25 to AS355 (A) flight and ensured that AS355 (B) pilot had copied the transmission. The AS355 (A) pilot was undoubtedly concerned that the HS25 was not flying in accordance with the plan that the APP had communicated to him as the HS25 was seen turning towards his helicopter having descended through his level (radar shows separation as 200ft vertical and 1·9nm horizontal). Immediately after this the HS25 crew had reported sighting both AS355s above their ac, the radar showing the HS25 300ft below AS355 (A) with 1·5nm lateral separation. Thereafter the vertical separation increased as horizontal separation decreased, the subject ac passing at the CPA with >700ft vertical and 0·2nm. Although this had had the potential for being a more serious encounter, the visual sightings by both crews and

actions taken by the APP and HS25 crew were enough to persuade the Board that any risk of collision had been quickly and effectively removed.

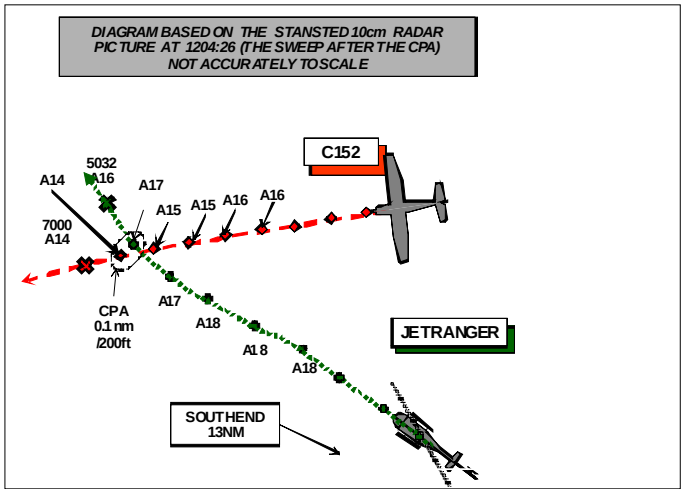
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Gloster APP allocated an acceptance level which did not ensure that deconfliction minima were achieved.

Degree of Risk: C.

AIRPROX REPORT NO 2012043

Date/Time:	22 Mar 2012 1204Z	
Position:	5139N 00022E (4nm NW Basildon)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Bell JetRanger	C152
Operator:	Civ Trg	Civ Trg
Alt/FL:	1500ft	NK
	1027hPa (QNH)	NK
Weather:	VMC Haze	VMC Haze
Visibility:	4-5km	NR
Reported Separation:	0ft V/50m H	Not Seen
Recorded Separation:	200ft V/<0.1nm H (See UKAB Note (1)).	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BELL JETRANGER FLIGHT EXAMINER (FE) reports conducting a VFR training flight from Manston to Leicester in a white and maroon helicopter with all external lights switched on; they had checked the NOTAMS for the route. At the time of the incident they were N of the Thames heading 300° at 95kt, in receipt of a BS from Farnborough LARS N and squawking as directed with Mode C; Mode S was not fitted. He had just told the handling pilot (HP) to keep a very good lookout because of the haze and especially because the clear skies and perfect sunny conditions meant that 'all the private Cessna pilots will be out and about'. His exact words were 'It's very easy to get hit on a day like this even when you're on home ground – it'll happen anytime'.

They were both undistracted with no other task being undertaken when he saw a white and grey Cessna 200m away on their right. After 3-4secs he realised they were on a converging course and said 'down, down now'.

The HP lowered the collective 'almost into autorotation'. This seemed to have no effect and the HP remained undecided as to which way to turn (L or R) away from the Cessna. The Flight Examiner (FE) said 'right, turn right', which the HP did. The FE realised the Cessna was now 'blooming' and much greater AOB was required to turn behind it so he assisted and increased the AOB to 60-70°.

As soon as they'd levelled their 'wings' the ATC controller said 'you have another ac 200ft beneath you'; the FE replied 'seen' and made an effort to calm the HP down as he was quite shaken.

He assessed the risk as being high and reported it to Southend ATC and later by telephone to Farnborough.

This type of incident will always be possible in a VFR 'see and be seen' environment when ATC have a wide area coverage with many responsibilities. Other than learning the lesson of 'vigilance' little else can be done to avoid these situations.

The Examiner reported the incident to his QA Manager who asked if anything should have been done differently. He thought however, that the pre-flight briefing had been adequate and had identified the need for workload reduction in the busy Essex-Stansted-Luton environment and this was achieved.

THE C152 PILOT reports that he was instructing on a VFR GH sortie (exercises 7 and 8.1, climbing and descending) in the Hanningfield reservoir area in a blue and white ac with external lights switched on. They were receiving a BS from Southend Radar, squawking 4575 with a Mode S compliant transponder with altitude reporting selected on.

Being unaware that an Airprox had taken place, he was uncertain of his altitude and position at the exact time of the incident; however, his airborne and landing times according to the ac tech log were 1120 - 1210.

He added that due to the nature of the exercises being demonstrated & practised, a very good lookout was maintained throughout the entire flight.

THE FARNBOROUGH CONTROLLER reports working moderate levels of traffic on LARS N when the Bell JetRanger called on frequency but he had little recollection of the event. He believed the squawk assignment was not immediately apparent as it was in an area with several other Southend squawks which appear very similar to their own as they begin with 50.

ATSI reports that a Bell JetRanger pilot reported an Airprox when his helicopter came into proximity with a C152 approximately 13nm WNW of Southend at alt 1800ft. The JetRanger was operating VFR on a flight from Manston to Leicester and was in receipt of a BS from Farnborough LARS (N). The C152 had departed Stapleford for GH manoeuvres and at the time of the incident was believed to be in contact with Stapleford Radio as it returned to Stapleford. The Farnborough LARS (N) controller was providing services with the aid of surveillance data from the Stansted 10cm radar.

ATSI had access to the pilots' reports, Farnborough LARS (N) controller's report, the Farnborough unit report and recorded area surveillance. In addition, transcription of the Southend Radar frequency [130.775MHz] was obtained. Stapleford Radio is not recorded.

Both the JetRanger and C152 pilots reported meteorological conditions as VMC in haze.

The C152 had been operating VFR in the Hanningfield area and had been in receipt of a BS from Southend Radar since 1122. The C152 was operating on the QNH of 1030hPa and was displaying the Southend Conspicuity code of 4575.

The JetRanger departed Manston at 1145 and flew W towards the Isle of Sheppey from where it turned onto a NW track. At 1151 the pilot called Southend Radar requesting a BS as it flew to the W of Southend. A BS was agreed, the QNH confirmed as 1030hPa, and a SSR code of 5060 allocated. The JetRanger pilot reported to Southend Radar at 1200:20 that they were changing frequency to Farnborough LARS and Southend instructed the JetRanger to squawk 7000. At 1200:44 the JetRanger called Farnborough LARS North, a BS was agreed and the QNH passed as 1029hPa, an SSR code 5032 was allocated and the JetRanger continued on a NW'ly track.

At 1202:40 the C152 left the Southend Radar frequency and changed to Stapleford Radio, the pilot reported changing the ac's squawk to 7000 and continued on a WSW track. At 1203:26 the C152 was in the JetRanger's 1 o'clock position at a range of 1.5nm. The ac were converging at a converted Mode C alt of 1900ft. By 1203:52 the distance between the ac had reduced to 0.8nm with the C152 coming into the JetRanger's 12 o'clock from the right and both ac were at alt 1800ft. The C152 then appeared to turn right slightly and commence a descent. At 1204:19 the C152 was in the JetRanger's 12 o'clock, range 0.1nm; the JetRanger at alt of 1800ft and the C152 at 1500ft.

At 1204:28 the LARS controller transmitted to the JetRanger, "[C/S] *you've got traffic directly underneath you by two hundred feet right to left"* and the pilot replied, "*just seen…".* As the two ac then diverged the C152 continued descending through alt 1400ft and the JetRanger descended to altitude 1600ft having commenced a turn to the right. At 1206:17 the LARS controller suggested that the JetRanger freecall North Weald but the pilot elected to call Stapleford and stated that he would return to the LARS frequency later.

The Airprox occurred when the JetRanger came into proximity with a C152 at alt 1800ft, 13nm WNW of Southend. Both ac were operating VFR in Class G uncontrolled airspace where the responsibility for collision avoidance rests solely with the pilots.

The C152 had recently transferred from Southend Radar to Stapleford Radio and the JetRanger was in receipt of a BS from Farnborough LARS (N). Under a BS, controllers with access to surveillance derived information may issue a warning to pilots if the controller considers that a definite risk of collision exists.

[UKAB Note (1): An analysis of the Stansted area radar showed the incident. It should be noted that the quoted accuracy of Mode C data is ±200ft. The JetRanger was squawking 5060 (Southend Approach) initially then 7000 and the C152 4575 (Southend Conspicuity) then also 7000; both ac were displaying Mode C alt and the C152 elementary Mode S data. At 1156 the C152 can be seen manoeuvring in the area reported as the JetRanger approaches from the SE on a NWly track. At 1200 the JetRanger passes 5nm W of Southend still tracking 310° and at 1900ft with the C152 manoeuvring in its 12 o'clock at 8nm indicating 1800ft; the ac continue to close. At 1200:37 the JetRanger changes to a 7000 squawk, still at 1900ft with the C152 3.9nm in its 1 o'clock, also 1900ft. One minute later the JetRanger changes squawk to 5032 (alt 2100ft) (Farnborough LARS) and at 1202:50 the C152 changes to 7000 (alt 1900ft) while in the JetRanger's 2 o'clock at 2nm. The ac continue to close on a line of constant bearing, the JetRanger descending to 1900ft, then at 1203:52 both ac indicate 1800ft with the C152 0.7nm in the JetRanger's 1 o'clock. At 1204:09 the C152 is in the JetRanger's 12 o'clock at 0.2nm, the former having descended to 1600ft and the JetRanger having turned about 10° to the left but remaining at 1800ft. On the next sweep the C152 (1500ft) is in the JetRanger's (1700ft) 12 o'clock at 0.1nm and on the following sweep the ac had crossed with less than 180m separation, the C152 indicating 1400ft and the JetRanger 1600ft.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controller involved and reports from the appropriate ATC authority.

A number of Board Members questioned why the JetRanger crew's first action was to attempt to descend to avoid collision when the radar replay indicated the C152 was slightly lower. The helicopter pilot Members opined that a probable poor horizon combined with the limited manoeuvre energy of the helicopter would predicate the pilot's response as being a descent in order to achieve separation in the most timely manner.

Members were of the opinion that the JetRanger crew would have been better placed by requesting and receiving a TS rather than a BS. One controller Member opined that the JetRanger crew may not have asked for a TS on the basis that it was unlikely they would have been accommodated. However, Members did not view this as a valid reason not to ask for a TS and agreed that pilots should always ask for the service most appropriate to their task and the Wx conditions.

The reported first sighting range of 200m was a late sighting by the JetRanger crew. From the geometry of the radar replay it would appear that in addition to being on a constant bearing, the JetRanger may have been occulted by the C152's L wing, resulting in a non-sighting by the C152 pilot. Given the series of manoeuvres required by the JetRanger crew to avoid collision, and the radar-recorded separation of less than 0.1nm and 200ft, the Board were of the opinion that the safety of the ac were compromised.

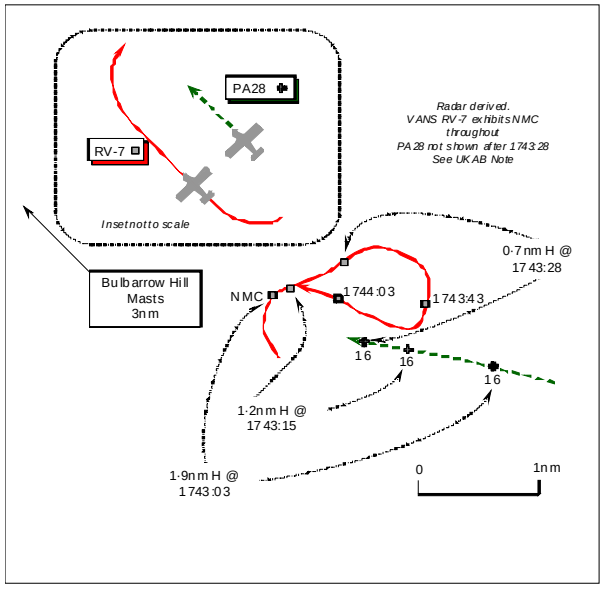
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the JetRanger pilot and a non-sighting by the C152 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 2012044

Date/Time:	23 Mar 2012 1745Z	
Position:	5051N 00219W (Vicinity of Bulbarrow Hill Masts - 16nm SE of Yeovilton)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28-151	VANS RV-7
Operator:	Civ Club	Civ Pte
Alt/FL:	2000ft	2200ft
	RPS (1026hPa)	QFE
Weather:	VMC CLBC	VMC CAVOK
Visibility:	15km	35km
Reported Separation:		
	Nil V/40m H	Nil V/150m H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER PA28-151 PILOT reports he was the co-pilot and PNF during a dual local flight originating from Yeovilton. The PF was navigating, whilst he as the PNF was operating the RT and acting as safety pilot. Bournemouth RADAR was providing a BS on 119·475MHz, that had been downgraded by ATC from a TS prior to the Airprox because of radar coverage. A squawk of A7000 was selected with Mode C initially and then the code changed to A7365 at the request of Bournemouth ATC; neither TCAS nor Mode S is fitted.

Returning to Yeovilton at 97kt, aiming to pass to the W of Bulbarrow Hill Masts (1129ft amsl) in a level cruise at 2000ft Portland RPS, the PF called visual with an ac crossing from L – R 500m ahead of their intended flight path at a higher altitude – some 500ft above. Both he and the PF observed the ac – a white VANS - as it descended rapidly and turned S before passing down their starboard side at a safe distance. Shortly afterwards he as the PNF called that he had lost sight of the VANS [an RV-7] and the PF drew his attention back to the ac that had now rapidly formated off their port wing. The RV-7 pilot flew at the same altitude on a parallel course no more than four wingspans - about 40m away - for about 10secs. There was no communication visually or by radio and the occupants of the RV-7 were not looking in their direction, but whilst the RV-7 was alongside he noted the ac's registration. As the PNF he recommended they maintain their altitude and heading of 316° as the RV-7 accelerated rapidly away and made a climbing turn to the R across their flight path before rolling onto a S'ly heading and passing astern. He assessed the Risk as 'medium'.

At this point he informed Bournemouth RADAR of the RV-7 and stated his concerns regarding the behaviour of the ac's pilot. The controller informed him that he had radar contact on the RV-7, but he was not in RT contact; both ac were in the 'Open' FIR and therefore able to fly unrestricted. Maintaining a good lookout, they continued on to their next waypoint on the same heading.

Both he and his colleague were a little shaken by the suddenness of the incident and were concerned that although the RV-7 was flying parallel to their course it appeared the other pilot was not aware of their PA28 nor looking out. In the PNF's opinion, the pilot of the RV-7 flew in a manner that made him doubt the RV-7 pilot's intentions; if he was aware of their ac he positioned himself too close without any form of consent or communication and manoeuvred in a way that compromised the safety of their flight.

The remainder of their flight back to Yeovilton was uneventful; the Airprox was reported to the club's CFI later that evening.

The ac has a blue and grey colour scheme and the fin mounted strobe was on.

THE VANS RV-7 PILOT reports that he was operating VFR just to the NE of Bagber; the ac is based at a private farm strip in the vicinity. He was not in receipt of an ATS but listening out on 118·00MHz. [No Squawk was specified but the radar recording shows the ac squawking A7000 without Mode C and Mode S fitted.]

Whilst conducting basic aerobatics the ac's TCAS displayed an ac contact 3nm away which was seen visually at a range of 1nm. Whilst looping he noticed the PA28 about 1000ft below his aeroplane flying in the opposite direction. About 3nm SE of Bulbarrow Hill Masts he continued the manoeuvre to arrive about 150m off the PA28's port side flying in the same direction at a height of 2200ft. He thought the PA28 pilot was not visual with his aeroplane. Continuing past the PA28 at 155kt, when well clear he commenced a climbing turn to the R. He assessed the Risk as 'none'.

UKAB Note: This Airprox is not captured on LAC radar recordings – see the ATSI report for local Bournemouth recorded radar data. The PA28, identified from its assigned squawk of A7365, is shown on the Jersey SSR at 1743:03, maintaining a steady track of about 285°(M) level at 1600ft verified Mode C (1013hPa). The contact perceived to be the RV-7 is shown squawking A7000 but no Mode C is indicated at all throughout. The RV-7 executes a manoeuvre back and forth 1·9nm – 1·2nm ahead of the PA28 until 1743:15, then flying NE'ly before turning SE'ly to pass 0·7nm to starboard of the PA28 at 1743:28. Thereafter the PA28 contact fades at a position 3nm SE of Bulbarrow Hill Masts - the position of the AP as reported by the RV-7 pilot - and is not shown again. The RV-7 turns about onto a course of about 290°(M) and follows the last known track of the PA28 in the direction of Bulbarrow Hill Masts.

The PA28 pilot reports that he was heading 316°(M) when the RV-7 passed abeam to port of his aeroplane at a position 2nm NW of Bulbarrow Hill Masts, however, the local Bournemouth recorded radar data shown within the ATSI report illustrates the Airprox occurred SE of Bulbarrow Hill Masts in the location reported by the RV-7 pilot.

Both pilots' accounts agree that the RV-7 passed to port followed by a climbing turn to the R across the PA28's flight path. Although not captured on the radar recording it seems from the Bournemouth recorded radar data that the contacts merged in azimuth.

ATSI reports that an Airprox was reported 2nm W of Bulbarrow Hill Masts, Dorset, in Class G airspace. The PA28 crew was operating VFR at 2000ft on a local flight from Yeovilton and was in receipt of a BS from Bournemouth RADAR on 119.475MHz.

The VANS RV-7 was operating VFR conducting aerobatics on a local flight from a private strip and was not in communication with an ATS unit. CAA ATSI had access to RT and radar recordings from Bournemouth RADAR, area radar recordings together with written reports from both pilots.

The Bournemouth METARs:

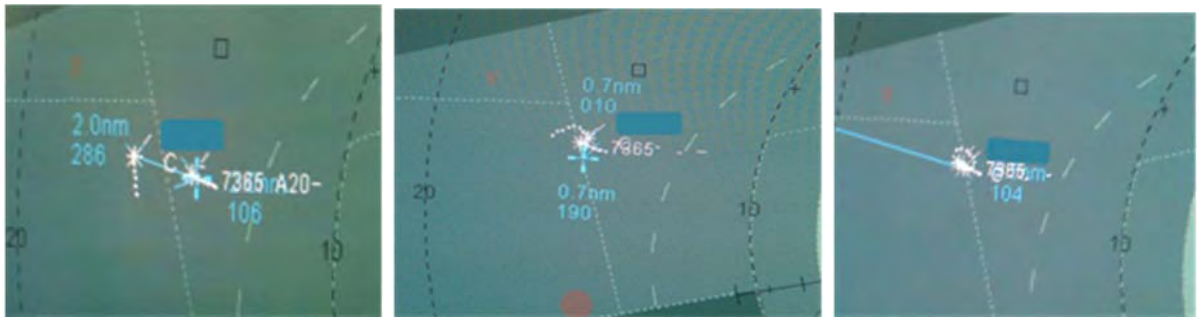
231720Z 15005KT CAVOK 15/08 Q1026=.

231750Z 16004KT CAVOK 15/08 Q1026=.

At 1718:40 UTC the PA28 crew contacted Bournemouth RADAR and reported O/H Dorchester at 2000ft, requesting a TS. The PA28 was given a squawk of A7365, identified and a TS agreed. The PA28 crew was intending to route to Swanage and then back to Yeovilton.

At 1727:50, when the PA28 was 18.7nm WSW of Bournemouth Airport, the controller downgraded the service to a BS due to the radar contact from the PA28 becoming intermittent. At 1742:57, when the PA28 was 14.2nm WNW of Bournemouth, a radar contact squawking A7000 with no Mode C, was shown 2nm WNW of the PA28. The A7000 squawk was identified as the RV-7 using the Bournemouth Radar Mode S function during the replay. Photographs of the Bournemouth Radar data (reproduced below) show the RV-7 turned to the R and orbited about the PA28.

AIRPROX REPORT No 2012044



The written report from the pilot of the RV-7 stated that he manoeuvred his ac to arrive 150m on the PA28's port side. The pilot of the RV-7 did not believe that the PA28 crew was visual with his RV-7; he continued past the PA28 and 'when well clear commenced a climbing turn to the R'.

The written report from the pilot of the PA28 stated that they saw the RV-7 formate on the PA28's port wing. The RV-7 paralleled their course for a short time before it was observed to accelerate rapidly and make a climbing turn to the R. The pilot of the PA28 was concerned about the behaviour of the RV-7 and informed Bournemouth RADAR about the traffic, but did not report an Airprox on the frequency.

The UK AIP at ENR 1.6.2, paragraph 2.2.2 describes the use of squawk A7004 which may be selected at a pilot's discretion:

'*7004 Aerobatics and Display. For use by civil or military aircraft conducting solo or formation aerobatic manoeuvres, whilst displaying, practising or training for a display or for aerobatics training or general aerobatic practice. Unless a discrete Mode A code has already been assigned, pilots of transponder equipped aircraft should select *7004, together with Mode C pressure-altitude reporting mode of the transponder, five minutes before commencement of their aerobatic manoeuvres until they cease and resume normal operations. Pilots are encouraged to contact ATS Units and advise them of the lateral, vertical and temporal limits within which they will be operating and using *7004. Controllers are reminded that *7004 must be considered as unvalidated and the associated Mode C pressure-altitude reporting data unverified. Traffic information will be passed to aircraft receiving a service as follows:

'Unknown aerobatic traffic, (number) o'clock (distance) miles opposite

direction/crossing left/right indicating (altitude) unverified (if Mode C pressure altitude

reporting data is displayed)'.'

The RV-7 was squawking 7000 with no Mode C information and was not in contact with Bournemouth RADAR. As both flights were operating in Class G airspace, VFR, the pilots of both ac were ultimately responsible for collision avoidance.

The PA28 was in receipt of a BS. Under a BS there is no requirement to monitor the flight and TI is not routinely passed. As the RV-7 was squawking A7000 without Mode C the radar controller had no indication that any unusual activity was taking place.

The pilot of the RV-7 believed that he manoeuvred well clear of the PA28. The pilot of the PA28 was concerned by the behaviour of the RV-7. The pilot of each ac was visual with the other ac although both reported that they believed that the other did not have them in sight.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings and reports from the appropriate ATC authority.

The Board noted that it was unfortunate that the RV-7 pilot had not selected the A7004 Aerobatics and Display conspicuity squawk, for use by pilots conducting solo or formation aerobatic manoeuvres. Had he done so, this might have alerted the Bournemouth RADAR controller to the presence of an ac conducting high-energy aerobatic manoeuvres along the PA28's route. The Board recognised that under the BS there is no requirement for the controller to monitor the flight and TI is not routinely passed because the controller might be dealing with other higher priority traffic. However, it could potentially have resulted in an earlier 'warning' to the PA28 pilots if RADAR had been able to appreciate what was happening. In this respect Members urged pilots to select the aerobatics conspicuity squawk, when appropriate, as it is a valuable warning to radar controllers that an ac is about to commence, or is engaged in, unpredictable high-energy manoeuvres.

Nevertheless, it was evident that in the see and avoid environment of Class G airspace the PA28 pilots had spotted the RV-7 at a range of 500m crossing ahead of their intended flight path about 500ft above them and were content with the separation as the RV-7 pilot descended and turned to pass down their starboard side on a reciprocal course. Both the PA28 crew and the RV-7 pilot were incorrect in surmising that the other pilot had not seen their ac and it was apparent from the RV-7 pilot's account that he had seen the PA28 whilst looping and had having passed it elected to close on it from astern. Pilot members considered that a 'wing-waggle' by either would have reassured the other pilot that his ac had been spotted. Nevertheless, the Board agreed it would have been difficult for the PA28 pilots to judge what the RV-7 pilot was doing once his ac had passed behind the PA28's wing and was turning astern; once the geometry changed it became an overtaking situation and thus the PA28 had right of way at that point. The RV-7 pilot reports he arrived off the PA28's port side 150m away, before accelerating away in his higher performance aeroplane and executing a climbing turn to the R ahead of the PA28. The GA pilot Member considered this manoeuvre unwise; the RV-7 pilot could have exhibited better airmanship by giving the PA28 a wider berth and certainly not overtaking to port nor crossing ahead. The Board recognised that it was the RV-7 pilot that had engineered the eventual separation here and the Members agreed unanimously that this Airprox had resulted because the RV-7 pilot flew close enough to cause the PA28 pilot concern.

The RV-7 pilot was entirely cognisant of the PA28 before he had flown at the same altitude on a parallel course off the PA28's port wing; this was about 40m away the reporting pilot had estimated. The Bournemouth radar photographs provided by ATSI reflect the RV-7 pilots overall manoeuvre; given the scale of the pictures however, it was not feasible to judge the minimum separation at close quarters with any certainty and the Board was unable to resolve the differing estimates reported by both pilots of the minimum horizontal separation at this point in the incident. However, with the PA28 pilot having re-established visual contact and the RV-7 pilot watching the PA28 closely throughout, coupled with the RV-7 pilot's ability to haul-off rapidly in his nimble aeroplane, the Board concluded unanimously that, in these circumstances, no Risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

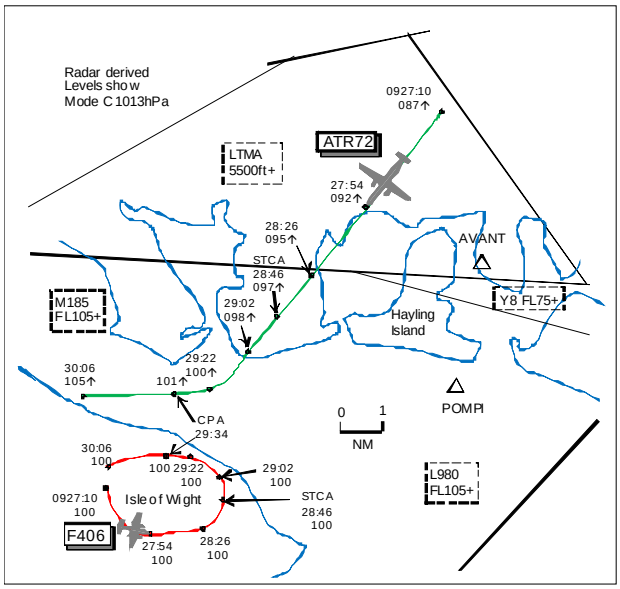
Cause: The RV-7 pilot flew close enough to cause the PA28 pilot concern.

Degree of Risk: C.

AIRPROX REPORT No 2012045

AIRPROX REPORT NO 2012045

Date/Time:	28 Mar 2012 0930Z	
Position:	5045N 00108W (O/H Ryde IOW)	
Airspace:	LFIR	(Class: G)
Reporter:	LAC S19/20/21/22T	
	1st Ac	*2nd Ac*
Type:	ATR72	F406
Operator:	CAT	Civ Pte
Alt/FL:	FL100↑	FL100
Weather:	VMC CLNC	VMC CLNC
Visibility:	20km	30km
Reported Separation:	200ft V/1nm H	Not seen
Recorded Separation:	100ft V/1·6nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LAC S19/20/21/22 (HURN) TACTICAL CONTROLLER reports the ATR72 was coordinated at FL120 direct ORTAC and the flight called passing FL82 near to GWC. At FL96 the ac label started flashing against a background squawk that was showing FL100. He turned the ATR72 R onto heading 270° and the background squawk turned L. TI was passed to the ATR72 crew who reported they had the traffic on TCAS. The crew then reported "visual" with the traffic, which appeared to be turning away.

THE LAC S19/20/21/22 (HURN) PLANNER CONTROLLER reports accepting coordination from LTC on the ATR72 at FL120 direct to ORTAC. He was discussing the re-route of another ac at FL70 at ORTAC with the ATSA when he saw STCA activate red [high severity] on the radar. At the same time S18T pointed it out to Hurn (T) which is when an avoiding action R turn onto heading 270° was issued to the ATR72 against the 0427 squawk level at FL100. Shortly after this the 0427 squawk began to turn L (in the same direction). Hurn (T) passed TI and the ATR72 crew reported that they had the ac on TCAS.

THE LTC SW DEPS TRAINEE CONTROLLER reports asking the Coordinator to request a shortcut route for the ATR72 at FL120 via ORTAC. This was duly done and noted on the fps with no conditions attached. She climbed the ATR72 to FL120 and transferred the flight to LAC S20 around HAZEL approaching FL80. She considered the climb profile sufficient enough to ensure the ac would remain inside CAS. Sometime later she observed the ATR72 turning away from unknown traffic squawking 0427 outside CAS.

THE LTC SW DEPS RADAR CONTROLLER (EXAMINER) reports the candidate asked for the short-cut route of FL120 to ORTAC for the ATR72, which the Coordinator obtained. He was watching a confliction between the ATR72 and another ac departing Southampton and once this was resolved the candidate transferred the ATR72 to LAC S20. He was happy to let the ATR go as it was clear of all conflictions within his sector and climbing to an agreed level. Their attention was then taken elsewhere with other traffic. The ATR was transferred to S20 in plenty of time within CAS and with CAS ahead for S20 to control the ac and continue radar monitoring. He accepted that they must present traffic inside CAS and at the point of transfer this wasn't considered well enough. The large change in the base of CAS to FL105 is known to S20 as it is their airspace and, as the ac was transferred inside CAS, then LAC S20 should have continued to monitor the flight and reacted to prevent it going outside CAS.

THE LTC S COORDINATOR reports the SW Deps controller asked him to coordinate the ATR72 on the short-cut route to Jersey at FL120 via ORTAC. He coordinated with S20 Planner (S20P) and neither of them stipulated that the ac should be in level flight or in the climb. SW Deps transferred the flight to S20 still in the climb to FL120 with

approximately 8nm to run before the base of CAS changed to FL105 but he was unsure what level the ATR72 was passing when it left the frequency. About 5min later the ATR72 was observed to be turning away from an unknown ac squawking 0427 outside CAS.

THE ATR72 PILOT reports en-route to the Channel Islands, IFR and in communication with London on 129·425MHz, squawking 0554 with Modes S and C. The visibility was 20km in VMC and the ac was coloured yellow/white; no lighting was mentioned. Near the Isle of Wight (IOW) during the climb at 190kt approaching FL100 for FL120 they noticed an ac on TCAS straight ahead range 7nm at a similar level. A TCAS TA followed and they became visual immediately with the traffic as London issued a turn about 60° to the R; no RA was generated. The other ac, a low-wing twin turboprop type, turned away, he thought, to their L and started a descent, passing 200ft below and 1nm clear on their L. The other flight was not talking to London and he assessed the risk as none.

THE F406 PILOT reports flying a local sortie from Farnborough, VFR and in receipt of a BS from Farnborough (downgraded from a TS) on 134·35MHz [actually 125·25MHz] squawking 0427 with Modes S and C. The visibility was >30km in VMC and the ac was coloured white/burgundy with nav, anti-collision and strobe lights all switched on. They were not aware of being involved in an Airprox until being told later by Farnborough. At the time they were in the vicinity of Ryde IOW at FL100 but did not see the reporting ac.

ATSI reports that the Airprox was reported in the vicinity of the Isle of Wight at FL100, in Class G airspace, when an ATR72 and a Cessna F406 came into conflict.

The ATR72 was operating IFR on a flight from London Gatwick to Guernsey and in receipt of a RCS from London Control (Hurn sector) on 129·425MHz.

The F406 was operating VFR on a local flight from Farnborough and was in receipt of a BS from Farnborough LARS W on 125·250MHz.

CAA ATSI had access to recordings of RT from Farnborough and Swanwick and area radar recordings together with written reports from both pilots and the Swanwick controllers.

The UK Met Office advised that the estimated 10,000ft wind in the vicinity of Southampton was N'ly at 5-10kt.

At 0838:00 UTC the Farnborough LARS W controller downgraded the service to the F406 flight from a TS to a BS due to it leaving solid radar cover to the S. At 0840:10 the F406 flight reported climbing to FL100.

At 0915:40 the ATR72 flight contacted London TC (SW Deps) on frequency 129·075MHz.

At 0919:50 the pilot of the ATR72 informed the controller that, *"…we can take, er, one two zero if we can get the shortcut to ORTAC*". The pilot of the ATR72 was instructed to standby and the SW Deps controller requested the S Coordinator to coordinate a direct routeing to ORTAC. The S Coordinator contacted the Hurn Planner and informed them that the ATR72 wished to go FL120 ORTAC. The Hurn Planner replied, *"Twelve ORTAC is approved."*

At 0921:40 the pilot of the ATR72 was instructed to route direct to ORTAC and climb to FL120. The written report from the SW Deps controller states that they judged that the climb profile was sufficient to ensure that the ATR72 remained inside CAS.

At 0926:00 the pilot of the ATR72 was instructed to contact London Control on 129·425MHz. At 0926:04 the ATR72 was climbing through FL079 with approximately 9·5nm to run to the point at which the base of CAS changed to FL105, with a GS of 252kt and a climb rate of approximately 650fpm.

At 0926:20 the pilot of the ATR72 contacted the Hurn Sector controller on frequency 129·425MHz and reported, *"…we're climbing flight level one two zero routeing direct to ORTAC".* The controller replied, *"…thank you maintain*." At 0927:10 the ATR72 had 5nm to run to the edge of CAS and was climbing through FL087. The F406 was operating outside CAS at FL100 in the vicinity of the Isle of Wight in a L turn through S. The SSR label and Mode C information from the F406 were displayed on the Hurn sector controller's situation display but were

displayed as a grey, less distinct, label due to the ac being outside CAS and not under the direct control of the Hurn sector.

At 0928:26 the ATR72 left the London TMA and entered Class G airspace at FL95, underneath airway L980 (base FL105). The Hurn controller was unaware that the ATR72 had left CAS. The F406 was turning L from an E'ly heading 7·3nm SSW of the ATR72.

At 0929:00, after STCA activated between the ATR72 and the F406 (0928:46), the controller instructed the ATR72 flight to, *"…turn right heading two seven zero degrees there is traffic on the radar indicating flight level one hundred not verified*." The pilot of the ATR72 read back the instruction and advised the controller that they had the traffic on TCAS. At 0929:22 the ATR72 was in the R turn climbing through FL100 with the F406, also at FL100, 1·9nm to the SSW of the ATR72.

At 0929:30 the controller passed TI to the ATR72 flight stating that the F406 was, *"…in your twelve o'clock range one and a half miles*", which was quickly updated to, *"…twelve o'clock one mile*". By 0929:30 the F406 had turned W'bound and was tracking parallel to the track of the ATR72 whose crew reported that they had the F406 in sight at, *"...nine o'clock at about er one mile*."

At 0929:34, the CPA, the ATR72 and F406 were on parallel tracks with the ATR72 passing FL101, 1·6nm to the N of the F406. There was a subsequent conversation between the pilot of the ATR72 and the controller during which the ATR72 gave details on the track and type of the ac they had seen. At 0930:06 the ATR72 re-entered CAS at FL105 and at 0930:40 the flight was instructed to resume own navigation to ORTAC. Shortly afterwards the ATR72 was transferred to Jersey Zone on frequency 125·2MHz.

Between 0915:00 and 0941:10 there were no transmissions between the F406 flight and Farnborough LARS W. At 0941:10 Farnborough requested a radio check from the F406 flight, which the pilot replied to. According to the written report the F406 crew did not see the ATR72.

The F406 flight had been downgraded to a BS by the Farnborough LARS W controller before the confliction with the ATR72. Under the terms of a BS the responsibility for traffic avoidance rests with the pilot and there is no requirement for the controller to monitor the flight.

When the S Coordinator and the Hurn Planner coordinated the ATR72 routeing direct to ORTAC at FL120 there was no discussion to establish whether or not the ATR72 would be level at FL120 or would be still in the climb on transfer.

CAP493, the Manual of Air Traffic Services, Section 1, Chapter 4, Paragraph 5.1 states that:

'Every endeavour shall be made to clear aircraft according to the route requested. If this is not possible the controller shall explain the reason when issuing the clearance. The expression "cleared flight plan route" is not to be used. If a pilot requests, or a controller offers, a direct routeing then the controller must inform the pilot if this direct route will take the aircraft outside the lateral or vertical boundaries of controlled or advisory airspace. The pilot will then decide whether to accept or decline the new route.'

Neither the SW Deps controller nor the Hurn controller issued instructions that would have kept the ATR72 within the confines of CAS, nor did they give advice to the pilot of the ATR72 that would have alerted him to the need to arrange his flight profile such that the ATR72 remained inside CAS. The written report of the SW Deps controller stated that they considered the climb profile sufficient to ensure the ac would remain inside CAS. ATSI calculated that, given the distance to run, GS and the climb rate of the ATR72 at the point of transfer of control it was extremely unlikely that the ATR72 would remain inside CAS.

The ATR72 was being provided with a RCS inside Class A CAS by the Hurn sector controller for just over 2min before it left CAS at 0928:24. CAP493, the Manual of Air Traffic Services, Section 1, Chapter 5, Paragraph 1.2.2 states that:

'Pilots must be advised if a service commences, terminates or changes when:

a) outside controlled airspace;

b) entering controlled airspace;

c) leaving controlled airspace, unless pilots are provided with advance notice in accordance with paragraph 1.2.3 below.

1.2.3 For flights leaving controlled airspace controllers should provide pilots with advance notice of:

a) the lateral or vertical point at which the aircraft will leave controlled airspace. Such notice should be provided between 5-10nm or 3000-6000ft prior to the boundary of controlled airspace;

b) the type of ATS that will subsequently be provided, unless the aircraft is coordinated and transferred to another ATS unit before crossing the boundary of controlled airspace.'

The pilot of the ATR72 was not advised that the ac would leave CAS, nor was the pilot advised when the ac left CAS. The service was not changed to reflect the fact that the ATR72 was outside CAS. It is likely that the pilot of the ATR72 was unaware that the ac was no longer inside CAS at the time of the Airprox. Although in Class G airspace pilots are ultimately responsible for collision avoidance, as the pilot of the ATR72 had not been informed that the ac had left CAS, he would have been unaware of the need to apply "see and avoid" and had not agreed to an ATSOCAS instead of a RCS.

When the Hurn controller recognised the confliction between the ATR72 and the F406 the ATR72 flight was instructed to turn R and TI was passed but the term "*avoiding action*" was not used.

The Airprox occurred in the vicinity of the Isle of Wight at FL100, in Class G airspace, when the ATR72 left CAS, unnoticed by the Hurn controller, and came into conflict with the F406.

Contributory factors are considered to be:

The coordination between the LAC Hurn Planner and the LTC S Coordinator did not clearly establish whether the ATR72 was going to be in the climb to FL120 or level at FL120 before transfer of control or establish a restriction that would ensure the ATR72 remained inside CAS.

The ATR72 was presented to the Hurn controller in such a position that its climb rate was unlikely to ensure that the ATR72 remained inside CAS.

The pilot of the ATR72 was not informed that the ac had left CAS and the service was not changed accordingly.

When the Hurn sector controller took action to resolve the confliction between the ATR72 and the F406 the term 'avoiding action' was not used.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

A controller Member, familiar with Swanwick operations, informed Members that the ATR72 crew's request to route direct to ORTAC was quite normal. 'Cutting the corner' reduced the ac's track miles by removing the requirement to route via SAM before turning S'bound. It was clear the coordination effected between LTC S Coordinator and LAC Hurn P was imprecise; Hurn P accepted FL120 offered by S Coordinator (which became the new exit level for the ATR from the Hurn Sector onto the Channel Islands and would be apparent to the Hurn T on his data display after input by Hurn P) but neither controller specified whether the ac was to be subject to a coordinated climb or be transferred in level flight. LTC SW Deps cleared the ATR72 flight as requested and then just over 4min later transferred the flight to LAC Hurn. This was earlier than normal, with SW Deps making an early judgement that its climb profile was enough to keep the ac within CAS but placing no restrictions on the flight (eg cross AVANT or abeam FL110 or above), which would have ensured it remained within CAS. When the ATR72 flight called on the Hurn T frequency, the controller merely acknowledged the call with, *"…thank you maintain"*. The ATR72's slow ROC was not assimilated by the Hurn T and again no restriction was placed on the crew to ensure their climb profile was sufficient to remain in CAS. The ATR72 crew would have been unaware that their flight profile would

take their ac outside of CAS and they would expect to be told this by ATC. When the ac did leave CAS, it also went unnoticed by the Hurn controller and therefore an appropriate ATS (ATSOCAS) was not offered. Members agreed that the Swanwick ATC teams had not fulfilled their responsibilities to ensure the ATR72 remained in CAS, or advise the crew that they were leaving CAS, which resulted in a conflict with the F406.

The excursion outside CAS only became apparent to Hurn T when STCA activated between the ATR72 and the F406, and it was also pointed out to him by an adjacent controller. Until then the F406 was displayed as a background track as the ac was outside CAS and not working the Hurn T. Hurn T reacted immediately by turning the ATR72 R and issuing TI; however the phrase 'avoiding action' was not used. Members agreed 'avoiding action' should have been used owing to the controller's late assimilation of the confliction and the controller being unaware of the F406's intentions. The ATR72 crew had reported seeing the F406 on TCAS before a TA was received and they had complied with the ATC turn instruction; an RA was not generated. Further TI on the F406 was given with the crew reporting visual as it passed 1nm clear on their LHS, 200ft below. Members noted that the ATR72 passed unsighted to the F406 crew although they had a responsibility to see and avoid within the Class G. The ATR72 had approached from the N whilst the F406 was carrying out a slow LH orbit; the ATR72 would have been more difficult to acquire as the F406 was belly-up to the ATR72 as it approached from below. This is a salutary lesson to all pilots whilst operating VFR in Class G to maintain a good lookout scan for other traffic at all times even if the likelihood of sharing the airspace with other traffic is low - expect the unexpected! Taking all of these elements into account, although the incident was not observed by the F406 crew, the actions taken by Hurn T when combined with the visual sighting and actions taken ATR72 crew were enough to allow the Board to conclude that any risk of collision had been effectively removed.

The NATS Advisor informed Members that following this incident a study was undertaken to analyse flight profiles from MID to ORTAC during March 2012. This found 4 flights out of 159 had left CAS where the base of CAS changes from 5500ft to FL105. Consideration was given to the feasibility and benefit of introducing a standing agreement for these flights to ensure that they remain inside CAS. It was decided instead to address the issue through other means and carry out a further analysis of September traffic to test the benefits of the actions taken. Safety Notice SIN027.12 was issued on 24th May highlighting the issue of flights leaving CAS. ATSOCAS CBT will be completed by all LAC ATCOs by 31st August. This incident is being used for lesson learning during safety briefings to be given to all LAC controllers by 30th September. Operational Analysis Dept has been tasked to do an analysis of any other areas where ac may be outside CAS during climb if their climb rate is slow. A campaign has started including posters by Competency and Proficiency Coordinators (CAPCs) and Watch Safety Managers (WSMs) to highlight the importance of telephone phraseology and unambiguous coordination.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Swanwick Sector teams did not ensure the ATR72 remained in CAS or advise the crew that they were leaving CAS, resulting in a conflict with the F406.

Degree of Risk: C.

AIRPROX REPORT NO 2012046

Date/Time:	27 Mar 2012 1646Z		
Position:	5558N 00128W (Newcastle - elev 266ft)		
Airspace:	Newcastle CTA	(Class: D)	
	Reporting Ac	*Reported Ac*	
Type:	A319	Hot Air Balloon	
Operator:	CAT	CAT	
Alt/FL:	3500ft	3500ft	See Fig 1.
	NK	QNH	
Weather:	VMC CAVOK	VMC CAVOK	
Visibility:	10km	>20km	
Reported Separation:			
	0ft V/0m H	200ft V/<1nm H	
Recorded Separation:			
	NRV /0.8nm H		

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports flying a scheduled passenger flight, IFR from Belfast inbound to Newcastle squawking as directed with Modes C and S; TCAS was fitted but gave no indications at the time of the incident. They were in receipt of vectors from Newcastle APR, heading 140° at 250kt, S of the RW07 extended centreline at about 20nm. As they were turned N to establish on the ILS he saw off the left wing tip a large hot air balloon less than 1nm away and about 500ft above them. The balloon pilot had made no radio transmissions while they were on the frequency.

They avoided it without any aggressive manoeuvring.

They understood that Newcastle ATC were also filing a report as the Balloon was inside the CTZ/A.

THE HOT AIR BALLOON PILOT reports that following take off from a site which was 800ft amsl the balloon was climbed to 2000ft to avoid livestock downwind, having been advised of a recent problem by a local balloonist.

When they were 10min into the flight the wind dropped dramatically to less than 1kt, so they climbed (outside CAS) in order to investigate winds at different levels, but there was no significant difference; when steady at about 3500ft they could not detect any movement over the ground.

He was busy transmitting to his ground support party when an ac passed close to them, heading about N and passing to their E. The ac was in straight and level flight and they saw no avoidance being taken. He assessed the risk as being low/none.

His flight was plagued by light and variable winds and it took another 60min to travel a straight-line distance of 2nm to final landing position.

The pilot attached an Ordnance Survey map showing the track of the balloon and overlaid on the map is the relevant section of Newcastle CTA.

ATSI reports that the Airprox occurred at 1645:53, 12nm SW of Newcastle Airport, on the boundary of the Newcastle Control Area CTA-4, Class D controlled airspace (CAS) between an Airbus A319-111 (A319) and a Lindstrand LBL 260A Hot Air Balloon (Balloon). The A319 was inbound to Newcastle airport IFR from Belfast Aldergove (EGAA), in receipt of a DS, upgraded to a RCS when it entered CAS. The Balloon had departed VFR from Slaley Hall, a private site just to the W of the boundary of Newcastle Control Area CTA-4 Class D CAS, which

has a base of 3000ft. The Balloon pilot did not contact Newcastle Radar but reported listening out on the frequency [before the CPA].

CAA ATSI had access to RTF recording, NATS Area Radar and Newcastle ATSU radar recordings, with reports from the controller and two pilots.

The Newcastle weather was:

METAR EGNT 271620Z 10004KT 8000 NSC 20/06 Q1035=
METAR EGNT 271650Z 10005KT CAVOK 20/05 Q1034=

At 1638:22, the A319 contacted Newcastle Radar (RAD) on handover from Scottish Control. The A319 was identified by RAD, 34nm W of Newcastle and a DS service was agreed; the A319 was then descended to FL070.

At 1638:49, the A319 pilot reported a possible nose gear (inflation) problem and warned that after landing the aircraft might need to stop on the RW. The A319 was turned onto a heading of 115° and descended to an alt of 3500ft on the QNH of 1035hPa.

At 1640:41, RAD advised the A319 pilot that he was number 2 in the arrival sequence, but planned to delay the arrival, to allow two departures to get airborne before his landing; the A319 pilot then reported reducing speed.

The Newcastle radar display showed a number of spurious returns, (anomalous propagation) resulting from the high pressure atmospheric conditions; one of these contacts was subsequently believed to be the Hot Air Balloon.

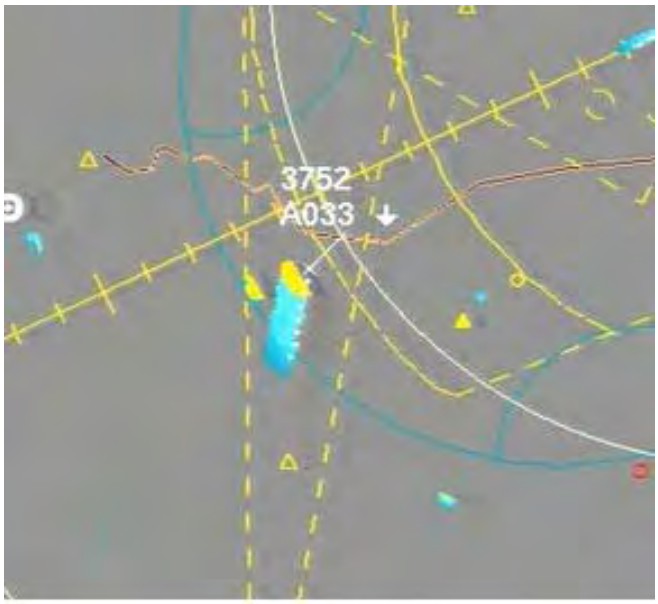


Fig 1. (1646:06)

At 1643:47, the A319 was turned left onto a heading of 015° and as it crossed the boundary of CAS the controller changed the service to a RCS.

At 1645:30, the A319 was given descent to an alt of 2500ft and at 1645:46, the pilot reported, *"er (A319)c/s sorry also we're just passing a Balloon very very close he's just to our left here probably er less than 5 miles".* The controller replied, *"OK what altitude - can you tell"* and the pilot responded, *"Er slightly higher than us about 4000ft er white and black …"* This was acknowledged by RAD and the A319 was turned right onto a heading of 050° to intercept the RW 07 localiser and then continued the approach without further incident.

The CPA occurred at 1645:53, as the A319 passed 0.8nm E abeam the radar contact which was believed to be the Hot Air Balloon. At that point the A319 was indicating an alt of 3500ft and the pilot reported that the Balloon was at a higher level.

From the data available to CAA ATSI, it was considered likely the Hot Air Balloon drifted inside CAS before descending below the base of the control zone. The Balloon pilot had been operating close to boundary of CAS and indicated that he was listening out on the Approach (Radar) frequency 124.375MHz. It was not clear why the pilot had not called in order to improve the SA of both ATC and other airspace users.

It is likely that the workload of the A319 crew was high in preparation for the landing with a nose wheel problem and they did not report visual sighting of the balloon until about 20sec before the CPA. The pilot's report indicated that the Balloon was 'avoided without any aggressive manoeuvring' but he was concerned about the close proximity of the balloon which had no transponder or radio contact.

The Airprox occurred when the Hot Air Balloon, which was operating close to the boundary of CAS, was believed by CAA ATSI to have crossed marginally into Class D CAS without an ATC clearance and into potential conflict with the A319.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The Board was shown a photograph taken by a balloon passenger on a mobile telephone apparently showing the A319 slightly below them. The poor quality of the photograph and the lack of camera technical details precluded a full analysis.

Due to the lack of positive information, in particular altitude information on the balloon, the Board could not positively determine whether the balloon had inadvertently drifted just inside CAS as apparently shown on the radar recording or whether it was below; in any case Members agreed that it would not substantially affect the cause or degree of risk of the incident.

Whether or not the balloon entered the Newcastle CTA, Members agreed that the pilot was unwise choosing to operate (or drifting into) that area (close to the extended centreline) without informing Newcastle ATC on the RT (Members assumed the pilot had an RT licence since he was carrying passengers). A simple call to Newcastle Radar would almost certainly have allowed them to identify the primary only contact as the balloon, adopt a helpful approach and inform other ac that the balloon had become becalmed and route them well clear of it.

As it was the A319 did route clear of the balloon by (radar verified) about 1nm horizontally, the crew albeit slightly belatedly saw the balloon opting for only a gentle turn away, and Members agreed that that was sufficient separation to ensure there was no conflict or risk.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: E.

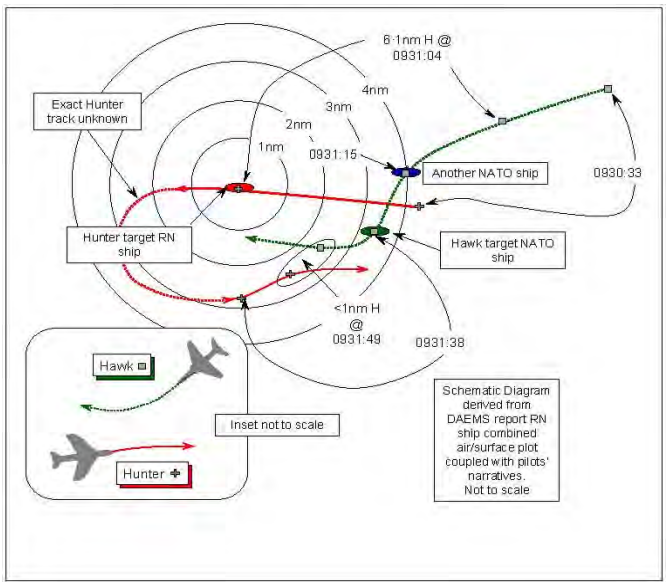
AIRPROX REPORT NO 2012047

Date/Time: 22 Mar 2012 0931Z

Position: 5000N 00400W (19nm SW of Start Point S Coast Exercise Areas)

Airspace: EGD 008 (Class: -)

	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk1	Hunter Mk58
Operator:	HQ Navy	Civ Comm
Alt/FL:	250ft	100ft
	QNH (1024mb)	RAD ALT
Weather:	VMC Haze	VMC Haze
Visibility:	9km	9km
Reported Separation:	200ft V/50m H	NR
Recorded Separation:	Reported as ¼nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T Mk1 PILOT reports he was the front seat PIC, flying dual, as the No2 in a mixed formation led by a Hawker Hunter. The rear seat was occupied by another pilot who was the PF at the time of the Airprox. The formation was conducting an Operational Sea Training (OST) 'Thursday War' exercise, flying visual attacks on a surface fleet and then re-positioning to conduct a pairs missile attack profile.

A face-to-face briefing had been conducted with the lead Hunter pilot before the flight, during which a sound deconfliction plan comprising both geographical and vertical separation had been briefed by the formation leader. It had been highlighted during the brief that, after the pair's attack profile, the Hunter would remain in the S Coast Exercise Areas (SC EXAs) to re-join with a Falcon DA20 in preparation for another attack, whilst the Hawk would RTB at Yeovilton. The Hunter pilot briefed that on completion of his missile profile he would track to the S until the Hawk had cleared the area to the NE. The Mission Commander in the Falcon DA20 had issued a Time over Target (TOT) of 0931 for both the Hawk and the Hunter, but allocated separate target ships to the two ac – a NATO warship to the Hawk and a RN warship to the Hunter. The weather in the SC EXAs was marginal for a 'VMC War', but assessed as within limits by both himself and his rear-seat pilot.

During the early part of the sortie, both he and his rear-seat pilot advised the Hunter pilot that the latter's VHF transmissions were unreadable [UHF Air Safety was used thereafter]. The Hunter and the Hawk joined with the Falcon DA20 to the E of the targets, which is SOP. Shortly afterwards [At 0925:30] the DA20 'launched' the Hunter and the Hawk on the missile profile. The Hunter and the Hawk climbed to medium altitude [15000ft QNH], remaining visual with each other throughout. Plymouth MIL passed updated positions for both targets, at which time it became apparent that the Hunter's target ship was about 4nm further W than the Hawk's target. Consequently, the Hunter accelerated and separated from the Hawk to the W. At a suitable range [8nm] from their target's last-known position, his rear-seat pilot commenced a high dive attack in accordance with the standard missile profile. As they broke cloud at 8000ft, the ship closest to the last reported position for their target was overflown, at which point it became apparent that it was not the correct NATO target ship, albeit it was from the same NATO state, of a sister class and of a very similar design and dimensions. He noticed that their target ship was about 1nm to the SW so the rear-seat PF adjusted his profile to overfly this ship. Flying in VMC, 6000ft below cloud with an in-flight visibility of 9km in haze out of sun, just after overflying their NATO target ship, whilst recovering wings level at 250ft QNH (1024hPa), heading 220° at 420kt, he noticed a dark object 'blooming' in the front canopy. He immediately gave the order to the PF to 'pull-up' whilst simultaneously taking control as he saw the camouflaged grey/green Hunter pass 200ft below them in a level R turn through an E'ly heading about 50m to port with a 'very high' Risk of collision. He executed a climbing R turn to avoid the Hunter and recovered to Yeovilton without further incident, during which it was noted that the ac had sustained 7.8g.

The Mission Commander had not declared an 'IMC War', which would have resulted in each ac taking up a pre-assigned IMC sanctuary level and might have avoided this Airprox.

His Hawk has a black colour-scheme and the nav lights, nose light and HISLs were on.

THE HAWKER HUNTER Mk58 PILOT reports he was the element leader, of a pair of ac [Hunter and Hawk] tasked to conduct practice attacks against a surface Task Group (TG), which included one RN warship, two NATO warships and an RFA, as part of a routine operational pre-deployment training 'Thursday War' Air Defence Exercise (ADEX) in the SC EXAs. The brief was detailed and complex. The second event of the serial was a missile attack against the TG, from an eastern gate, which involved both ac 'launching' from the wing of a DA20 Falcon ac, climbing to medium altitude [15000ft QNH] and then diving steeply onto the target at the final stage of the attack to emulate the missile profile. During the element briefing it became clear to him that the crew of the No2 Hawk ac had not conducted a missile profile before, [he thought]. Consequently he went through the profile in detail, focusing particularly on the final dive and off target de-confliction procedure. Normally, when two Hawks are simulating such missile profiles, the ac conduct a 30sec staggered 'launch' from the DA20 in order to achieve lateral and time de-confliction over the target area. A height de-confliction is also briefed, with sanctuaries to be honoured until the pilots of the two ac are visual with each other. On this occasion, however, he briefed the No2 Hawk pilot that they would launch together and that he would accelerate ahead of the Hawk to achieve the necessary spacing prior to the final dive. He calculated that he would achieve a 30sec lead as the dive commenced at a range of 7nm from the targets. For the off-target de-confliction he briefed that he would turn L, onto approximately S, and descend to low-level. Off-target, the No2 Hawk was to turn R onto a NE'ly heading and continue to climb to medium level to return to base at Yeovilton, which catered for the height de-confliction. He did not specifically brief height sanctuaries as the ac were to turn away from each other off-target; he in the Hunter descending to low level and the No2 Hawk climbing to medium altitude.

The sortie proceeded normally, except that comms on the VHF frequency were poor, so all intra-formation RT comms were conducted on the UHF Air Safety control frequency. The missile profile started by joining the DA20 at the E Gate, over 40nm [some 65nm] from the target, at low altitude [250ft asl at 0920] for a TOT of 0931. During the transit from the E Gate the target positions were passed by PLYMOUTH MIL - who provide a BS. Flying the lead Hunter, his target was the RN warship about 4nm, bearing 250° from the No2 Hawk pilot's target that was one of the NATO warships. He was aware from the previous event with the ships, which had concluded at 0905, that there was also Another NATO warship in the vicinity. The W - E split of the targets of about 4nm worked well for their planned 30sec split; both ac would commence the dive at approximately the same range from their respective targets at the same time and achieve a simultaneous TOT. From the 'launch' point to the level off at medium altitude [15000ft] he could see the No2 Hawk in his mirror. Once level, he accelerated to 540kt GS and watched the Hawk recede behind him. At the dive point he assessed that he had achieved the required 30sec spacing and also that the No2 Hawk was displaced to the N of his own line of attack (LOA), which he expected, given the target disposition.

At the subsequent element debrief, the No2 Hawk pilot confirmed that his Hunter was positioned in the No2 Hawk's 11 o'clock at a range of about 4nm at the dive point. He called 'diving' at a suitable range [7nm] from the target and assumed that the No2 Hawk was also commencing the dive at that point. As he came out of cloud at about 4000ft amsl in a 45°dive, he saw three targets: his own was easily recognizable as the RN warship, the furthest to the W of the three and, as expected, one NATO ship was about 4nm away on a bearing of about 070°, in the position corresponding with No2 Hawk's target. The other NATO warship was approximately midway between the two targets, a mile or so S of a line joining the targets and therefore on a bearing of approximately 110° from his own target. He called 'on top' a few secs after 0931 and turned S, letting down to below 250ft asl. He waited for about 5sec, but hearing no 'on top' call from his No2 Hawk he transmitted on the UHF frequency 'Hawk, say posit' and started a turn to the E at 360kt. As he had not heard an 'on top' call from the No2 Hawk (which may have been simultaneous with his own), and hearing nothing in response to his second call, he concluded that the No2 Hawk was off-target and had followed the brief by turning R onto a NE'ly heading and commencing a climb. As he turned L through a SE'ly heading, however, he saw the No2 Hawk coming off Another NATO warship, in a R turn at low-level. He remained very low - between 100-250ft asl - to de-conflict from the Hawk, but it was obvious that No2 Hawk pilot saw him late as the ac pitched up noticeably as it passed down his port side. He took no evasive action as he was comfortable that there was no collision risk, although very uncomfortable that the No2 Hawk was in that position.

At the debrief the No2 Hawk PIC explained that he had identified the first target by reading the ships pennant number, recognized that it was the wrong target and, on seeing the second NATO warship to the SW continued in that direction in a shallow dive to overfly the ship at low-level. The Hawk crew acknowledged that their post target actions had eroded the briefed de-confliction. However, as formation leader he was ultimately responsible and with hindsight, given the experience of the No2 Hawk crew, he should have been more explicit about the height de-confliction and he should have remained on a S'ly heading until he had positive confirmation on the RT that the No2 Hawk had exited the target area. These points were debriefed in a constructive way.

The Airprox occurred whilst flying in VMC some 4000ft clear below cloud with an in-flight visibility of 9km in Haze; the surface wind was 070/15kt.

RN FLIGHT SAFETY CENTRE (RNFSC) INVESTIGATION

Elements of the 65-page RNFSC Investigation Report, which included some 36 Recommendations have been summarised below.

As part of a modified ADEX serial the Hunter and Hawk crews were tasked to conduct a pairs Fighter Bomber Attack (FBA) profile followed by a missile attack against surface units conducting Operational Sea Training serials in the SC EXAs. The Hawk was programmed to target a NATO warship and the Hunter was programmed to target an RN warship. On completion of their respective attack profiles the briefed separation criterion for safe flight was not maintained and as a consequence a Defence Air Safety Occurrence Report (DASOR) and associated Airprox were filed by the Hawk PIC. The Hawk Delivery Duty Holder (DDH) subsequently convened an Occurrence Investigation into the Airprox and a very thorough report was provided. A replay of events using the RN Ship's Command Management System (CMS) and the walk-through of events by the Ship's Fighter Controller coupled with the surface and air picture from the RN warship proved invaluable to the investigative team and enabled them a clearer understanding of the sequence of events.

The Hawk and the trial Hunter ac were scheduled to operate together in the provision of Air Support during a Joint Tasking and Readiness Capability Fast Jet Target Replacement Trial.

[UKAB Note 1. The Trial was intended to assess the suitability and utility of Hunter ac in exercises to train RN warship crews]

During the trial, the Hunter was to operate within the confines of the regulatory environment set by the MAA for Military Registered Civilian Owned Aircraft (MRCOA) Operators through the Manual of Flying Orders for Contractors (MFOC). The MAA had explicitly approved the conduct of this trial; HQ Navy Cmd had approved the conduct of this trial and specifically approved mixed ac type formations.

The full deconfliction requirements should have been detailed within the Trial Instruction (TI). It appears that the Hawk Unit and the Hunter Operator were applying different deconfliction parameters, none of which can be sighted in any official document.

At the briefing the Hawk PIC was asked by the Hunter pilot if he was happy to launch as a pair with the Hunter; he declined because he was unaware that the TI included authorisation by NCHQ for mixed ac formations. The TI had been delivered to the Hawk pilot's unit, but it had not been briefed at Unit level. A line in the TI states, 'All pilots are known to each other and these serials, with the attendant briefing requirements, are familiar to all Hawk aircrew. The deconfliction requirements are identical, whether the ADEX ac are Hawk or Hunter ac'.

The TI summary states 'The trial ac [Hunter] will be flown in routine ADEX serials alongside Hawk ac from 'another' MRCOA RN unit and Falcon DA20 ac - it does not specifically mention the Hawk pilot's unit and therefore this serial was flown in contravention of the approved TI.

There is a discrepancy within the statements of the Hawk PIC and the Hunter pilot as to the level of briefing that was required to conduct the missile profile. When asked at the brief whether he was content with the missile profile, the Hawk pilot said that he was content but still wished it to be covered in the brief (which it was). However, he was under the impression that the formation leader took this to mean that he had no experience in this missile profile. The Hawk pilot was used to briefing all profiles within the sortie brief, regardless of currency and he was therefore at liberty to ask for it to be covered as it was good practice to remind each other of the profile required.

The Hunter pilot states that the Hawk pilot had asked how they should fly the profile and that he had been required to go into a lot more detail than what is laid down in the Flight Profiles and Threat Simulations for JSATO [Joint Support Air Tasking Organisation] Aircraft publication. He states that it was more than an overview of the profile and that he was required (amongst other things) to brief throttle settings and GPS manipulation to achieve a TOT. At this point in the brief it would have been expected that the Authorising Officer would have stepped in as it is his responsibility iaw MRP RA 2306 to ensure that crews are competent.

Both the master and revised Pilots Logs (PLOGs) state that there is a simultaneous TOT of 0931. The Hunter was on top the RN warship at 0931:04 and the Hawk was on top the NATO warship at 0931:38.

The Hunter pilot reported that the VMC sanctuaries for the earlier FBA Exercise serials were briefed as 100ft and below for the Hunter and 400ft and above for the Hawk, although the aim was to remain in visual contact. He did not specifically brief the minimum height of 1000ft QNH for the Hawk on the missile profile as he thought that element was obvious to all; he did brief a L turn through S for the Hunter and a R turn through N for the Hawk. There would also be a geographical deconfliction between the two ac due to the disposition of the ships. 1000ft is a sensible cut-off height for the missile profile for the No 2 ac; however, it is stated in the Flight Profiles and Threat Simulations for JSATO Aircraft handbook that the aircraft is to end up on the target at its lowest cleared height. Nothing is mentioned about a pair's missile profile. (It has also been briefed that ac No 2 is not to descend below 2000ft until lead has called below 1000ft – this guidance has not been seen to be documented.) The 300ft height separation has also been mentioned by the Hawk pilot's unit but where the figure is laid down cannot be identified.

It is impractical to use the ships' disposition to form the basis of a geographical deconfliction plan especially when the targets are involved in a dynamic situation such as the 'Thursday War'. It was briefed that the Hunter would attack the RN warship, which was to the W of the TG and the Hawk would attack the NATO warship that was further N and that the deconfliction plan of the Hunter turning L through S with the Hawk turning R onto N to RTB Yeovilton would be a sensible off-target plan. The de-confliction plan was not questioned at the brief by the Hawk PIC. Had both aircraft been tasked against the same target, the geographical de-confliction plan as briefed would have stood a better chance of being effective.

The Hawk PIC stated that no updated target location information had been given to them by the Falcon DA20 or Plymouth MIL so he radioed for an updated position and entered it into their GPS. As they descended towards the target they realised that the ship at the coordinates passed to them was not their target; however, they carried on with the missile profile, adjusting their course and height to overfly the correct ship. The Hawk was on-top its target NATO warship at 0931:38, making it 38sec late on TOT; the crew did not make an 'On-Top' RT call. They then continued as briefed. However, he then saw the Hunter right wing low, blooming into his vision and called 'pull up' to the PF and took control (it was stated in the debrief that at this point the Hunter pilot had had visual contact on the Hawk for 20sec prior to the incident).

The 0928 picture (from the Command Management System (CMS) of the RN warship shows the Hawk's target NATO warship is 105° at 3.2nm from the Hunter's target RN ship, further S than the reported position, which meant that the Hawk had to turn further S to achieve its on-top. This increased the risk of an Airprox as it placed the Hawk into the path of the Hunter executing a hard L turn off-target, which was contrary to the briefed plan of the Hunter pilot heading S until the Hawk had turned R off-target to RTB.

The TI states that there should be a time separation of one minute between the Hunter and its playmate; this was not briefed as the Hunter pilot briefed they would have the same TOT.

Regardless of the TOT confusion, if a strict height deconfliction plan had been briefed then the Airprox would not have happened.

It seems that there is no standardised sanctuary height for a VMC war. When operating on different sqns and ac types there have been different heights used by each. During the sortie that culminated in the Airprox, the primary separation was geographic. In a member of the investigative team's opinion using geographic separation on moving targets does not give enough of a safety factor.

The Hawk pilot's unit and other RN Hawk units apply a generally accepted VMC sanctuary of 300ft and 500ft respectively, but neither has been able to find the source document that states this. Also, there is disparity between individual pilots as to what the vertical separation criteria are. Again, this observation about reduced

safety factors was not brought up at the post flight de-brief. Importantly, no clear guidance exists as to what point ac are to take up their VMC sanctuary.

The Hawk pilot commented in his Airprox report that the Mission Commander could have declared an IMC 'war', which may have avoided the Airprox. The Mission Commander declares an IMC/VMC 'war' based on conditions for the area in which all the ac are operating as a 'package' and as best as he can across the area of operations. Once the jets are 'launched' from the attacking ac [the Falcon DA20] they are responsible for changing the type of 'war' profile (IMC/VMC) - based on the conditions they encounter at the time. The Hawk pilot had assessed the conditions as marginal but within limits.

The Hawk co-pilot has stated that before descending on the missile profile, a discussion was held within the ac questioning what the deconfliction plan was. There was an element of doubt as to the full plan, but the Hawk crew elected to continue due to the briefed lateral separation of the surface units. Therefore, there was a misunderstanding whilst airborne of what the de-confliction plan was within the Hawk cockpit post the pre-flight brief.

The SA within the Hawk cockpit of the surface picture was incorrect. The NATO warship - the Hawk crew's target - was actually S and E of the RN warship. This was due in part to the fact that the position of the NATO warship passed to the Hawk crew by Plymouth MIL was actually that of a sister ship.

The Hawk co-pilot stated that after the on-top of the NATO warship he commenced a R turn to RTB to Yeovilton and at the same time the Hawk PIC called avoiding action on the Hunter. The CMS recording shows the Hunter flying O/H its target, continuing W and, once 1.5nm clear of the ship, turning L through S onto E. At the same time, the Hawk rolled out onto approx 200° at the same altitude as the Hunter. If the Hawk had remained on 200° it would have passed ahead of the Hunter by approximately 0.75nm. However, the Hawk makes a hard R turn onto 280° where both ac achieve Closest Point of Approach (CPA) which was less than ¼nm. Both ac then continue on these headings and the separation opens. The Hawk remains on 280° until 0933:10 before turning onto a NE heading.

In the DASOR submitted by the Hunter pilot it is stated that 'Normally, when 2 Hawks are simulating missiles, the aircraft conduct a 30-second staggered launch in order to achieve lateral and time de-confliction over the target area. A height de-confliction is also briefed with sanctuaries to be honoured until the aircraft are visual with each other'. This information cannot be located in any reference/guidance document.

The Hunter pilot believes that the Hawk crew agreed at the debrief that the deconfliction plan had been degraded by the Hawk crew. However, the restriction on the Hawk not to descend below 1000ft was not covered in the brief. Further, the actual geographic disposition of the ships meant that geographic separation alone would be insufficient. Therefore, the deconfliction plan was insufficient throughout.

None of the aircrew questioned could locate the SOP for the handing over of formation lead and continuing the briefed sortie in the event of comms degradation.

Recommendations within the Unit Investigation DAEMS Report

Ownership of the Flight Profiles and Threat Simulations for JSATO ac publication should be reassigned; given a Books of Reference (BR) title and its contents used to help populate a Hawk flying guide and tactics manual (TACMAN).

A clearly defined VMC height sanctuary is to be defined and detailed within The Flight Profiles and Threat Simulations for JSATO Aircraft publication. Specifically, it is to mandate each occasion when the VMC sanctuary is to be applied.

A standardised briefing template is to be established for RN Hawk operations and is to be included in a Hawk Flying guide.

Element leaders are to be nominated on the PLOG.

Sanctuaries are to be included as part of the out brief and detailed in the authorisation sheet.

Authorising officers are to be reminded of their responsibilities as detailed in MRP RA 2306 – specifically, they are to ensure that the Aircraft Commander or Formation Leader has thoroughly planned his mission, alternate mission or duty.

HQ Navy Cmd to introduce a competency requirement…that details the required competencies and currency criterion that are to be maintained for Hawk pilots scheduled to fly FOST flight profiles.

If position updates are anything other than Mode 2 derived, then that is to be relayed by Plymouth Mil to the requesting unit.

Bar Alt/RADALT (altitude/height datums) should not be mixed where multiple ac (including mixed ac types) are using vertical separation as part of their de-confliction plan.

The missile profile as detailed in the Flight Profiles and Threat Simulations for JSATO Aircraft is to be reviewed to confirm the accuracy of the data contained within it and thereby assure safety of flight.

The pair's missile profile is to be included in The Flight Profiles and Threat Simulations for JSATO Aircraft publication and its requirement confirmed by FOST.

The second ac in a pairs missile profile shall not descend below 1000ft unless visual with the lead ac whereupon it can continue the descent to its authorised minima.

The requirement to make an on-top call during a missile profile is to be included in the Flight Profiles and Threat Simulations for JSATO Aircraft publication.

The VMC criterion that has to be maintained in order to conduct ADEX flight profiles safely (during a VMC war) is to be reviewed by NFSF (FW).

Due to the inadequacy of the guidance on how to fly the required missile profile and the distinct lack of guidance on what constitutes a FBA profile – consideration should be given to creating a Hawk TACMAN.

None of the aircrew involved could locate the SOP for the handing over of formation lead and continuing the briefed sortie in the event of comms degradation. The publication was not sighted through the course of the investigation - the procedure as detailed is to be located, briefed to the Hawk DDH and then transferred into the Hawk Flying Guide.

Aircrew and Air Traffic personnel are to be reminded of the regulations at MRP 1410(1) Para 41 specifically that they should call an Airprox at the time of the event.

A nominated unit should sponsor the production of a dedicated RN Hawk Flying Guide.

Aircrew are to be reminded of the need to remain clear of Ship's HIRTAs.

HQ NAVY CMD comments that an extremely thorough and detailed investigation has highlighted a number of key weaknesses in the planning, briefing and execution of the sortie and listed 21 contributory factors to the cause of this Airprox. Some 36 separate recommendations were made by the investigation team and there are many lessons identified which are pertinent to the safe operation of ac in similar circumstances, including the importance of thorough briefing and robust authorisation.

UKAB Note (2): Subsequent to the RNFSC Investigation, the Hunter pilot's company made a number of observations, abbreviated extracts of which are included herein.

THE HUNTER PILOT'S COMPANY, in addition to receiving a copy of the RNFSC report, conducted its own review into the incident, to extract lessons learned and to make changes, if deemed necessary, to mitigate the risk of this sort of incident happening again. This review involved the Hunter pilot and two other company pilots who flew in the mission, the substantial amount of planning & briefing material used to prepare for the sortie and notes made from the sortie debrief.

The TI was produced by the company as a requirement of their internal processes. No inputs were received from the RN Hawk community (operators or NCHQ), although they were invited to contribute several times.

Whilst reviewing the RNSFC report it became apparent that the authors have a slight misconception regarding the way the sorties are planned and the division of responsibilities and accountabilities between the two contractors. As a consequence some of the recommendations may be misplaced.

The PLOG has no formal standing. It is a document produced by the Falcon leader to co-ordinate the Falcon and Hunter/Hawk formation participation to make it easy to spot conflictions between the formations. It is very Falcon-centric. It is not a FLYPRO and it does not, and should not, contain details of Hunter/Hawk formation domestics, sanctuaries, deconfliction plans, off-target manoeuvre, egress plans, loser plans, FBA profiles, ROE, etc. Sanctuaries change constantly, depending on the phase of the sortie, the type of attack, the Wx, Helo 'no-fly' zones, pilot experience, etc. There is no 'one size fits all'.

No evidence was found of any flaws in the planning and briefing process used by the Hunter crews. However, this is not to say that lessons cannot be learned from this incident: the Hunter pilot could have accentuated the off-target plan. In addition it is noted that, when operating in unfamiliar and inexperienced mixed formations, extra care should be taken to ensure positive confirmation of critical events before moving on to the next phase of the sortie, even if this prejudices completion of a subsequent task. In this case, with hindsight, the Hunter pilot should not have turned back to head for the East Gate for the next missile profile (even though he remained west of the RN Ship target until 38sec after the TOT) without positive confirmation that the Hawk was off-target.

This sortie was not routine business; extensive planning and preparation had been conducted in the weeks beforehand, which was thoroughly and comprehensively briefed, as evinced by the extensive briefing material made available to all crews, the detail of the briefing on all aspects of the sortie and in particular on the technique for emulating the missile attack. A final irony was that after the sortie the Hawk pilot's authorising officer congratulated the Hunter pilot on the quality of the brief.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a report from the RNFSC together with a copy of the ships Command Management System plot and reports from the appropriate ac operating authorities.

The Board commended the pilots concerned and the RNFSC for the comprehensive reports provided into this Airprox and a very thorough investigation that had highlighted a number of issues. The RNFSC report had dealt comprehensively with the regulatory aspects underlying this encounter and addressed them via a comprehensive list of recommendations.

Visual attack profiles of this nature demand robust visual deconfliction measures an experienced pilot Member opined, but simple rules can take into account the geographical spread of the targets, attack directions and altitude restrictions, which if rigidly applied can be effective. A CAT pilot Member suggested the deconfliction plan could have worked if it had been followed, despite the fact that it was based on a geographical deconfliction involving mobile targets together with minimal vertical separation. The vertical deconfliction measures at the culmination of the missile profile was not briefed satisfactorily and there was an assumption on the part of the Hunter pilot that the Hawk crew would fly no lower that 1000ft until visual contact had been established with his ac. It was also pointed out that both ac were operating to different altitude references; the Hawk crew relying on a barometric altimeter but the Hunter pilot with the added benefit of a RAD ALT. If the vertical deconfliction in the target area had been stressed more positively, then there would have been less room for potential confusion within the Hawk crew; nevertheless, if there was any doubt on their part they should have turned away to the N. The CMS plot shows the Hunter pilot 'on top' his target RN ship at 0931:04, over 6nm WSW of the Hawk. However, he had then turned about and was heading E'ly at 0931:38 when the Hawk was 'on top' its target NATO ship. In the Board's view, if the Hunter pilot had followed his own deconfliction plan by clearing the target area further to the S, he would have been several miles away from the Hawk at the time the latter was 'on top' and no conflict would have arisen. The absence of an 'on top' call by the Hawk did not aid the Hunter pilot's SA. Without this call the Hunter pilot had no positive confirmation of where his No2 was or that the latter was off-target until he saw it. However, it was evident from the CMS plot that the Hunter pilot had turned E well before the Hawk was 'on top' its target NATO ship and had set the Airprox in train before the Hawk crew could have made this call. The Members agreed unanimously that the Cause of this Airprox was that the Hunter pilot did not adhere to the briefed deconfliction plan.

The Hawk PIC had spotted the Hunter 'blooming' in the canopy ahead and gave the order to the PF to 'pull-up', whilst taking control of his ac from the rear-seat pilot at 250ft amsl and initiating a climbing R turn. However, the Hunter pilot had seen the Hawk somewhat earlier as it cleared another NATO ship at low-level several miles away; he took no avoiding action as he was content that there was no Risk of a collision. The Airprox is not shown on radar recordings available to the UKAB and the CMS plot gave no indication of the ac levels as they passed, so the vertical separation could not be accurately assessed. However, the CMS plot does show the two ac just before they pass port-to-port; minimum horizontal separation is stated within the RNFSC account to be about ¼nm. Given that the Hunter pilot had remained very low, with the Hawk in sight throughout, and was able to take robust action if needs be, the Board agreed unanimously that no Risk of a collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

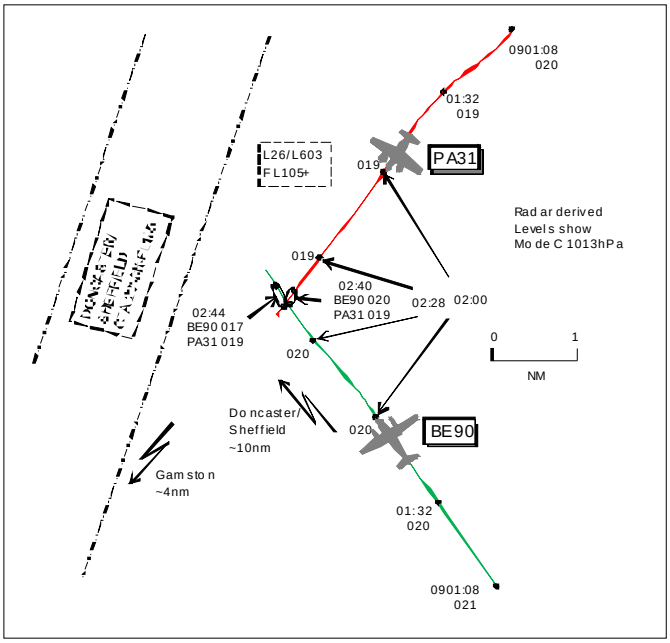
Cause: The Hunter pilot did not adhere to the briefed deconfliction plan.

Degree of Risk: C.

AIRPROX REPORT No 2012048

AIRPROX REPORT NO 2012048

Date/Time:	2 Apr 2012 0903Z	
Position:	5322N 00050W (8·5nm SE Doncaster/Sheffield)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	BE90	PA31
Operator:	Civ Comm	Civ Comm
Alt/FL:	1900ft	2000ft
	QNH (1011hPa)	QNH (1012hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	20km	>10km
Reported Separation:	300ft V/50m H	200ft V/Nil H
Recorded Separation:	50ft V/<0·1nm H [see Note (1)]	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BE90 PILOT reports flying solo en-route to Doncaster/Sheffield, VFR, and in receipt of a BS from Doncaster on 126·225MHz squawking an assigned code with Modes S and C; TCAS was not fitted. The visibility was 20km flying 1200ft below cloud in VMC and the ac was coloured white/grey with strobe, beacon and nav lights all switched on. After his initial call he was told to standby and, owing to his late release from the previous agency, as he was approaching the CTR boundary he turned R to remain outside CAS. After receiving clearance to enter the CTR VFR and a BS he turned towards Doncaster Airport. Soon after establishing on heading 310° at 150kt, level at 1900ft QNH 1011hPa, he looked R to see a light twin-engine ac about 800m away on an approaching/ converging heading and a little above his level. He descended 200-250ft to increase separation while maintaining visual contact with it, estimating he passed 300ft below and 50m clear of it at the CPA. He assessed the risk as medium.

THE PA31 PILOT reports flying a survey flight from Gamston, VFR, monitoring Gamston frequency 130·475MHz and squawking 7000 with Modes S and C; TCAS was not fitted. The visibility was >10km flying 1500ft below cloud in VMC and the ac was coloured white/purple; ac lighting was not reported. He departed Gamston for a survey in the East Midlands area. In order to prepare the ac for the survey he had to fly straight and level for 2min at 2000ft and elected to do this to the NE of Gamston where he knew it would not interfere with anybody, just monitoring the Gamston frequency as he was not far from the aerodrome. When complete he headed back towards the East Midlands area heading 200° at 150kt maintaining 2000ft QNH 1012hPa while getting closer to Gamston. Although the Wx was good in the area, he was looking further towards East Midlands where clouds were building up. About 8-10nm on the GAM 050°R he first noticed a twin-engine ac, possibly a King Air, passing below very close, about 200ft; this ac had been hidden by his ac's LH engine nacelle. It was already too late to take any kind of avoiding action. He was initially unsure if it was an ac as it was 3sec after that he saw it already on his R rear quarter of his ac. He assessed the risk as high.

THE DONCASTER RADAR CONTROLLER reports the BE90 flight called on frequency requesting joining instructions VFR. The flight was given a BS and instructed to join not above 2000ft routeing towards L base RW20. Two minutes later the BE90 pilot requested to report an Airprox, stating he was flying straight and level on a NW'ly track at altitude 1900ft when he saw an ac, possibly a PA31, on his R tracking SW about 50ft above and that he had descended 200ft to avoid.

ATSI reports that the Airprox occurred at 0902:41 UTC, 8·7nm to the SE of Doncaster/Sheffield Airport, within Class G airspace, between a BE90 and a PA31.

The BE90 was inbound VFR from Southend Airport and was in receipt of a BS from Doncaster Radar. The PA31 was operating from Retford/Gamston Airport on a VFR survey flight, monitoring Gamston Radio (A/G) frequency 130·475MHz and not in receipt of an air traffic control service.

Controllers at Liverpool provide the Doncaster Approach Radar service. The Doncaster 10cm radar is situated on the airfield at Doncaster/Sheffield and the PSR data is transported to Liverpool via a dual data communication channel link. The Claxby SSR data feed is provided by NATS. The workload was assessed as light/medium.

CAA ATSI had access to RT and radar recordings from Doncaster together with NATS area radar recordings and written reports from the controller and both pilots.

METAR EGCN 020850Z 24008KT 9999 FEW024 10/06 Q1011=

At 0900:18, the BE90 flight established contact with Doncaster Radar and, after being allocated the Doncaster/ Sheffield Conspicuity squawk 6160, was instructed to standby. Doncaster Radar showed the BE90 positioned 16nm SE of Doncaster with the PA31 12nm N of the BE90.

At 0901:07, the BE90 pilot was asked to, *"pass your message"* and the following RT exchange took place:

BE90*"(BE90 c/s) is a Beech ninety inbound to you from Southend er VFR currently er one two miles to the southeast at er two thousand feet er VFR requesting a VFR join."*

Controller*"(BE90 c/s) Doncaster roger and operating er Runway two zero the Doncaster QNH is one zero one one what service are you looking for when you're outside."*

BE90*"One zero one one just a Basic Service will be fine (BE90 c/s) we've got Charlie copied.*"

[Doncaster radar showed the distance between the 2 ac as 5nm (0901:32) with both ac indicating an altitude of 1900ft.]

Controller*"(BE90 c/s) roger Basic Service you have cleared to enter the Doncaster control zone not above two thousand feet VFR routeing left base runway two zero."*

BE90*"Clear to enter not above two thousand feet VFR er and for left base runway two zero (BE90 c/s)."*

[UKAB Note (1): At 0902:28, using Claxby SSR data (at short range), the BE90 is tracking NW with the PA31 in its 2 o'clock at a range of 1nm. The BE90 is indicating FL020 (altitude 1940ft QNH 1011hPa) and the PA31 at FL019 (1840ft QNH). The 2 ac maintain their levels and tracks until 0902:40, with the PA31 in the BE90's 0230 position at a range of 0·2nm. The CPA occurs before the next radar sweep at 0902:44, which shows the ac having crossed, the PA31 is passing 0·3nm behind the BE90 which was indicating FL017 (altitude of 1640ft). At the CPA it is estimated that lateral separation was <0·1nm. However the vertical geometry shown on the radar recording does not accord with that reported by BE90 pilot who stated that the PA31 was first seen slightly above and his avoiding action descent increased the separation between their ac. The radar recording shows the BE90 100ft above the PA31, until just before the ac cross, and then 200ft below on the sweep after the CPA. By interpolation this would put vertical separation as about 50ft however both pilots reported vertical separation of about 200ft.]

At 0903:08, as the BE90 entered CAS the following RT exchange occured:

Controller*"(BE90 c/s) just entering controlled airspace Radar Control report the field in sight."*

BE90*"Entering controlled airspace er Radar Control wilco and er can I just report an Airprox."*

Controller*"(BE90 c/s) that is understood you were on a Basic Service there was seven thousand traffic observed in your vicinity but on a Basic Service you don't pass traffic information - pass the details."*

BE90*"I realise that just er saw quite late on my right slightly higher a light twin and I think maybe a P A thirtyone or similar and yeah I just say it's for paperwork purposes I yeah so I descended a few hundred feet to keep well clear."*

The controller, when asked about the observed 7000 squawk, indicated that it was not unusual to have 12 or so ac operating in the area on a BS and it was not normal practice to identify or monitor such flights. Had the pilot requested a TS, the controller's normal practice would be to identify the flight, projecting a 1min predictive line from the ac label and passing appropriate TI when necessary. The controller indicated that the BE90 pilot had commented that he was fine with a BS and given the good weather conditions, the controller was content that the pilot was keeping his own lookout.

The controller remembered observing the 7000 squawk but had judged at the time that, given the distance between the 2 ac, there was no need to pass any information. The controller was not monitoring the 2 flights and indicated that given the operating range of the radar display and the label overlap of the 2 ac, it was not immediately clear that the 2 ac were in very close proximity.

The BE90 pilot and controller had agreed a BS and the controller allocated the Doncaster conspicuity code. CAP774 UK Flight Information Services Chapter 2, Paragraph 1 states:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.'

When the BE90 flight contacted Doncaster Radar, the distance between the 2 ac was 12nm, the weather was good and the controller was content that the pilot was maintaining his own lookout. There was no requirement for the controller to monitor the flight or pass any TI. When the BE90 flight was given a joining clearance, the distance between the ac was 5nm. The controller believed that the SSR labels had started to overlap as the range between the 2 ac had reduced and the controller had not been aware of the close proximity of the 2 ac. CAP774 UK Flight Information Services Chapter 2, Paragraph 5 & 6 states:

'Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ), and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot's situational awareness. This will not normally be updated by the controller/FISO unless the situation has changed markedly, or the pilot requests an update. A controller with access to surveillance-derived information shall avoid the routine provision of traffic information on specific aircraft, and a pilot who considers that he requires such a regular flow of specific traffic information shall request a Traffic Service. However, if a controller/FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

'Whether traffic information has been passed or not, a pilot is expected to discharge his collision avoidance responsibility without assistance from the controller/FISO.'

The PA31 flight, operating VFR in Class G airspace, was monitoring Gamston A/G Radio and was not in receipt of an air traffic control service. The BE90 pilot was content with a BS. Neither of the 2 pilots had requested a higher level of service, such as a TS, which would have provided TI and a better situational awareness of the traffic environment. CAP774 UK Flight Information Services Chapter 1, Paragraph 8 states:

'Fundamental to the provision of the UK FIS outside controlled airspace is the standard application of the services to prevent the boundaries between the services becoming confused. Agreement to provide a service and acknowledgement of that level of service by a controller/FISO and pilot respectively, establishes an accord whereby both parties will abide with the definitions of that service as stated herein. Once an accord has been reached the controller/FISO shall apply that service as defined…'

The controller and BE90 pilot agreed the provision of a BS and the controller was not required to monitor the flight or provide any TI. The controller was not aware that the 2 ac were in close proximity and was not able to provide a warning.

The Airprox occurred in Class G airspace when the pilot of the BE90 became concerned by the close proximity of the PA31. The BE90 flight was in receipt of a BS and there was no requirement for the controller to monitor the flight.

The situation was resolved when the pilot of the BE90 sighted the PA31 and descended to increase the vertical separation between them.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

As the incident occurred in Class G airspace, both crews were responsible for maintaining their own separation from other traffic through see and avoid. Although the Wx was suitable for VFR, a pilot Member thought that the PA31 pilot would have been better served talking to Doncaster while operating to the E of the CTA/CTR, particularly when he had been setting up his onboard equipment. He advised that survey ac frequently have additional instrumentation in the cockpit that can physically interfere with pilots' lookout and/or draw their attention into the cockpit; although it was not clear whether these were factors in this incident, he would always recommend a TS for survey flights. It was also unclear why the BE90 pilot had requested a BS. That said, a controller Member opined that as the inbound BE90 flight had been cleared to enter CAS, 1min before the CPA and was about to receive a RCS, he would have expected the controller to give a traffic warning on the converging PA31. The ATSI Advisor informed Members that the controller had seen the PA31's squawk when the subject ac were 10nm and 5nm apart but then did not monitor the flight's progress. Although under a BS a controller may pass a traffic warning under Duty of Care, in this case the controller judged that there was no need to pass a warning. The PA31 pilot reported looking ahead at Wx in the E Midlands area when he first saw the BE90 as it passed about 200ft below, too late to take any avoiding action, which Members agreed was effectively a non-sighting and part cause of the Airprox. The BE90 pilot saw the converging PA31, which had right of way under the RoA Regulations, about 800m away and slightly above, which was thought to be a late sighting and other part cause of the Airprox. He commenced an immediate descent to increase separation, estimating he passed 300ft below and 50m clear of it at the CPA. The visual sighting and prompt action taken by the BE90 pilot was enough to persuade the Board that any risk of collision had been quickly and effectively removed.

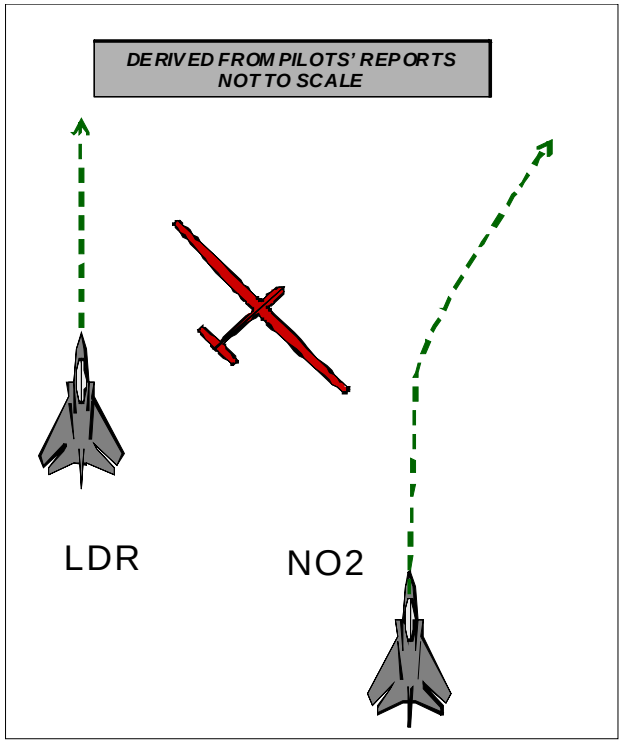
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the PA31 pilot and a late sighting by the BE90 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012049

Date/Time:	16 Apr 2012 1236Z	
Position:	5305N 00350W (30nm SE RAF Valley)	
Airspace:	UKDLFS/Lon FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Tornado GR4	Schleicher ASW27
Operator:	HQ Air (Ops)	Civ Pte
Alt/FL:	1500ft	2500ft
	RPS	QNH (1022hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	30km	>50km
Reported Separation:		
	20ft V/50ft H	50ft V/30m H
Recorded Separation:		
	NK	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports flying a grey ac as No 2 of a pair on a tactical low-level sortie, squawking 7001 with Mode C. While heading 061° at 430kt conducting a rejoin after a simulated attack, they were flying at about 1500ft agl, in a 'sanctuary level', with much of their lookout focussed on regaining visual contact with their leader in the 30sec up to the CPA; they became visual with him as his ac passed below and in front of them. Upon looking out to turn L for the rejoin, the pilot saw a white glider in level flight about 400m away in their 12 o'clock position, co-height and flying from their L to R. He took immediate avoiding action by bunting and rolling to the R.

Once clear of the glider they positioned to confirm the glider was unaffected and re-acquired the ac about 2nm to the S in the vicinity of the Airprox location. The sortie was then continued without any further incident. Although he assessed the risk as being high, he did not report it on the radio at the time as he was unsure of what frequency the glider would be operating on.

After landing the nearest gliding clubs to the incident location were contacted to find out if one of their ac had been involved.

THE SCHLEICHER ASW27 PILOT reports flying a white glider on a cross-country task from Lleweni Parc, Denbigh listening out on a glider common frequency; SSR and TCAS were not fitted. Initially soaring conditions were good with a cloudbase of about 5500ft alt but were forecast to deteriorate mid-afternoon with an approaching warm front. Approaching his first turn point at Blaenau Ffestiniog at about 1200 the soaring conditions were deteriorating with the approaching front so after rounding the turn point he retreated to better conditions across the Conwy Valley, with a downwind track of about 045° at 65kt. When he was S of Betws y Coed at an alt of 2500ft he became aware of a fast jet passing R to L behind and below his left wing immediately followed by another passing much closer (first seen about 100m away) and below his right wing while in a right turn; he estimates that at the closest point it was 30m away.

He took no avoiding action as there was no time but assessed the risk of collision as being high.

He reported the incident on landing.

UKAB Note (1): The Valley METAR was:

EGOV 151250Z 34019KT 9999 FEW028TCU 10/02 Q1020 BLU NOSIG

UKAB Note (2): One of the Tornados can be seen on the Prestwick combined radar. The other ac and the glider do not show at any stage, although another very intermittent primary contact shows about 5nm to the E of the reported incident position. Two other RAF Valley recoveries can be seen in the area.

HQ AIR (OPS) comments that this Airprox highlights the need for military pilots to continue to lookout in all sectors during a formation rejoin; lookout must not be concentrated solely in the sector where the other formation member is expected to be.

This part of LFA 7 is an area of intense low level military flying training; on any given day many fast jet aircraft will be operating in the area where this Airprox took place. Military aircrew conducting training in the area are aware of the glider site at Lleweni Parc and tend to plan not to operate as far E as the glider site, but recognise the possibility of encountering gliders almost anywhere. Equally, glider pilots must understand where military aircraft activity is concentrated and where their chance of an encounter with a military fast jet is significantly increased. Recognising that the main risk will be from a Valley-based Hawk, it has been suggested by members of this Board that a representative from the gliding club visits RAF Valley where he might see at first-hand the level of activity that takes place on the area known as the 'northern plain'; advice may then be considered for glider pilots flying from the club during weekdays, on the best way to manage their risk. Increased liaison between the Station and the club would be welcomed and improve awareness and safety for all users of the airspace. The use of a Transponder in this case would not have helped the Tornado crew with an earlier detection of the glider as TCAS is not yet fitted to Tornado, although it is under consideration. However, the use of Mode C by gliders should be encouraged given that most Valley-based fast jet ac have TCAS II fitted.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar recordings and reports from the Tornado operating authorities.

Members were briefed that the Tornado station and the gliding community co-operated well and quickly identified the glider involved in this incident, facilitating speedy and accurate reporting.

The Board noted that this incident took place in a busy part of Class G airspace where pilots have a responsibility to see and avoid other ac. The gliding Member informed the meeting that Lleweni Parc is a regenerated site and that visitors who might not be familiar with local conditions are frequent. Even in deteriorating weather he was surprised that a glider would be operating at such a low altitude; that being the case he opined that the Tornados too would not have expected to see a glider at that alt and position where the terrain in Snowdonia (10nm to the W) is over 3500ft.

Nevertheless 'see and avoid' pertained and the (unpowered) glider had right of way under the RoA. Although the No2 Tornado crew did see the glider, they recognised that the sighting was late and the Lead crew, who also had a lookout responsibility, did not see the white glider at all. The Tornados were approaching the glider from the rear quarter at about 400kt closing speed and it would have taken about 2sec to cover 400m, the estimated range that the No2 pilot saw the glider. That being the case, the Board agreed that the effectiveness of the avoidance taken by the Tornado would have been marginal. The glider pilot, understandably due to the geometry of the incident, did not see either Tornado until after they had passed.

A majority of Members believed that due to the high closure rate and uncertainty regarding the small separation extant, there had been a risk that the ac would have collided.

AIRPROX REPORT No 2012049

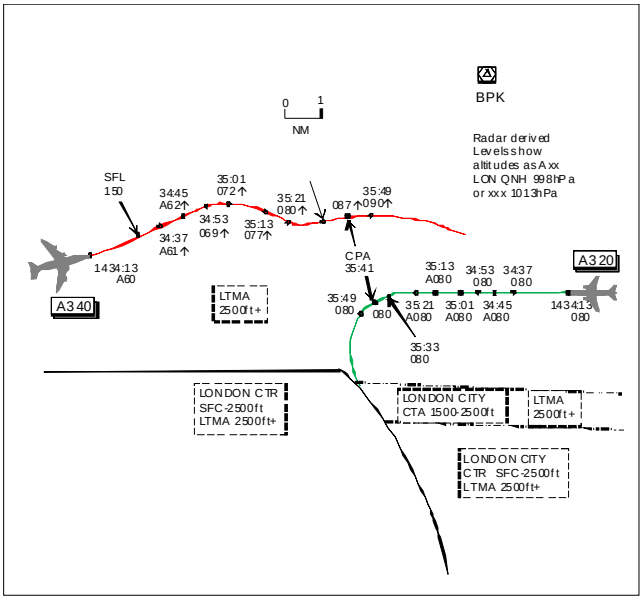
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the Tornado crews.

Degree of Risk: A.

AIRPROX REPORT NO 2012050

Date/Time:	17 Apr 2012 1436Z	
Position:	5139N 00012W (13nm W LAM)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A320	A340
Operator:	CAT	CAT
Alt/FL:	FL080	↑FL150
Weather:	VMC NK	IMC NK
Visibility:	NK	NK
Reported Separation:		
	500ft V/2·5nm H	NK
Recorded Separation:		
	700ft V/2·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports inbound to Heathrow, IFR, heading 270° at FL080 and 220kt as instructed by ATC. When 10nm W of LAM a TCAS TA was triggered by an A340 and ATC issued a L turn onto 110°. He estimated minimum separation was 2·5nm horizontally and 500ft vertically and he reported this to ATC.

THE A340 PILOT reports outbound from Heathrow, IFR, following a BPK7G SID; they were levelled at 6000ft in cloud with moderate turbulence and were under a high workload owing to thunderstorm activity. After some time ATC told them to, "maintain heading and climb FL150". However, as PF, he thought he heard 'heading 150° climb FL150'. He pulled for open climb, and the FO checked this, but he then also put the turn to 150° in whilst the FO was looking at the radar picture and outside at Wx. After a matter of seconds ATC told them to turn L immediately onto heading 040°, which was when the FO picked up the mistake. He (PF) disconnected the AP and turned the ac immediately onto heading. ATC asked if they had a problem as a navigational error had occurred. He apologised, admitted his error and explained that he had not heard the first word "maintain" and transposed the sentence to "heading 150° and climb FL150".

THE LTC HEATHROW INT N CONTROLLER reports the A320 was 7nm W LAM on radar heading 270° at FL080. The A340, on a BPK SID, was seen 3nm WNW of the A320 climbing through FL079 and in a R turn towards the A320. He gave the A320 flight a L turn onto 110° in order to ensure separation and passed TI. The A340 continued to turn towards the A320, whose crew told him that they had the A340 on TCAS and later that they were visual. He considered using the phrase 'avoiding action' but, as TI had been passed and the crew had the A340 on TCAS and were visual, he elected not to. At this point the only avoiding action available to him was a descent which may have contradicted TCAS and should not be passed. He continued to pass TI until the event was over.

THE LTC NE RADAR CONTROLLER reports the A340 flight on a BPK SID was instructed to continue present heading and climb FL150. He then observed the ac begin a R turn, while climbing through FL077, towards an A320 which was downwind traffic at FL080. The A340 flight was instructed to turn L 20° and it was realised immediately that this was not going to resolve the conflict so an avoiding action L turn heading 040° was issued. He, the mentor, stepped in to reiterate avoiding action and pass TI. The A340 appeared to turn L briefly and then make another turn to the R. After querying this, the pilot advised that he had thought the instruction was to climb to FL150 and fly heading 150° and apologised for the mistake.

ATSI reports that the Airprox was reported in LTC airspace when an A340 and an A320 came into confliction at FL080 approximately 14nm W of LAM.

AIRPROX REPORT No 2012050

The A340 had departed London Heathrow for a flight to the Far East and was in receipt of a RCS from LTC NE on the NE Deps frequency 118·825MHz. The A340 was operating on SSR code 5204.

The A320 was inbound London Heathrow and was in receipt of a RCS from LTC Heathrow INT DIR N on frequency 119·725MHz. The A320 was operating on SSR code 3125.

The LTC NE sector was being operated by a trainee and mentor using surveillance from the Debden Radar. The NE sector included the LAM Sector and NE Deps at the time of the incident. ATSI assessed the traffic/RT on the NE sector as moderately light. The LTC DIR N was operating using Swanwick Multi-Radar Tracking (MRT).

ATSI had access to both pilot reports, NE and LL INT DIR N controller reports, recorded area surveillance and transcription of frequencies 118·825 and 119·725MHz.

The London Heathrow METARs were:-

EGLL 171420Z 25017KT CAVOK 13/01 Q0997= and METAR COR EGLL 171450Z 26015KT CAVOK 13/01 Q0997 TEMPO 4000 SHRA TSGR BKN012CB=

The A320 flight called LL INT DIR N at 1428:16 inbound LAM descending FL120. The A320 crew was instructed to leave LAM on a heading of 270° at 220kts. The A320 flight was then given stepped descent through consecutive flight levels.

The A340 flight called LTC NE at 1430:20 passing 2400ft for 6000ft on a BPK7F SID. The NE trainee requested the A340 flight to squawk ident.

Having just passed LAM, the A320 flight was instructed to descend FL080 at 1432:30. At the same time the A340 had reached altitude 6000ft and was inbound CHT in accordance with the SID. Once clear of traffic being vectored for arrival to London Heathrow, the A340 flight was instructed, at 1434:15, "…*continue present heading climb now flight level one five zero."* This was read back, "*continue present heading and climb flight level one five zero (A340 c/s)."* Mode S showed that the A340's heading at this time was 065° (inbound BPK).

The A340 continued on a Mode S reported heading of 065°for a further 30sec, after which, from 1434:45, Mode S indicated that a R turn was being executed. By 1434:53 the A340 was passing FL069, 8nm WNW of the A320, which was maintaining FL080. The A320 was continuing on its W'bound heading with approximately 3nm to run before it could be expected to be vectored L into the arrival sequence. Although the A340's turn had commenced it was not yet appreciably off the inbound BPK track.

At 1435:00 the A340 was 30° to the R of the SID track (Mode S heading 095°) and the NE trainee instructed the A340 flight to, "…*turn left twenty degrees*", and after a correct read back the NE trainee transmitted, *"(A340 c/s) avoiding action turn left now heading zero four zero degrees*." Immediately after the read back of the heading the NE mentor assumed control of the RT and passed TI, *(A340 c/s) twelve o'clock er flight level eight zero left turn immediately heading zero four five."* The A340 pilot responded, "*we're turning left this time (A340 c/s)."* The A340 was further instructed to, "…*expedite climb.*"

Low-Level STCA activated between the A340 and A320 at 1435:13. Separation between the 2 ac was 5·2nm/ 300ft (3nm or 1000ft required). See Figure 1.

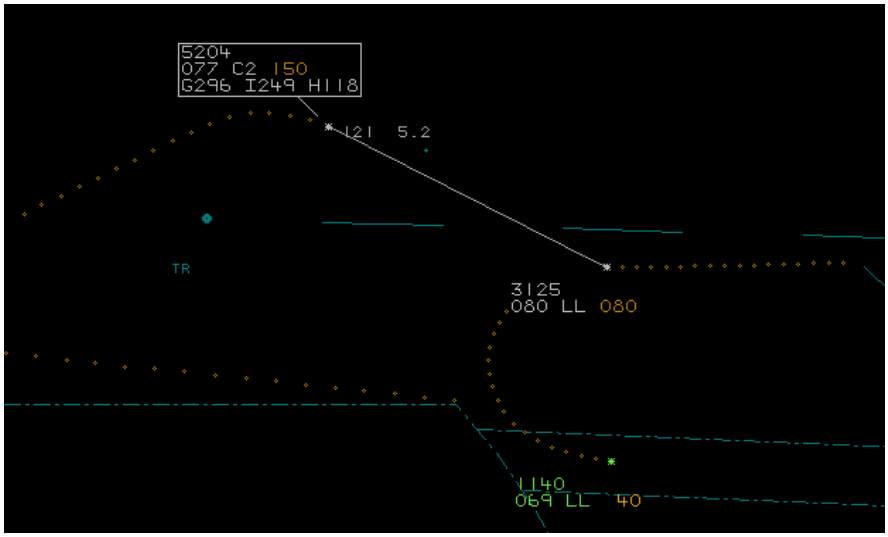


Figure 1: (Swanwick MRT) 1435:13 UTC

At 1435:15 LL INT DIR N instructed the A320 flight, *"(A320 c/s) turn left heading one one zero degrees."* Following a correct read back the LL INT DIR N controller stated, *"That's it there is traffic in your* (1435:20) *right er one o'clock range of four miles climbing er climbing above you*." The pilot responded, "*Thanks er yeah on TCAS*." The LL INT DIR N then informed the A320 flight, "*He's turning away from you now (A320 c/s).*" The pilot replied, *"(A320 c/s) copied and er looking* (1435:40) *now visual*."

High Level STCA was activated at 1435:21 as the A340 passed FL080, Mode S heading 111°, 4·1nm NW of the A320. (See Figure 2). On the next update of the surveillance replay the STCA down-graded to Low Level and the A340 was observed to have turned L from a Mode S heading of 111° to 102°.

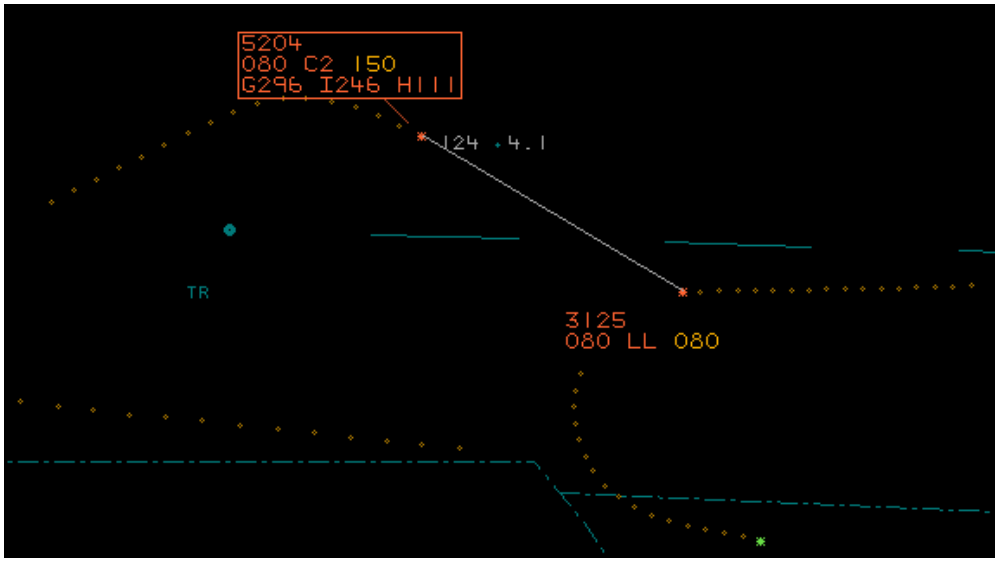


Figure 2: (Swanwick MRT) 1435:21

Separation was briefly lost at 1435:33 when the distance between the 2 ac fell to 2·8nm/400ft. (See Figure 3). At this time the A320 could be seen to be commencing its L turn and the A340 had turned L to heading 084°.

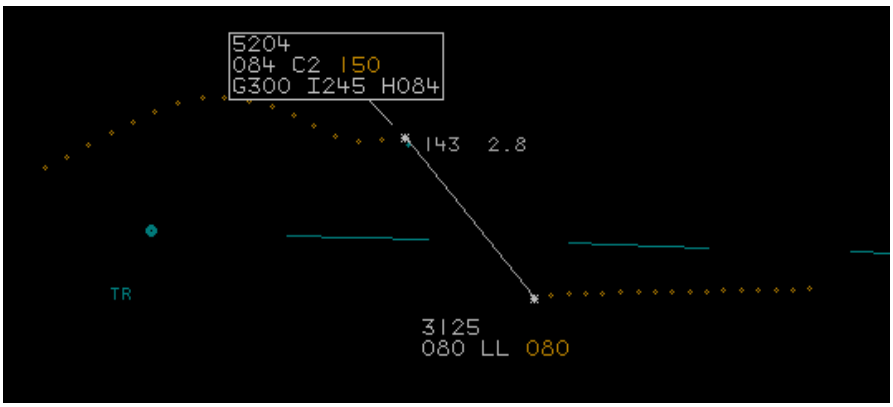


Figure 3: (Swanwick MRT) 1435:33

Surveillance Replay showed that STCA deactivated at 1435:41 but the A340's Mode S heading was beginning to show a R turn. The distance between the ac at 1435:41, the CPA, was 2·6nm/700ft.

Separation was restored at 1435:49 when the A340 passed FL090 (2·9nm/1000ft), the A320 now firmly established in its LH turn and moving away from the A340. At this time the A340's Mode S heading reported that the A340 had turned slightly further to the R onto heading 093° then onto 099°. (See Figure 4).

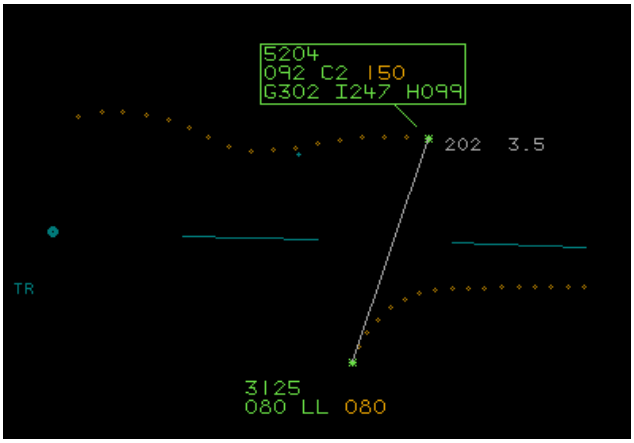


Figure 4: (Swanwick MRT) 1435:57

At 1435:57, the NE trainee, having resumed control of the sector, informed the A340 flight, *"(A340 c/s) you're turning right again turn left now heading zero four zero degrees.*" The pilot replied, "*we're turning left zero four zero*." The NE mentor again assumed control of the sector and informed the A340 crew, "...*you seem to be tracking about er heading of er one hundred at the moment.*" The pilot replied, "*we're turning through zero eight zero for o- zero four zero.*"

The A340 eventually reached a Mode S heading of 114° at 1436:13 before commencing a L turn. Figure 5 shows the 4sec interval trail history of the A340 at 1436:42.

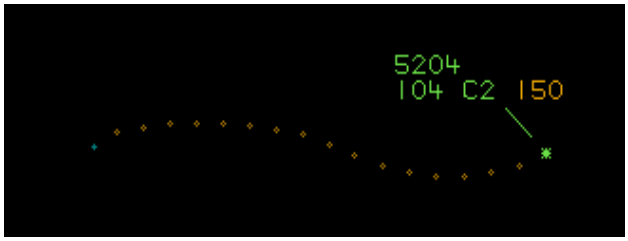


Figure 5: (Swanwick MRT) 1436:42

At 1437:30 the NE mentor asked the A340 pilot if there had been a navigational problem on departure. The A340 pilot responded, "*…apologies I thought you said heading of one five zero climb one five zero…"* The A340 flight was then instructed to resume its own navigation to REDFA and shortly thereafter transferred to the next en-route sector.

The A320 flight was issued with further vectors and descent for landing on RW27R.

The A340 pilot report indicates an increased flight deck workload due to thunderstorm activity in the area.

The NE trainee controller observed that the A340 was diverging from the SID route within 15sec (approximately 2–3 updates of a situation display using Debden radar). Avoiding action was issued immediately thereafter; however, the A340 was in a L turn for 20sec before appearing to re-establish to the R.

The re-engagement of a R turn that followed is not explained by this investigation.

The separation requirement between the 2 ac was either 3nm or 1000ft. Separation was lost for 16sec. The minimum distance between the 2 ac was 2·6nm and 700ft. At this time the 2 ac were diverging and no risk of collision existed.

ATSI did not have access to any TCAS information that may have been generated during the encounter.

An Airprox was reported following a loss of separation between an A340 and A320 in LTC airspace when the A340, having been instructed to continue on its present heading (065°) and climb FL150, commenced a R turn away from its assigned heading.

The pilot of the A340 believed the ac had been cleared on to heading 150° at the same time as being cleared FL150. This belief was likely pre-disposed by the increased flight-deck workload on the A340.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

CAT pilot Members agreed that this incident stemmed from a CRM issue on the A340 flightdeck. Although the crew reported high workload owing to thunderstorm activity, the crew needed to prioritise their tasks to ensure SOPs were carried out normally as well as the extraneous tasks. When the LTC NE controller issued the *"…continue present heading climb now flight level one five zero"* instruction, the FO had read it back correctly but did not monitor the actions of the PF. The FO monitored the PF selecting an 'open climb' on the FMS but did not notice the PF change from Nav to Hdg mode and then select 150°. As a result, the A340 deviated from its assigned heading and turned into conflict with the A320, which caused the Airprox. Pilot Members also discussed the different procedures used by different airlines with respect to pilot's actions in the event of being issued with avoiding action heading instructions by ATC. Some airlines require their crews to disconnect the A/P and fly the turn manually whereas others are required to fly the manoeuvre using the heading bug with A/P engaged, which can lead to a slower turn rate. In this case the A340 crew had reacted in reasonable time to the NE controller's avoiding action instruction, the manoeuvre requiring the crew to reverse from the ac's erroneous R turn into a turn to the L.

The NE trainee controller was very quick to notice the A340's deviation and acted before STCA activated by turning the ac L and then reinforcing the turn with avoiding action. The mentor then re-iterated the instruction as well as giving TI on the A320 before issuing an, *"…expedite climb"* instruction. Simultaneously with STCA activating, the Heathrow INT DIR N had issued the A320 with a L turn away from the A340 and then passed TI. The A320 crew had received a TCAS TA at about the same time and followed the ATC L turn instruction before visually acquiring the A340 passing clear on their R. As the L turns took effect the ac passed with 700ft/2·6nm separation at the CPA. With the actions taken by all parties leading to a minor loss of separation with the ac diverging the Board were able to conclude that any risk of collision had been effectively removed. The A340's subsequent R turn occurred after the Airprox and the Board could not shed any light on why this had occurred.

AIRPROX REPORT No 2012050

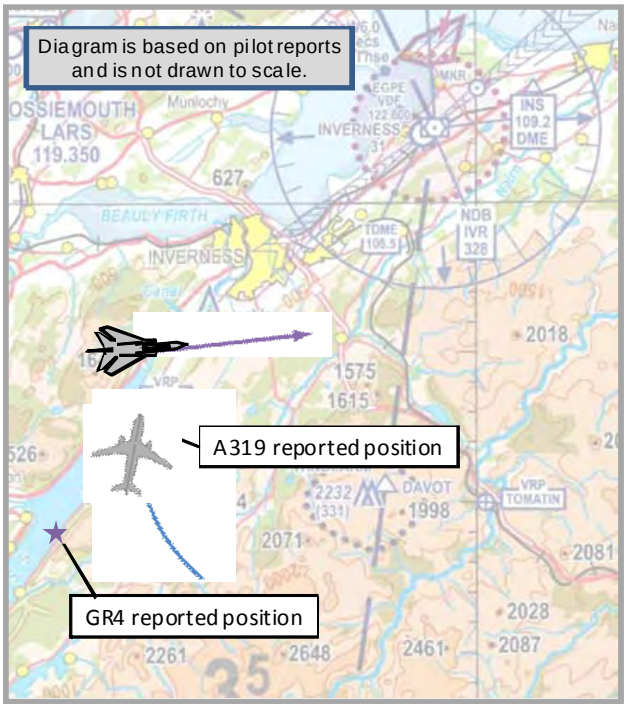
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A340 crew deviated from their assigned heading and turned into conflict with the A320.

Degree of Risk: C.

AIRPROX REPORT NO 2012051

Date/Time:	20 April 2012 0936Z	
Position:	5722N 00420W (15nm SSW Inverness Airport - elev 31ft)	
Airspace:	Scot FIR	(Class: G)
Reporter:	Inverness APR	
	1st Ac	*2nd Ac*
Type:	Airbus A319	Tornado GR4
Operator:	CAT	HQ Air (Ops)
Alt/FL:	3700ft	3000ft↑
	QNH	RPS (982hPa)
Weather:	VMC CLAC	VMC CLAC
Visibility:	NR	20km
Reported Separation:		
	0ft V/1nm H	NK
Recorded Separation:		
	NK	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

INVERNESS APR reports that the Airbus was being vectored for the ILS RW05 and was on R base at an alt of 3700ft.

As the ac was turned onto a closing heading the pilot reported that he was visual with a fast jet and therefore, did not take the turn in order to remain clear of it. A 7001 squawk then appeared on Radar but with no Mode C indication. By not taking the turn onto the ILS the A319 was increasing its separation from the pop up traffic. The A319 was turned L, further away from the unknown traffic and changed to a LH pattern for the ILS.

When later talking to the A319 pilot on the ground, he reported that he had a contact on TCAS to his L and 3000ft below. The ac then pulled up in front of him, carried on climbing and accelerated away; he was visual with the ac throughout and did not receive a TCAS RA.

The Inverness METAR was:

METAR EGPE 200920Z 05004KT 020V090 9999 FEW003 SCT008 BKN018

THE AIRBUS A319 PILOT reports flying a scheduled passenger flight inbound to Inverness under IFR, squawking as directed with Modes C and S and in receipt of a DS from them. While closing with the localiser, heading 010° at 200kt, in and out of cloud but initially IMC, they saw a target on the TCAS screen. As they popped out of cloud into VMC they saw visually a grey/green Tornado ac and simultaneously received a TCAS 'traffic traffic' call.

They took no avoiding action as the Tornado accelerated past them very quickly and only a 'traffic' warning was given by TCAS.

The APR Controller only saw the ac on his radar screen after they pointed it out to him and they were told that the ac was displaying a transponder code that did not require them to contact Inverness as it was in Class G airspace.

After they landed, the Capt spoke with Inverness TWR who liaised with the Radar Controller. The Capt also consulted his company and all agreed that an ASR would be filed.

THE TORNADO GR4 PILOT reports that he was flying as a singleton conducting TFR training at 250ft MSD running from S to N in the Great Glen (LFA14). They were squawking 7001 with Modes C and S listening out on Lossie APP but had not established comms with them. The cloud base was 1200ft amsl (about 300-400ft agl either side of the Great Glen) with broken layers up to 3000ft at which height the weather was clear above. At 0936 while 24nm SW of Inverness Airfield, the TFR was disengaged and a climb of 8-10° nose-up at 320kt was commenced maintaining a track of 035° to clear the terrain and IMC and remain in Class G airspace well clear of ADR N560D. The HP elected not to call Inverness Radar as it would have been impossible to remain VMC below cloud and have line-of-sight comms with them, but instead elected to freecall Lossiemouth Approach in the climb in order to receive a service before crossing N560D. Contact was made with Lossiemouth APP as they passed through 3500ft and once level at 8000ft in VMC they turned onto an Easterly track to cross N560D with Lossiemouth APP.

They were informed on the ground, via Lossiemouth ATC, that Inverness ATC were filing an MOR against the Tornado for passing within 1nm of an A319 – as the A319, having left N560D into Class G airspace, was positioning for the ILS Localiser at 3700ft for RW05 at Inverness.

BM SAFETY MANAGEMENT reports that this Airprox occurred between an A319 operating IFR in receipt of a DS from Inverness APP and a Tornado GR4 operating VFR. Given the relatively low altitude of the Airprox event, it was not displayed on the NATS radar replay; however, Inverness ATC kindly provided BM SM with photographs taken from their radar recording and a short timeline of events from their perspective. This timeline showed that the Airprox occurred at approximately 0935:45 as the GR4 climbed out from low level.

Analysis of the Lossiemouth APP RT transcript showed that the timings were accurate and the GR4 pilot first contacted APP at 0935:52; consequently, LOS ATC was unable to influence the event.

ATSI reports that an Airprox was reported 15nm SW of Inverness Airport when an A319 and a Tornado GR4 came into conflict at 3700ft.

The A319 was operating an IFR flight from Luton to Inverness and was in receipt of a DS from Inverness Radar.

CAA ATSI had access to RT recordings of Inverness Radar, Inverness and area radar recordings and written reports from both pilots and the Inverness Radar controller.

The Inverness METARs are provided for 0920 and 0950 UTC:

EGPE 200920Z 05004KT 020V090 9999 FEW003 SCT008 BKN018 08/07 Q0992=

EGPE 200950Z 04006KT 9999 SCT006 BKN016 08/07 Q0992=

At 0928:30 the A319 contacted Inverness Radar at FL130, a DS was agreed and the pilot was instructed to descend to FL080. The Inverness Radar controller subsequently gave descent and heading instructions to the A319 pilot to position the ac on right base for the ILS approach to RW05.

At 0935:30, as the A319 was level at alt 3700ft and the controller instructed the pilot to turn R onto 020° in order to close the localiser from the R. The pilot replied that a Tornado had passed in front of them at a range of about a mile.

At 0935:36 a 'pop-up' contact squawking 7001 with no Mode C could be seen on the radar just to the west of the position symbol of the A319, crossing left to right.

At 0935:50, the controller instructed the A319 to turn left heading 360° to increase the separation against the 7001 traffic. There was no height information from the 7001 squawk displayed on radar until the traffic was 2nm E of the A319 and tracking away from it, when the Mode C displayed FL087.

The A319 was subsequently re-vectored for the ILS and landed without further incident.

As both aircraft were in Class G airspace the pilots of both aircraft were ultimately responsible for collision avoidance.

The A319 was in receipt of a DS but as there was no indication of the presence of the Tornado on radar until after the A319 reported seeing it, the Inverness Radar controller was unable to take any action that would have assisted in the prevention of the Airprox.

[UKAB Note (1): The recording of the Prestwick combined shows the A319 squawking 6164, S of Inverness in the descent, until it disappears below radar cover at 0934:05 as it descends through FL055 with FL037 SFL displayed on the Mode S. The Tornado is first seen at 0936:13 squawking 7001 but initially with no Mode C.]

[UKAB Note(2): The controller reports that he spoke with the A319 captain after landing, who stated that he had had a TCAS contact to the L and 3000ft below him. The contact then pulled up in front of him. The A319 captain also states in his Airprox report that the crew were IMC when they first saw the TCAS contact but on entering VMC, saw the Tornado crossing from L to R in a rapid climb and received a 'Traffic, Traffic' call from TCAS.]

HQ AIR (OPS) comments that a combination of weather conditions conspired to create a conflict between an RAF Lossiemouth-based ac recovering to base from low-level in the highlands, and traffic on the approach to RW05 at Inverness. In this case, the Tornado crew were obliged to climb out of low-level and ensured they did so on a north-easterly heading to remain well to the west of ADR N560D, remaining in Class G airspace, clearing IMC as quickly as possible, and obtaining a radar service as quickly as possible. The mandatory requirement for IFF at low-level ensured that the Tornado was detected as quickly as practicable by Inverness and the A319 pilots. Whilst crews are encouraged to obtain a radar service before entering IMC, this is not always possible in light of the local terrain, and remaining below Safety Altitude in poor weather conditions is not an option.

The Station Commander at RAF Lossiemouth has reviewed their local procedures in light of this and another similar incident and has ensured that crews are reminded of airmanship issues regarding operations near other airfields and has mandated additional Flying Order Book restrictions on crews operating in the vicinity of the Inverness approach lanes. These are in addition to extant procedures, over and above those required, regarding the under-flight or transit of ADR N560D and W6D in the vicinity of Inverness. He also noted that continued liaison with the airport operators takes place.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

An Air Cmd pilot Member advised the Board that this Airprox had prompted a review of the procedures and orders to RAF Lossiemouth aircrews to ensure deconfliction with Inverness traffic and ac on the Advisory Route N560D. The BM SM Adviser stated that specified areas had been established within which RAF Lossiemouth crews were required to make initial contact with the Inverness radar controller. The Civ controller Board Members agreed that initial contact with Inverness Approach would have been a more appropriate course of action for the Tornado crew. Although the crew believed they would be unable to contact Inverness before climbing through a cloud layer and elected to call Lossiemouth for a service before crossing the Advisory route, they climbed from low altitude in a position where avoiding Inverness traffic was the priority. Moreover, Inverness would have been able to provide a service while they crossed N560D. Pilot Members agreed but also opined that since the Tornado had to climb through IMC, and so could not visually acquire potentially conflicting traffic, they pulled up too close to Inverness. An earlier climb and provision of radar service from Inverness would have resulted in the incident being avoided.

Prior to CPA, the A319 crew had situational awareness of the conflicting traffic from their TCAS display, such that when they entered VMC they were able to visually acquire the Tornado. However, the Tornado crew were unaware of the proximity of the A319 until after they had landed. The distance at CPA was given as 'about 1nm' over the RT and reported on the Airprox form as 2nm by the A319 pilot, both 'on the nose'. Extrapolation of the radar replay tracks, after 0934:05 for the A319 and before 0936:13 for the Tornado gives an estimated CPA in range of 1.25nm. It is not possible to verify the vertical separation at the CPA due to the lack of Mode C readout on recorded radar from the Tornado. Notwithstanding the lack of awareness of the position of the A319 by the Tornado crew, The

Board assessed that the Airbus crew were alerted to the presence of the Tornado by TCAS and that the GR4 passed at a distance great enough such that there was no appreciable risk of collision.

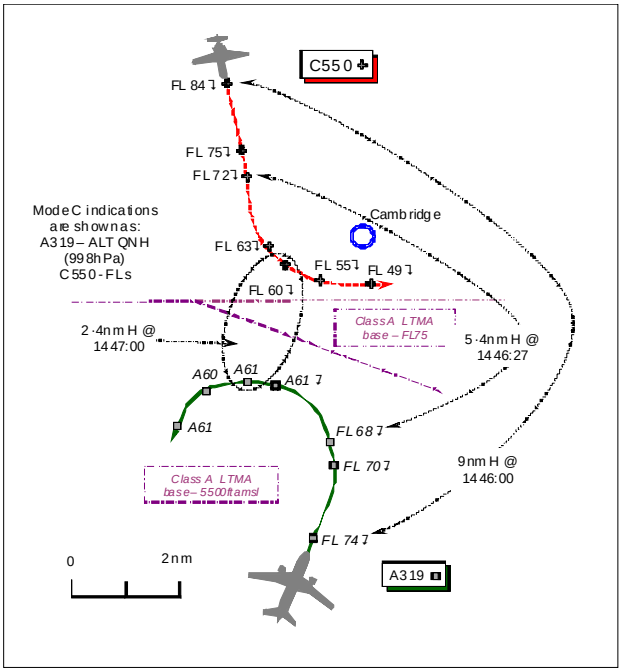
PART C: ASSESSMENT OF CAUSE AND RISK

Cause:The GR4 climbed out of low level through a cloud layer and into conflict with the A319.

Degree of Risk: C.

AIRPROX REPORT NO 2012052

Date/Time:	17 Apr 2012 1447Z	
Position:	5211N 00007E (2·5nm SW of Cambridge)	
Airspace:	LTMA/FIR	(Class: A/G)
Reporter:	LTC Swanwick	
	1st Ac	*2nd Ac*
Type:	A319	C550
Operator:	CAT	Civ Comm
Alt/FL:	↓6000ft QNH (996hPa)	<10000ft↓ (996hPa)
Weather:	NK NK	VMC Rain
Visibility:	NK	>10km
Reported Separation:	NK	NK
Recorded Separation:	550ft V/2·4nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LTC STANSTED INTERMEDIATE CONTROLLER (ESSEX RADAR) reports that the A319 was inbound to Luton and, when O/H BKY, placed on a NE'ly heading with descent to 6000ft QNH (996hPa). After some weather avoidance for another flight, the A319 was turned toward Luton. At this point the Luton controller pointed out the C550 inbound to Northolt on a Charlie arrival working LJAO E. The C550, in Class G airspace, was descending at a high rate in order to get beneath the base of CAS. STCA activated and he issued avoiding action to the A319 crew, turning the ac further L. LJAO E also turned the C550 to the L. Since the A319 was inside CAS and the C550 outside CAS in Class G airspace there was no loss of separation, but in his opinion safety was compromised.

THE A319-100 PILOT completed an Airprox report 3 months after the occurrence. He states that he was in receipt of a RCS descending through 6000ft; no TCAS TAs or RAs were enunciated.

THE CESSNA CITATION C550B (C550) PILOT reports he had just completed a functional check flight (FCF) on an IFR FPL and was flying back to Northolt in VMC, following radar vectors from LATCC (Mil) LJAO E under a DS. The assigned squawk was selected with Modes C and S; TCAS is fitted.

Close to BKY, during the descent at 220kt they received many radar vectors; ATC issued a R turn onto a S'ly heading between 180° to 240° and some seconds later passed an 'immediate L turn' onto a heading between 090° to 150°, but neither he nor his co-pilot could remember the exact heading. The first S'ly turn was not completed before they started the avoidance manoeuvre. The ac they were avoiding was displayed on TCAS but the contact never went yellow; neither a TA nor an RA was enunciated. The other ac - a white twin-engine airliner - was seen and they supposed the minimum separation was at least 6-8nm, but it was too far away to estimate or identify the type of ac and they did not check with ATC. He assessed the Risk as between 'none' and 'low'.

THE LATCC (MIL) LJAO EAST TACTICAL CONTROLLER (LJAO E) reports that at the time of the Airprox he was working only the C550, which had been operating in the East Anglia area on an air test at FL150 under a DS. He had been on console for about 5min when the C550 crew informed him that their air test was complete and requested recovery to Northolt; a R turn onto S was issued to position the ac towards BKY for a 'CHARLIE' Arrival. Two Tornado ac then climbed out of Marham and were coordinated not above FL140, which kept the C550 at FL150. As the C550 was tracking towards BKY he noticed an unknown A7000 squawk, but with no Mode C,

tracking slowly NE at a range of 20nm, which he perceived to be a risk. Therefore, TI was passed to the C550 crew with, in addition, a 15° L turn if the other ac was not sighted; the C550 crew executed the turn which resolved the confliction with the unknown ac squawking A7000. Luton RADAR was prenoted and required the ac to remain below CAS and route towards BKY, descending to 2400ft Luton QNH (996hPa). Following this, he instructed the C550 crew to set the Luton QNH and descend initially to an altitude of 4000ft as the Area Safety Altitude (ASA) in that area was 3300ft, (4000ft to the S of Cambridge where the LTMA base is 5500ft). As the C550 approached 8000ft in descent he informed the crew that below the ASA they would be responsible for their own terrain clearance and asked if the crew could accept TS for further descent. He confirmed acceptance of TS and a descent to 2400ft ALT was issued. At this point his attention was drawn to the A319, inside Class A CAS where the base level is 5500ft (London QNH), descending to 6000ft with a London Luton SSR data block indicator. At this point he believed that the C550's ROD would place it below the TMA and so he did not perceive a confliction with the A319. As the two ac converged he realised that the C550 would not remain outside CAS and issued an avoiding action L turn onto 090° to remain clear of both CAS and the A319. At this point the C550's Mode C indicated above 6500ft ALT, (and above the ASA of 3300ft for that Sector). With the C550 remaining outside CAS and the A319 turning L onto a track of 210° (to remain within CAS), STCA activated, followed by the CAS warning. Once the C550 was below 5500ft he released the crew onto their own navigation towards BKY and then called Luton RADAR. After talking to Luton RADAR he issued the assigned Luton squawk, and passed the ac on to Luton RADAR.

ATSI reports that the Airprox occurred 2.5nm SW of Cambridge Airport, on the northern boundary of Class A CAS (LTMA-9), between an A319 inside CAS and a C550 outside CAS within Class G airspace. The A319 crew was operating IFR, inbound to London/Luton and in receipt of a RCS from the LTC Essex RADAR controller. The C550 was returning IFR to Northolt after the completion of a functional flight check and was in receipt of DS from LATCC (Mil) LJAO E. This changed to a TS just prior to the Airprox.

The Essex RADAR controller's workload was assessed as medium and CB activity in the area resulted in requests for weather avoidance, which added to the complexity of the situation.

The LONDON QNH datum was 998hPa.

The 1420Z Luton METAR: 25015KT 9999 SCT043 12/02 Q0996=

The 1420Z Cambridge METAR: 24017KT 9999 FEW025 SCT040CB 14/01 Q0995=

The C550 crew, under the control of LJAO E, was in receipt of a DS inbound for a Northolt non-airways 'CHARLIE' arrival for RW25. This required the C550 to descend below CAS to an altitude of 2400ft London QNH, routeing via BKY. At 1438:49, LJAO E passed inbound details on the C550 to Luton RADAR in accordance with standard procedures. Luton RADAR issued a squawk of A4676 and agreed to accept the C550 in the descent to an altitude of 2400ft QNH N of BKY.

At 1443:56, the A319 crew contacted LTC Essex RADAR and reported descending to FL90. Essex RADAR gave the A319 crew a heading of 025° and cleared them to descend to an altitude of 6000ft Luton QNH (996hPa). The radar recording shows the A319 passing 15.5nm NE of Luton Airport towards BKY, indicating FL104, with the C550 positioned 27.7nm N of the A319, indicating FL121.

At 1444:30, the Essex RADAR controller became involved in an RT exchange with another ac requesting weather avoidance routeing outside CAS, which increased the RT loading. At 1445:51, Essex RADAR instructed the A319 to turn L heading 250°. The distance between the two ac was 10.4nm. In his written report the Essex RADAR controller indicated that Luton RADAR advised him about the C550 inbound to Northolt via BKY.

At 1446:21, STCA activated at low level – white - and recorded radar data shows the distance between the two ac as 6.5nm. The controller immediately issued avoiding action, "[A319 C/S] *avoiding action continue that turn left heading 2-1-0 degrees there's unknown traffic 4 miles north of you 7 thousand 1 hundred feet descending."* At 1446:32, STCA activated at high level - red (see Fig 1). The A319 pilot responded, *"Copied left heading 2-1-0*

degrees [A319 C/S]". The A319 is shown indicating an altitude of 6300ft with the C550 indicating FL71. [About 6650ft London QNH (998hPa).]

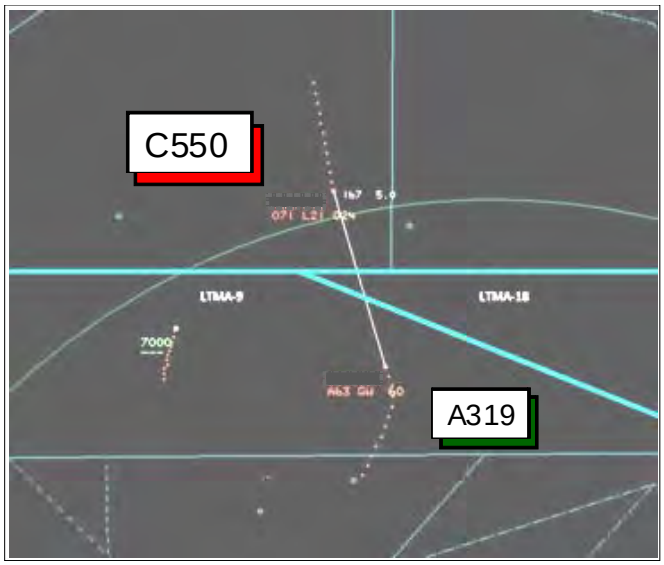


Fig 1 - 1446:32

[UKAB Note (2): At 1446:51, the C550 is shown commencing a L turn onto a SE'ly track. The CPA occurs at 1447:00, when the Stansted 10cm Radar recording shows the distance between the two ac as 2.4nm with vertical separation of 550ft. The A319 was indicating an altitude of 6100ft QNH (998hPa) and the C550 was indicating FL60 – equivalent to about 5550ft London QNH (998hPa).]

At 1447:52, the controller updated the A319 pilot, "[A319 C/S] *descend to altitude 5 thousand feet – to keep you in the picture that traffic was working the military it actually remained outside controlled airspace so there was no loss of separation."* The pilot replied, *"Okay that's copied descend 5 thousand feet* [A319 C/S]". At 1448:42, the controller transferred the A319 to Luton RADAR.

The Essex RADAR controller's workload was medium with added complexity due to weather avoidance. The A319 was approaching BKY when the controller was involved in an RT exchange regarding weather avoidance which would involve another ac leaving CAS. Immediately after this, the controller turned the A319 L onto a heading of 250° and at the same time became aware of the C550 which was descending to 2400ft, through FL87, with a high ROD. The speed, closure rate and tracks of the two ac caused the controller to be concerned. This together with low and high STCA activation caused the controller to give avoiding action to the A319 crew. At the same time the LJAO controller gave the C550 an avoiding action turn onto an E'ly track to remain clear of CAS. The C550 remained outside CAS and was deemed to be separated.

The Manual of Air Traffic Services (MATS) Part 1, Section 1, Chapter 5, Page 12, paragraph 13.1.4, states:

'Although aircraft operating in controlled airspace are deemed to be separated from unknown aircraft flying in adjoining uncontrolled airspace, controllers should aim to keep the aircraft under their control at least two miles within the boundary. Controllers should be aware of the operation of aircraft in adjacent uncontrolled airspace, particularly if circumstances have made it necessary to vector an aircraft to be less than two miles from the boundary. In such circumstances, consideration should be given to co-ordinating with the appropriate controlling agency if applicable. Unpredictable manoeuvres by unknown aircraft can easily erode separation and controllers should take appropriate action with respect to the safety of the aircraft.'

The Airprox occurred when the controller became concerned about the close proximity and trajectory of the C550, which because of the speed and closure rates caused the high level STCA to activate and caused both controllers to give avoiding action. A number of factors were considered to be contributory:

The LJAO controller allowed the C550 to route direct to BKY which, given the level and trajectory of the C550, was unlikely to keep the ac outside CAS and required an avoiding action turn.

The added complexity of the CB activity and Wx avoidance may have limited the controller's ability to recognise the situation earlier and resulted in an avoiding action turn when the controller became concerned about the intentions of the C550.

BM SAFETY MANAGEMENT reports that during the incident sequence the LJAO E controller made a number of skill and knowledge based errors; for brevity, this report will address only those issues that directly involved the Airprox.

The C550 crew had been operating in East Anglia on an air test whilst in receipt of a DS from LJAO E and was the only ac on frequency. Whilst LJAO E described their workload and task complexity as 'low', BM SM contends that the descent of an ac into the lower airspace to affect a handover to Luton is often complicated given the presence of background traffic; this complexity is heightened when the ac in question is in receipt of a DS.

The incident sequence commenced at 1441:34, when LJAO E instructed the C550 crew to descend to FL70, routeing inbound to Northolt. At this point, the C550 was 22nm N of that element of the LTMA with a base of CAS (BoCAS) of 5500ft QNH to the SW of Cambridge and FL75 to the SE of Cambridge. At 1442:53, LJAO E instructed the ac to descend to 4000ft Luton QNH (996hPa). At this point, the C550 was 16.8nm N of the BoCAS, descending through FL135, and the A319 was 35.5nm S of the C550, tracking NNE'ly, descending through FL120. At 1444:42, LJAO E passed TI to the C550 crew on un-related traffic stating, "*traffic right 1 o'clock, 1-5 miles, opposite direction, no height information, if not sighted, turn left 1-5 degrees, report steady with heading*." The deconfliction vector was accepted by the C550 crew and, at 1445:32, they steadied on a heading of 175°. At this point, the C550 was 6.6nm N of the BoCAS descending through FL94; the A319 was 13.3nm SSE, tracking NE'ly, descending through FL82.

At 1445:50, due to LJAO E's ASA, the C550 pilot accepted a TS and LJAO E then descended the ac to 2400ft QNH in accordance with the acceptance altitude stipulated by Luton APP. Based upon LJAO E's report, it was at this point that the controller detected the A319, 10.7nm SSE of the C550, tracking NE'ly, descending through FL76; the C550 was descending through FL88 and was 5.2nm N of the BoCAS. LJAO E state that they believed that the C550's ROD would place the ac beneath CAS and thus clear of confliction. Assessment of the radar replay demonstrates that between 1444:00 and the CPA at 1447:00, the C550's ROD does not reduce below that established at 1445:50; it actually shows an increase. The Unit investigation confirmed that LJAO E did not use the level prediction tool available to them to assess the RoD.

At 1446:14, LJAO E instructed the C550 crew to, "*route now direct BARKWAY*", which was acknowledged. At 1446:21, STCA activated white between the C550 and the A319; the C550 was descending through FL76, 6.5nm NW of the A319 which was commencing a L turn inbound to Luton, descending through FL70. At 1446:26, LJAO E instructed the C550 crew, "*avoiding action, turn left immediately heading 0-9-0 degrees, traffic* [the A319] *was south, 7 miles, tracking north, at Flight Level 6-0*." The description of the A319's level [FL68] as FL60 was erroneous and it is reasonable to argue that LJAO E had mistaken the C550's Mode S SFL for their SSR Mode C. At this point, the C550 was 2.6nm N of the BoCAS.

At 1446:53, the C550's turn in response to LJAO E's avoiding action becomes visible on the radar replay, with the C550 1nm N of the BoCAS and 2.8nm N of A319; the C550 was descending through FL63, the A319 was descending through FL61. The CPA occurred at 1447:00 as the C550 passed 2.4nm NNE of the A319, some 550ft below it. The C550 remained outside CAS throughout the incident.

LJAO E had not assimilated that the ROD of the C550 would place the ac closer to the BoCAS and thus into confliction with the A319. Once LJAO E identified the confliction between the C550 and the A319, either through their own perception of the event geometry or prompted through the action of STCA, LJAO E took positive action to resolve the confliction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Although separation was not eroded between the A319 within the Class A LTMA and the C550 in Class G airspace, the Board agreed the Essex RADAR controller had been entirely justified in submitting this report.

It was evident that the C550 crew was descending to their assigned altitude in Class G airspace in conformity with the instruction issued by LJAO E, who perceived initially the ac would pass clear beneath the base of the LTMA. Analysis of the radar recording suggests that if the C550 had maintained a projected southerly track then it would have been marginally below the BoCAS - at the radar return after the CPA the C550 indicated FL55 - equivalent to about 5050ft London QNH (998hPa) – suggesting the C550 would have remained just beneath Class A CAS where the BoCAS lowers to 5500ft ALT. Horizontal separation against the A319 would, however, have been minimal and in the Board's view, too close for comfort. The LJAO E controller, alerted by STCA, spotted the A319 and also concluded that the C550's track and ROD would be insufficient to keep the C550 in Class G airspace before the ac reached the boundary of the LTMA. Therefore, LJAO E elected to turn the C550 to remain clear of the A319 and also afford more room to manoeuvre clear of CAS. Given the activation of high-level STCA, coupled with the TI from the Luton controller that the C550 was descending inbound to Northolt, the Essex RADAR controller was rightly concerned at the C550's speed and closure rate and promptly issued avoiding action to the A319 crew, turning the ac away to the S. The combined effect of both these complimentary avoiding action turn instructions and the crews' responses ensured that horizontal separation did not diminish below 2.4nm.

It was concluded, unanimously, that the Cause of this Airprox was that the flight profile of the C550 caused the Essex RADAR controller concern. However, the avoiding action turn instructions proved wholly effective in ensuring that any Risk of collision was removed.

The Board noted BM SM's comments about achieving appropriate descent profiles with traffic descending into Class G airspace beneath the LTMA clear of CAS and other traffic, whilst also achieving a handover to Luton; this Airprox highlighted the inherent difficulties and complexity for LJAO controllers when controlling traffic inbound to Northolt in this busy and closely confined airspace. This Airprox was the first of two cases involving traffic in transit to Northolt for a 'C' arrival dealt with by the Board at this meeting. The assessment of the second case - Airprox 2012060 – resulted in a Safety Recommendation relating to the provisions of an ATS to traffic inbound for a Northolt 'C' arrival.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C550's flight profile caused the Essex RADAR controller concern.

Degree of Risk: C.

AIRPROX REPORT No 2012053

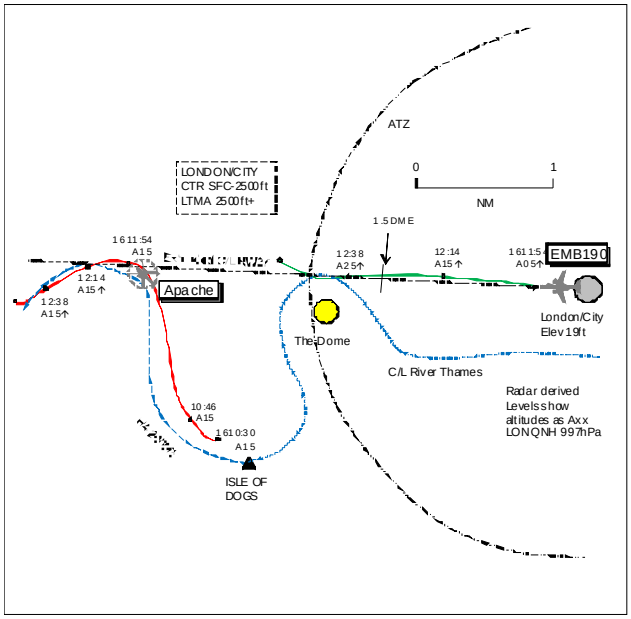
AIRPROX REPORT NO 2012053

Date/Time: 17 Apr 2012 1612Z

Position: 5131N 00001E (1·5nm W London/City - elev 19ft)

Airspace: ATZ/CTR (Class: D)

	Reporting Ac	*Reported Ac*
Type:	EMB190	AH64
Operator:	CAT	HQ JHC
Alt/FL:	1500ft↑ QNH	1500ft QNH
Weather:	VMC NR	VMC CLBC
Visibility:	>10km	20km
Reported Separation:	300ft V/1nm H	NR
Recorded Separation:	Nil V/2·6nm H OR 1000ft V/2·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMB190 PILOT reports on departure from London/City, IFR, and in communication with City Tower on 118·075MHz squawking with Modes S and C. While lining-up RW27 ATC informed them of an army helicopter holding at the Isle of Dogs VRP not above 1500ft. ATC then informed them this traffic would be routeing directly W'bound staying S of the C/L. They confirmed the traffic in sight over the Isle of Dogs well S of the climb-out and they could also see it on their TCAS display showing 1400ft. They were cleared for take-off and as they rotated the Capt, PNF, noted the traffic was not tracking directly W but NW, still at 1400ft. The Capt reported this to ATC as they passed through 500ft however ATC did not speak to the helicopter flight. The helicopter continued closer to the RW27 C//L at 1400ft and the FO, PF, followed the departure flight guidance while the Capt searched for a visual reference; both crew monitored the TCAS display. Heading 274° at 128 kt the FO called for 'climb sequence' at 1000ft aal however the Capt announced that the intention was to delay acceleration owing to the proximity of the traffic. The FO confirmed he had the traffic on TCAS and both crew agreed the safest course of action was to continue at V2+10kt to out-climb the helicopter. The climb sequence/acceleration was completed at 2000ft aal with all other SOPs adhered to. He estimated the helicopter was within 1nm and 300ft below as they followed the SID passing 1500ft climbing straight ahead to the 1·5nm turn point on the CLN departure. No TCAS TA or RA was generated and he assessed the risk as high.

THE AH64 APACHE PILOT reports en-route from Wattisham to Middle Wallop VFR and in communication with London/City Tower on 118·075MHz squawking with Modes S and C. Earlier he had been cleared by Heathrow Radar direct from QE2 Bridge to the Isle of Dogs. As they approached they were transferred to City Tower and the controller gave them clearance to enter heli-route H4 with a clearance limit London Bridge at standard operating altitudes. ATC subsequently provided TI on an ac shortly to depart London/City, the EMB190, which they were visual with on the RW. ATC then informed the EMB190 flight of their helicopter and then cleared the ac for take-off. At this point they turned N following H4 from the Isle of Dogs at 70kt and as they reached the bend of the river the EMB190 crew advised ATC that the previously called traffic, their helicopter, was on the C/L going N. This statement was absolutely correct as that is where the heli-route H4 is. The controller acknowledged the call but passed no comment or instructions. They continued to follow the river as it turns W and then S towards London Bridge. He believed that there was no conflict at any time and thought the EMB190 crew were under the mis-apprehension that his helicopter was somewhere where it shouldn't have been. The fact the controller didn't pass comment or instructions to either flight suggested that he didn't understand why the EMB190 crew has passed comment on his helicopter's position, presumably as he could see his helicopter was where it should have been and that the route would shortly turn W and S again. The EMB190 crew may not have known this and perceived that a collision was possible. After being passed the TI on the EMB190 he had maintained 1500ft instead of climbing to 2000ft which had increased separation. SA could have been improved if ATC had responded

to the EMB190 crew's call by informing them that his helicopter would be turning W and then S. If he had perceived a risk, not knowing the EMB190's departure route or what other traffic was a factor, his only option would have been to maintain his cleared route knowing that the controller was aware of both ac's positions and had provided adequate separation. Subsequently they continued along the route as cleared, no comment was passed on the RT or was an Airprox notified on any of the frequencies he used en-route. He was unaware there had been a perception or actual risk of collision until being contacted 1wk post incident. He assessed the risk as none.

ATSI reports that the Airprox was reported by the crew of an EMB190 when it came into proximity with an AH64 Apache helicopter as the EMB190 departed London City's RW27.

The EMB190 was departing London City RW27 on a CLN7T SID for an IFR flight to Amsterdam and was in contact with London City TWR on 118·075MHz. The Apache was on a VFR flight from Wattisham to Middle Wallop and at the time of the incident was in contact with London City TWR on 118·075MHz.

[UKAB Note (1): The UK AIP at AD 2-EGLC-6-3 CLN7T SID RW27 states 'Climb and maintain 3000 – straight ahead until I-LSR d1.5 turning right (MAX 210KIAS) onto LON VOR R076 to be level by LON D18 (7.94%). Resume normal speed. At LON D25.5 turn right onto BNN VOR R106. At BNN D32 turn left onto CLN VOR R246 to CLN VOR.']

ATSI had access to pilot and controller reports, recorded area surveillance, recordings of the London City TWR frequency, Heathrow SVFR frequency and the London City Coordinator's telephone line. In addition ATSI received the London City unit investigation report.

The prevailing weather for London City was: METAR EGLC 171550Z 26021KT 9999 –SHRA FEW022 SCT030 09/05 Q0997=

At 1551:40UTC the Apache pilot called LTC Heathrow SVFR (SVFR) on 125·625MHz. The Apache was identified and given a BS. The SVFR controller instructed the Apache to route direct from the Queen Elizabeth II Bridge to the Isle of Dogs, VFR, not above altitude 1500ft.

The EMB190 crew called London City TWR at 1557 and was issued with squawk and clearance, then the ac's start-up was approved.

At 1559:20 SVFR called London City TWR and notified TWR of the Apache, which was, "…*going direct to the southern tip of the Isle of Dogs not following the river*".

The EMB190 crew called for taxi at 1603:40 and was instructed to taxi to holding point 'Delta'.

At 1605:40 SVFR spoke to the London City Coordinator to enquire as to whether or not they wished to work the Apache. The London City Coordinator elected to work the Apache and details were passed. SVFR informed the London City Coordinator that the Apache intended to route along H4 from the Isle of Dogs to London Bridge. At the same time, the TWR controller informed a departing C510 that, "…*an Apache helicopter about a mile south of the field will be holding two miles southwest.*" Shortly after, at 1606:40, the EMB190 flight was instructed to backtrack and line-up.

At 1607:34 the SVFR controller re-iterated the Apache's clearance limit as the southern tip of the Isle of Dogs and the Apache flight was instructed to contact London City TWR. The Apache was 2·2nm E of the Isle of Dogs VRP at 1100ft.

The Apache flight called TWR at 1608:20 as it approached the Isle of Dogs. The Apache pilot was instructed, "…*you can continue westbound H four to London Bridge*" and was instructed to operate at 'standard altitudes'.

At 1610:29 the Apache flight, having just passed the Isle of Dogs VRP, was passed TI, "…*shortly to depart from runway two seven is an Embraer one ninety will be turning north roughly abeam the Dome climbing three thousand feet.*" The Apache pilot acknowledged the TI with, *"…copied the traffic"*.

At 1610:45 the EMB190 crew was informed, "…*traffic information for you there's an Apache helicopter approximately two and a half miles southwest of the field indicating fifteen hundred feet continuing westbound."*

AIRPROX REPORT No 2012053

The EMB190 pilot reported visual and was then cleared for take-off. The Apache was 3nm WSW of the London City ARP at altitude 1500ft and turning on to a N'ly track as it joined the H4 heli-route inbound London Bridge.

By 1611:49 the Apache had reached a position on H4 concomitant with the extended C/L/climb-out track for the London City RW and was turning onto a W'ly track at altitude 1500ft.

At 1611:53 the EMB190 crew reported, "…*that traffic's* (the Apache) *directly on the centreline now."* The TWR controller responded, "*Roger*."

[UKAB Note (2): The EMB190 first appears on the radar recording at 1611:54 0·4nm W of London/City climbing through altitude 500ft, 2·9nm E of (and behind) the Apache, which is turning through W, level at altitude 1500ft.]

By 1612:17 the EMB190 was passing 1600ft 2·6nm E of the Apache (see screenshot below).

[UKAB Note (3): As the EMB190 climbs through altitude 2500ft at 1612:38, the Apache is 2·2nm ahead and 1000ft below.]

The Apache flight was instructed to contact Heathrow SVFR at 1612:40.

The EMB190 commenced a RH turn on its allocated SID having reached 3000ft at 1612:57. The Apache was 2nm W of the EMB190 at 1500ft continuing on a W'ly track in the vicinity of Wapping.

The EMB190 flight was instructed to contact LTC NE at 1613:00.

The incident occurred in Class D CAS, within which there are no prescribed separation standards between IFR and VFR flights. Controllers have a responsibility to prevent collisions between known flights; therefore in Class D airspace controllers pass sufficient TI to IFR and VFR flights to assist pilots in avoiding each other.

The London City TWR controller passed TI to both the Apache and the EMB190 crews. To the EMB190 the controller stated, "*…an Apache helicopter approximately two and a half miles southwest of the field indicating fifteen hundred feet continuing westbound."* The TI passed allowed the EMB190 crew to form an expectation that the Apache would, literally, continue W'bound. This is amplified in the EMB190 pilot's report, 'this traffic would be routing westbound staying south of the centre line. The Apache was to fly from the Isle of Dogs in an 'upstream' direction along H4, which could be considered as an overall W'bound direction. However, in that position, the upstream heli-route/river direction marks an almost 90° degree turn to the N and intercepts the London City RW extended C/L/climb-out track. Whilst the Apache was continuing as cleared it was not going to continue truly W'bound at that time.

When the EMB190 crew called visual with the Apache, the Apache was only in its turn and not established on a N'ly track. Then, sometime during the EMB190's take-off roll and rotation, the Apache reached the limit of that N/S stretch of the heli-route before turning W. Therefore there was a difference between the expectation of the EMB190 crew with regard to the Apache and the actual flight path of the helicopter, causing the EMB190 crew to amend their SOP as described in their report.

An Airprox was reported by an EMB190 departing London City's RW27 when an Apache - operating in the vicinity as cleared - did not manoeuvre as the EMB190 crew had expected, causing the EMB190 crew to amend their SOP on departure.

Contributory to the Airprox was the TI formulated by the London City TWR controller, which informed the EMB190 crew that the Apache would be continuing W'bound, when its flight path would actually be taking it initially on a N'ly track towards at the extended C/L/climb-out track.

Further to the incident London City ATC recorded the following learning point to be disseminated across the unit and also shared with other units:

"Traffic information must be clear and correct in order to give pilots situational awareness. Simply meeting the requirements of IFR-VFR separation is not enough … and judgement must be used in regards to pilot awareness…"

HQ JHC comments that the Apache crew correctly operated their ac in accordance with the clearance given from ATC, with standardised London helicopter routing and, given that the radar derived CPA was 1000ft/2·2nm, is in agreement with the helicopter crew in there being no conflict at any time.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was clear that the EMB190 crew had a different expectation of the Apache's flightpath from that which was actually flown. The City ADC had informed the crew that the helicopter would route W'bound but the Apache had proceeded in accordance with its ATC clearance to continue W'bound on H4 which involved a turn onto a N'ly track at the Isle of Dogs before turning W and then S following the river while on the extended C/L RW27. The EMB190 crew thought the Apache would stay S of the extended C/L so were concerned when, after visually acquiring the helicopter prior to departure as it commenced its turn at the Isle of Dogs, it then appeared on TCAS in potential confliction immediately after take-off. The crew monitored the helicopter's progress and elected to delay acceleration so as to out-climb it. Members thought that the 'whole picture' would have been painted better to the EMB190 crew had the ADC said the helicopter was 'following the river'. The minimum ATC services requirement for Class D airspace is for TI to be passed to both the IFR (EMB190) and VFR (Apache) flights and to give traffic avoidance advice to the IFR flight if requested; no separation minima are specified. The NATS Advisor informed Members that the turn at the Dome (d1·5 on the CLN7T SID) and the promulgated climb gradient to be followed assists in deconflicting departures from helicopters routeing on heli-route H4. After TI was passed to the Apache pilot he saw the EMB190 on the RW and he was aware of its intended flightpath. The radar recording shows the EMB190 climbing out on the SID to 3000ft, 'in trail' of the Apache, and turning R when over 2nm distant and 1000ft above. Whilst conscious of the EMB190 crew's concern, with both flights flying in accordance with their clearances and safety margins having been maintained, the Board concluded that this had been a sighting report where normal procedures, safety standards and parameters pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

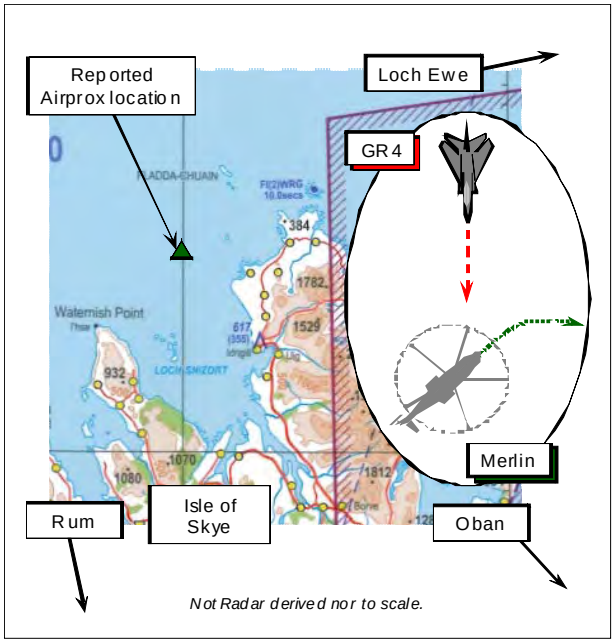
Cause: Sighting report.

Degree of Risk: E.

AIRPROX REPORT No 2012055

AIRPROX REPORT NO 2012055

Date/Time:	19 Apr 2012 1612Z	
Position:	5740N 00630W (Mouth of Loch Snizort - Isle of Skye)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Merlin HM1	Tornado GR4
Operator:	HQ Navy	HQ Air (Ops)
Alt/FL:	500ft	610ft
	QNH (985hPa)	QNH (985hPa)
Weather:	VMC NK	VMC CLBC
Visibility:	20km	20km
Reported Separation:		
	250ft V/¼nm H	400ft V/½nm H
Recorded Separation:		
	Not recorded	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AGUSTA WESTLAND MERLIN HM1 HELICOPTER PILOT reports he was flying a VFR transit with passengers on board from Oban to a warship in the vicinity of Loch Ewe during Exercise JOINT WARRIOR. After departing Oban at 1520Z he routed through the Sound of Mull, E of Rum and W of the Isle of Skye at 135kt, 500ft RAD ALT with the BAR ALT set to the Force QNH (985hPa).

They were in communication with the embarked Air Safety Cell - C/S EAGLE - on the UHF safety frequency of 313·175MHz to assist with deconfliction from an Air Defence Exercise (ADEX), which had commenced at 1530Z; they were also passing 'Ops Normal' calls to the warship via HF. Unable to speak directly to EAGLE because of high ground until they were NW of Skye, traffic could be heard on the frequency so they asked the HF radio operator aboard the warship to relay their helicopter's position to EAGLE so that the Air Safety Cell could deconflict the Exercise fast-jets. This was confirmed on HF as being done and EAGLE was heard to impose a 'hard deck' [lower operating limit] of 1500ft FORCE QNH for all participating fixed-wing ac because of multiple helicopters in the vicinity. Participating helicopters were limited to operating not above 500ft FORCE QNH to allow 1000ft separation.

As his Merlin rounded the NW side of the Isle of Skye, direct communication was established with EAGLE on UHF. Approaching a position 57°40'N 006°30'W on a heading of about 045° EAGLE warned of low-level traffic ahead. About 30secs later EAGLE repeated the warning and a Tornado GR4 was spotted in their 10 o'clock 5-6nm away heading towards them at a similar altitude, but on an approximate heading that would take the jet slightly astern. Initially the GR4, heading approximately 200°, looked to be passing clear astern, but it was then seen to turn onto a heading, he thought of about 150°, towards his Merlin and remained on a steady bearing. To avoid the GR4, he was forced to turn hard R and initiate a rapid descent to 250ft RAD ALT as the GR4 passed ¼nm astern and 250ft above his Merlin with a 'high' Risk of collision.

Some 20secs later the crew of an unidentified ac [reported by the GR4 crew to be another Exercise callsign] was heard to ask EAGLE if an altitude restriction had been imposed on fixed-wing ac. EAGLE reiterated that a 'hard deck' of 1500ft was in force for fixed-wing ac due to multiple rotary-wing contacts in the area. The GR4 was then seen to climb rapidly and proceed towards the SE. An Airprox was reported on landing aboard the warship.

The Merlin has a maritime grey low-conspicuity camouflage scheme; the white HISLs were on. TCAS is not fitted.

THE TORNADO GR4 NAVIGATOR reports with HUD recorder transcript that he was flying as the bounce (No3) against a pair of GR4s during an evasion training sortie. Two Tornado GR4 ac – Nos 1 & 2 – had departed from Lossiemouth independently as a pair and transited to the W coast of Scotland [S of Skye], which was the only area with suitable weather for their sortie. Descending to low level with Scottish MILITARY he then switched to EAGLE Safety on 313·175MHz [no ATS was established]. A squawk of A7001 was selected with Modes C and S on.

After switching frequency and listening [since 1606:01] they heard the Merlin crew on frequency, together with two other callsigns. Before contact was established with EAGLE he heard another callsign being 'cleared' to operate not below 1500ft QNH in a position 57° 53'N 005° 49' W [a point of land W of Loch Ewe], with the Merlin inbound at 300ft and not above 500ft from Waternish Point. Two-way RT contact was then established with EAGLE [at 1609:23, "*Eagle Safety,* (GR4 formation C/S) *formation of two GR4s currently low-level to the south end of Isle of Skye transiting to the south..training request if there is any exercise traffic in the local vicinity to affect".* The No3 GR4 navigator perceived that EAGLE advised of rotary traffic north of the Isle of Skye between Stornoway and Loch Ewe and 'south [of Skye] no immediate traffic to effect', the controller believing another ac to be 'south west of Benbecula approximately 30nm'. [The Merlin's position was, however, some distance S of that reported by EAGLE and was ahead of rather than behind the GR4]. Based on this information they elected not to carry out any evasion training until S of the Isle of Skye and to remain above 500ft to deconflict from the Exercise rotary-wing traffic; the No1 and No2 were then advised there was no traffic to affect to the S of Skye. Just before the Airprox EAGLE passed TI to the Merlin crew [at 1611:21, "[Merlin C/S] *EAGLE 1..heads up..traffic north east of your position range 10 miles southbound believed to be GR4 indicating unintelligible non exercise".* This TI was updated to the Merlin crew at 1612:07, *"..previously reported traffic now north approximately four and a half miles tracks south-west indicating low-level".*]

Flying at 610ft amsl, 2000ft clear below cloud with an in-flight visibility of 20km, hearing this information the No3 started a L turn to remain N of the Merlin which was first sighted at a range of 2nm, to the NW of Skye flying straight and level. The Merlin crew then called on the RT visual [at 1612:26, adding 8sec later *"..we are visual he's* [the No3 GR4] *just passed approximately half a mile astern of us".* At 1612:33, the No3 GR4 crew reported to EAGLE visual with the Merlin. The response from EAGLE was *"..roger believe he did call but..thought they would be..further south than the called position".*]

The No3 crew was visual with the Merlin and did not feel that any avoiding action was necessary, passing ½nm away and 400ft clear above the helicopter at the closest point with a 'low' Risk of collision. Another pilot with an Exercise callsign then called on the RT asking if there were any flight restrictions, to be told Exercise fixed-wing a

The ac's white strobes were on.

UKAB Note (1): Despite being requested, to date no report has been received from the EAGLE Safety controller who was aboard a foreign warship participating in Exercise JOINT WARRIOR.

UKAB Note (2): This Airprox occurred outwith recorded radar coverage.

UKAB Note (3): Several Y Series NOTAMs were issued by LF Ops relating to Ex JOINT WARRIOR 121. These NOTAMs warned military crews of 'intense aerial activity involving multiple fast-jet and rotary wing aircraft…..'. However, these NOTAMs all referred to Exercise airspace blocks further E than the Airprox location, extending no further W than 005°50'W.

AUS also issued an Airspace co-ordination notice - ACN 2012-04-0066 – applicable to this Exercise, within which it is stated at para 7:

'Eagle Safety. Two ATC Safety Cells will be established and will operate from the most appropriate ships subject to exercise requirements. Callsigns are Eagle One and Two and Eagle Safety frequencies are 313.175 MHz (North) and 362.250 (South).'

HQ NAVY comments that Eagle Safety is an ATC function that is established during JOINT WARRIOR and NATO exercises that have significant aviation input. The benefit from an Air Safety Cell (ASC) being embarked within the force that has no exercise role is that it can concentrate solely on Air Safety. This Airprox is an example of exactly why the ASCs are established and serves to highlight the requirement for there to be third party deconfliction, primarily of exercise players but also against non-participants. The frequencies for ASCs (callsign

EAGLE) are promulgated in exercise instructions; in this instance it is noted that the Tornado crew had the frequency and were monitoring it. EAGLE frequencies are safeguarded from exercise jamming and are not encrypted at all; indeed the ASC has the authority and ability to order cease jamming of any frequency, if required for Air Safety purposes.

Due to the nature of the terrain in the vicinity of this Airprox, the Merlin could not establish 2-way comms with the ASC embarked aboard the foreign warship. During these exercises it is normal for the ATC team on an aircraft carrier to also monitor the EAGLE frequency and to provide assistance where necessary in order to deconflict their own aircraft operations. The communications fit within a warship is somewhat limited and in this instance the ship's SATCO was liaising with the ASC via the standby radio, whilst the ship's on-watch ATCO was using their own HOMER frequency. SATCO relayed information to the Merlin using the EAGLE frequency in order to overcome the terrain masking difficulties.

A 1500ft hard-deck was imposed for exercise traffic, but the Tornado formation ac were non-participants and had not asked for a service from EAGLE. In Class G airspace it would not have been possible for EAGLE to impose the hard-deck on the Tornados, however the call to the other participants of multiple rotary-wing traffic operating up to 500ft should have prompted a requirement for appropriate altitude separation to be applied. Formal identification of the Tornados did not take place, however timely traffic information was passed to the Merlin in order for them to take avoiding action.

It is noted from the HUD tapes attached to the ASIMS report that the initial sighting of the Merlin was in the Tornado's 12 o'clock, crossing R-L, and the pilot maintained a left hand angle of bank with the Merlin drawing left across the HUD and below, showing the GR4 passing behind the Merlin and above it. Had the Tornado not turned left the separation would have been greater.

An exercise such as JOINT WARRIOR will always create scenarios where differing types of aircraft will be attempting to operate in the same airspace as either red or blue participants, or as no-play strangers. There is an enduring need for the embarkation of ASCs in order to provide real world Air Safety as far as possible. This safety net was in place, and worked in this instance. Margins could have been greater though had the Tornado crew not flown so close to the Merlin once it was sighted, or had honoured the hard-deck imposed on participating FW aircraft.

HQ AIR (OPS) comments that the lack of a report from the EAGLE ASC controller makes conclusions hard to draw, except from the information provided in the No3 GR4 HUD recording. Based on the evidence from the crews involved it appears that the non-exercise No3 GR4 transited the vicinity under normal Rules of the Air and the crew was aware of the Merlin from listening out on the EAGLE SAFETY frequency. The No3 GR4 was a non-exercise aircraft and so the exercise altitude restriction would not have applied, and there is no evidence that EAGLE SAFETY attempted to impose an altitude restriction on the GR4. The crew report hearing snippets of information regarding other aircraft receiving altitude restrictions but none that applied to them, although this is at odds with the understanding of the Merlin crew, which was that the restriction applied to "all fixed-wing aircraft".

The GR4 crew's position and intentions call to EAGLE before the Airprox was somewhat confused and did not assist the controller's SA. In any case, the controller was able to call TI to the Merlin based on radar data and the reciprocal of this was used by the GR4 crew to gain 'tally' and avoid the conflict. The GR4 crew's 'left turn to maintain north of the Merlin' did not achieve its stated aim and continued after they reported having gained visual contact at 2nm. This exacerbated the situation by reducing the horizontal separation distance and triggering the Merlin pilot's avoiding action. The turn initially placed the Merlin in the centre of the GR4 HUD but was eased at closer range ensuring that no actual risk of collision existed.

Considering the Merlin's reported altitude of 300ft, the transit altitude selected by the GR4, which would normally be at 250ft, was reasonable [610ft RAD ALT]. Although the GR4 navigator reports receiving a BS from EAGLE this was not the case and no service was agreed. Nevertheless, EAGLE could have requested the GR4 crew to maintain above 1500ft for deconfliction purposes but this would have required explicit agreement, which was not requested. The incomplete and misleading position reports in this instance contributed significantly.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the crews of both ac; a transcript, still photos and video of the relevant GR4 HUD recording, together with comments from the appropriate operating authorities.

The Board discussed the issue of the NOTAM'd Exercise airspace and the applicability of any 'hard deck' for fixed-wing ac; Members agreed with HQ Navy Command's contention that the GR4, as a non-participating ac, remained outwith the Exercise JOINT WARRIOR scenario and whilst in transit in Class G airspace was not compelled to abide by any Exercise 'hard-deck' limitation. Nevertheless, aware of the EAGLE Safety frequency, the GR4 crew had wisely listened out and then subsequently called the controller as they transited S toward their intended RV with other elements of the formation. The Board was briefed on the difficulties of producing an accurate transcript from the HUD recording, but the GR4 pilot's Station had reaffirmed that it was the No3 crew that made the RT call to EAGLE at 1609:23, which described the position of the No1 & 2 but did not describe the position of the No3 bounce GR4. This call, Members agreed, would have subsequently confused the EAGLE Safety controller as the information given did not make it plain that their's was a single GR4 – the No3 - southbound to the N of Skye to join up with the two GR4's to the S. The absence of a report from the EAGLE Safety controller aboard the foreign warship was unfortunate; it could have assisted greatly here and the Navy Command Member apologised for its lack of availability to the Board. However, it was plain that EAGLE did not perceive a confliction between the Merlin and No3 GR4 beforehand based on the information given by the No3 GR4 crew. Fortunately, the No3 crew was already aware from listening to the RT that a helicopter was operating at 300ft, and below 500ft from Waternish Pt. Hence the No3 GR4 crew's decision to transit at an altitude greater than 500ft. The Navy Command Member contended that the GR4's recorded level of 610ft RAD ALT was not a sufficient margin above the reported altitude of the Merlin. However, an HQ Air fast–jet Member explained that whilst operating in the 'see and avoid' environment of Class G airspace, outside the NOTAM'd area over open water where they would normally select a low-level transit altitude of 250ft, the No3 GR4 crew had taken due account of the presence of the Merlin below 500ft by flying higher than normal. With information gleaned from listening to RT calls from exercise traffic and EAGLE Safety, the GR4 crew saw the Merlin at a range of 2nm they report. However, the HQ Air (Trg) Member remained unconvinced that the GR4 pilot had seen it this early because of the continued L turn shown on the HUD recording; he perceived that the No3 GR4 navigator saw it first at closer range after the Merlin pilot's avoiding action descent. Nonetheless, the HUD 'shots' convinced the Members that the GR4 had passed clear above and astern of the Merlin, which was unmistakably evident on the recording clearing to port and below.

Within the promulgated airspace the Merlin crew would quite reasonably not have expected to encounter participating fixed-wing at their level at all, with Exercise JOINT WARRIOR ac operating above the 1500ft 'hard-deck' where specified by EAGLE Safety, so the helicopter crew was probably quite surprised to see another fixed-wing ac in the area below this altitude. The Ops LF Advisor added an important point of advice here for Exercise planners; if they wish to exclude other non-participating military ac from the lower reaches of the LFS during major exercises then, subject to relevant staff approval from Ops LF/Air Staff, it is feasible to overlay an Exercise area with a blanket LFS restriction for non-exercise participants.

The ATS provided to the Merlin crew by EAGLE was not specified in their report, nonetheless, it was evident from the GR4 HUD recording that EAGLE Safety had spotted the No3 GR4 'stranger' at a range of 10nm, called it to the Merlin crew and provided an update at a range of 4½nm. This enabled the Merlin crew to acquire the GR4 heading towards them in their 10 o'clock 5-6nm away. As the Merlin was operating below 500ft, with the GR4 shown to be at 610ft – both operating on RAD ALT – vertical separation was not less than about 110ft, but the Board understood that where they might have thought this was Exercise traffic and expected greater separation of about 1000ft from it, this would have been a concern to the Merlin crew. The Members agreed unanimously that this Airprox had resulted because the GR4 crew flew close enough to cause the Merlin crew concern.

In considering the inherent Risk, the Board perceived that after sighting the GR4, the Merlin pilot's robust avoiding action of a hard R turn and rapid descent to 250ft RAD ALT would have been highly effective in quickly increasing the vertical separation clear below the GR4 to 360ft. The Merlin pilot estimated in his written account that the Tornado passed ¼nm astern. The GR4 crew's own horizontal estimate was ½nm astern, which was also that passed on the RT to EAGLE by the Merlin crew at the time. The GR4 crew saw no need for avoiding action when they saw the Merlin, probably because of the prompt and robust avoiding action already taken by the Merlin pilot, which would have placed the helicopter beneath them at slightly less than their own estimate of 400ft. Nonetheless, with separation in the order of 360ft vertically and the GR4 passing ¼ - ½nm astern, this was enough to convince the Members that no Risk of a collision had existed in the circumstances reported here.

AIRPROX REPORT No 2012055

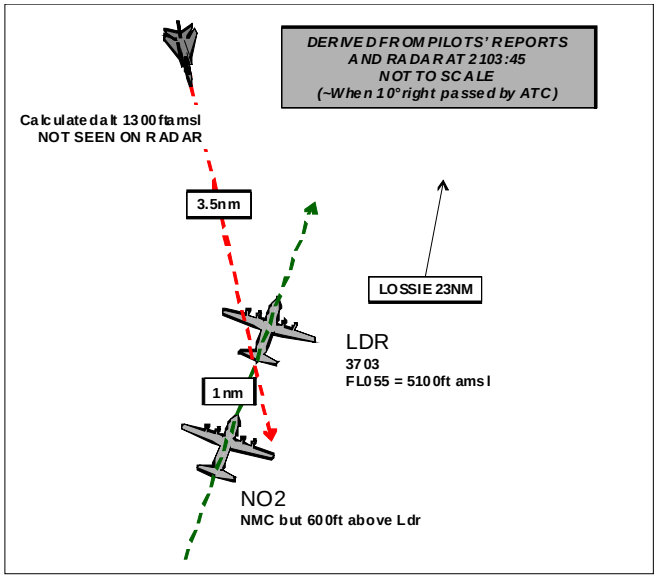
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The GR4 crew flew close enough to cause the Merlin crew concern.

Degree of Risk: C.

AIRPROX REPORT NO 2012057

Date/Time:	24 Apr 2012 2103Z (Night)	
Position:	5731N 00349W (23nm SW Lossiemouth)	
Airspace:	Scot FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	MC130P	Tornado GR4
Operator:	Foreign Mil	HQ Air (Ops)
Alt/FL:	5800ft↓	>2680ft↑
	SPS (29.92in)	RPS (994hPa)
Weather:	IMC BL	VMC CLBC
Visibility:	1nm	8km
Reported Separation:		
	25ft V/70m H	NK
Recorded Separation:		
	NK	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MC130P PILOT reports flying as No2 of a flight of 2, on a night formation, exercise support mission; TCAS was fitted but was set to TA only in accordance with their (formation) SOPs. They were heading of 057° on an en-route descent at 230kt while in receipt of a TS from Lossie APP on VHF when they experienced an Airprox with a single Tornado, seen ¼nm away, displaying nav lights, and climbing through their level from L to R. The incident occurred while they were descending through 5600ft amsl to 4000ft amsl, in 1nm radar trail and 600ft above their leader while on a vector from Lossie APP for a visual low-approach at Lossiemouth to depart at low level.

They were given TI by Lossie on a Tornado and when reporting visual, Lossie gave them a heading of "10 degrees right" for traffic deconfliction. The Tornado passed from L to R from No2's 10 o'clock position to their 4 o'clock, about 25-50ft above and about 100-300ft away. No RA was given because of wing TA-only TCAS configuration.

Both the Tornado and their formation were under TS from Lossie and were in IMC.

They [No2] pushed forward on the flight controls when the Tornado was first observed in their 10 o'clock position about ½-⅓nm away to increase the RoD and therefore, increase the separation between the two ac. An Airprox notification was passed to their leader, who in turn passed it to Lossie APP.

They assessed the risk as being high.

THE TORNADO GR4 NAVIGATOR reports departed Lossiemouth at 2057 on a training flight and were climbing to FL50 following a SID 05 West under a TS [see BM SM report] while squawking as directed with Mode C. When they were 15nm NW of the airfield, they informed ATC that they were coming left onto S and requested a descent to 3000ft on the Lossiemouth QFE of 999. They were in a high workload situation while engaging and monitoring the TFR heading 177° at 378kt, (they were not using NVGs at the time).

They were aware of a C130 C/S XXX to the west on recovery, via a Radar-to-Visual approach. Upon coasting in at the 'Nairn Gap', they reported that they were good VMC and going en-route and at that time ATC informed them of the 2xC130s on recovery in their right one o'clock, 15nm going right to left and descending to 4000ft. They then heard ATC report their position to the C130s as being "North, 10nm crossing left to right". Believing that there was sufficient vertical separation between ac, their current heading would put them behind the recovering ac and the fact the C130s were under a radar service, they went en-route, set the RPS of 994hPa, levelling at 3000ft and transferred to the low-level common frequency.

They were VMC, in sight of the surface but were not visual with the C130s due to a thin layer of cloud at about 4000ft.

After completing the TFR checks, they proceeded to engage the TFR system from the leg MEA of 3000ft. They descended to a BARO alt of 2680ft at 2103:45 (verified by RAIDS) at position N5726 W00346 when the system reacted to what was assumed to be weather returns and started to climb the ac. The ac went almost immediately through the leg MEA of 3000ft and the climb was continued to 5740ft BARO alt at 2104:10 (verified by RAIDS) at position N5723 W00345 while the crew assessed what had happened before then descending back to 4600ft for the next leg's MEA.

The whole event had happened very quickly and they were good VMC again above the thin layer of cloud, 30nm SW of Lossiemouth heading S and they elected to continue the sortie rather than return to the Lossiemouth ATC frequency.

They were unaware of any Airprox incident until they were informed by the Duty Authoriser upon their return to the Ops desk after landing at 2200z.

They took no other avoiding action as they were unaware of the incident at the time and assessed the risk as being low.

Having analysed the incident post flight with hindsight, applying sound airmanship would have lead to the pilot changing three things to try and avoid a similar situation in the future:

If near an airfield with recovering traffic then it would be worth staying with ATC until it is absolutely certain that the traffic is well out of the way before going en-route.

Try to avoid routing at 3000ft through the extended centreline, albeit over 20nm out on the extended centreline, when on RW05 with ac potentially undertaking GCA recoveries.

If there is traffic close to or above the route, ideally wait until it is well away from track and heading away before engaging TFR that has the potential to pull up into their track.

BM SAFETY MANAGEMENT reports that this Airprox occurred at night, between a MC130P (C130), operating IFR in receipt of a TS from Lossiemouth APP, and a Tornado operating VFR; the Tornado went en-route from APP's freq at 2102:39, just before the CPA.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated. The Airprox was not captured on the radar replay, the Tornado having descended below recorded radar coverage at 2102:22 and re-appearing shortly after the CPA at 2104:24.

The Tornado crew reported that they were VMC with 8kms visibility with a thin layer of BKN cloud at 4000ft and the C130 (2) crew reported IMC with 1nm visibility between layers of cloud.

The C130 was operating as the trail ac of a pair inbound to RAF Lossiemouth for a self-positioned visual approach. The Tornado had departed RAF Lossiemouth, in receipt of a TS from APP and was positioning to enter the UKLFS in the vicinity of the 'Nairn Gap'. The incident sequence commenced at 2100:56 as the Tornado turned onto SSE'ly track at FL50, not yet having commenced an instructed descent to 3000ft QFE 999hPa; the C130 [No2] was 33.4nm SSW of the Tornado, tracking NE'ly and descending through FL81.

At 2102:17, the Tornado reported to APP that they were, "*victor mike below and going on route*"; this was acknowledged by APP and they then passed TI to the Tornado on the C130 flight stating, "*traffic right, one o'clock, one-five miles, crossing right left, two Charlie one thirties, descending to height four thousand feet*." The Tornado had just coasted in, indicating descent through 3500ft; the MC-130P (2) was 18.9nm SSW descending through FL67. There was approximately 140° angular difference between the ac's respective tracks. The TI passed by APP was co-incident with the Tornado descending beneath the base of NATS radar coverage and thus disappearing from the radar replay, not reappearing until after the CPA (squawking the Lossiemouth assigned SSR code). Based upon the Tornado's track after the CPA and the lack of a contradictory statement in the crew's report, it is reasonable to argue that the Tornado maintained its SSE'ly track throughout the incident sequence.

The Tornado acknowledged the TI and APP then passed them the RPS and instructed them to, "*squawk as required, change en-route*" which was acknowledged at 2102:39. The Tornado crew subsequently reported that they decided to 'go en-route' because they believed that "there was sufficient vertical separation between aircraft, a current heading that should put them behind the recovering aircraft and the fact that the [C130 (2)] were under a radar service."

At 2102:49, APP passed TI to the C130 flight on the Tornado as, "*traffic north, one-zero miles, crossing left-right, a Tornado at three thousand feet*" which was acknowledged. Based upon the Tornado crew's report, it is evident that they were still monitoring APP's freq as they report having heard this TI.

At 2103:24, APP updated the TI on the Tornado to the C130 flight as, "*previously reported traffic, left eleven o'clock, five miles, crossing left-right*". The C130 lead replied that the formation was, "*India Mike Charlie*" which APP acknowledged. At 2103:41 when prompted by the Supervisor, APP instructed the C130 flight to "*turn right ten degrees*" which was acknowledged. Although the turn was not formally phrased as deconfliction advice, it was meant as such by APP and interpreted as such by the C130 crews, as highlighted in their report. Although the turn was aimed to 'ensure that a gap was maintained between the contacts', this was not achieved. It is worthy of note that the C130 crew were operating in IMC, having received TI on a conflicting aircraft, when a DS would have been available.

Based upon the Tornado crew's report, at 2103:45 they descended to a BARO altitude of 2680ft, in a position approximately 2.6nm N of lead C130, which was descending through 5300ft, and 3.6nm NNE of C130 No2. Their TFR then reacted to what the crew believed was weather returns and initiated a climb to a BARO altitude of 5740ft, levelling at that altitude at 2104:10. This position was approximately 1.6nm SSE of the lead C130, which was descending through 5100ft, and 1.2nm SE of C130 No2; consequently, the CPA occurred between 2103:45 and 2104:10 as the Tornado climbed through the C130 flight's height.

The No2 C130 crew stated that they first sighted the Tornado at around ½ to ⅓nm and increased their RoD to increase separation. The Tornado crew did not visually acquire the C130 and stated that at the time of the incident they were conducting reversionary night flying, with a transition to NVG planned later in the sortie. The No2 C130 crew assessed minimum separation as 25 to 50ft vertical and 100-300ft horizontal.

ATC provided a good level of service to the C130s. Although a little over 1000ft vertical separation existed, cognisant that the Tornado was VFR en-route (albeit squawking a Lossiemouth code) and that the C130s were IMC, ATC stepped beyond the bounds of a TS to attempt to provide a measure of deconfliction between the C130s and Tornado.

APPs description of the relative motion of the C130 relative to the Tornado however has greater relevance. Based upon the Tornado crew's report, the use of the word "*crossing*" by APP indicated to the Tornado's crew that they would pass behind the C130 formation. As has been stated in previous Airprox investigations, many aircrews interpret the word "*crossing*" as a motion at approximately 90° to their track; in this instance, around 140° angular difference existed between the respective tracks; however, in the absence of a definition of "*crossing*" the term is interpretable and, arguably, the C130 flight was on a track that would cross that of the Tornado. Whilst CAP413 permits the use of "*converging*" as a descriptor for relative motion, again there is no definition and perceptions of its meaning amongst ATCOs appear to differ. Moreover, the wording of CAP413 suggests that "*converging*" and "*crossing*" are mutually exclusive terms. What is clear from the evidence is that the Tornado crew linked the TI passed by APP with their expectation to shortly be within the UKLFS and thus below the height of the C130 formation and elected to change to their en-route frequency. Unfortunately, the unexpected reaction of the TFR to what the crew believed to be weather returns conspired to climb their ac into the thin cloud layer at 4000ft and through the level of the C130.

Accepting the part that the TI played in the Tornado crew's initial decision making process, it remains that the Tornado had gone en-route approximately 80sec prior to the CPA and as such was responsible to 'see and avoid' other ac. An equally likely course of events could have been for ATC to issue a vector to the C130 formation which would have markedly changed the event geometry and rendered the Tornado's previously obtained TI worthless. On that basis, the Airprox was caused by a conflict of flight paths within Class G airspace. Given the separation reported by the C130 crew, it is reasonable to argue that the conflict was resolved by ATC and the C130 and that without the 10° right turn, coupled with the increased RoD, the outcome could have been much worse.

RAF ATM Force Cmd, in association with RAF FS, is reviewing the issues highlighted in this report.

HQ AIR (OPS) comments that the supervisor in the GR4 crew identified several key learning points from this incident. The incident formed the basis of a flight safety discussion amongst the staff with a view to educating other crews who might face similar circumstances in future. There are a myriad ways in which the situation could have been prevented but the primary cause was the automatic pull up generated by the TFR. The potential for a TFR pull up in this scenario was one of the hazards identified in hindsight by the crew. The activation of the pull-up feature of the TFR is much like an autopilot actioned TCAS RA and as such must be followed as it can indicate an undetected failure of the TFR system; hence, it was reasonable for the crew to permit the pull-up to proceed but there was clearly no concern over a potential confliction, as the pilot reports. With the TI provided by the controller, particularly the use of the phrase "crossing", and the increasing height separation being generated by their intended profile, the decision to go en-route was not unreasonable. However, the call they heard to the C130s that they (the GR4) were crossing left to right, which by the same token should have implied they were passing ahead not behind the C130s, was not fully processed. If the "crossing" call is to relate to a track crossing angle an additional descriptor of "passing/tracking ahead", "passing/tracking behind" or "converging/conflicting etc" is required to communicate an appropriate level of SA. Therefore, the GR4 crew's SA regarding the potential for conflict and the decision to engage TFR were contributory.

HQ USAFE-UK comments that there is little to disagree with the post flight analysis by the Tornado crew. Furthermore, we endorse the above comments with regard to phraseology used for certain types of conflictions; CAP413 cannot cover every eventuality so, where applicable, controllers should surely "tell is how it is" rather than feel constrained by the inadequacy of permitted phrases.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a recording of the Tornado Head Up Display (HUD), transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board agreed that this was a most complex incident. Murphy's Law (Capt Ed Murphy USAF Edwards AFB 1949) – "If anything can go wrong, it will".

In an attempt to determine whether the controller had played any part in the incident it was important to determine when the Tornado had disappeared from his display; the display is not recorded. Initially only the Prestwick combined radar recording was examined which showed the Tornado descending below radar cover at 2102:25. In order to try to determine when the Tornado disappeared from the controller's display the Aberdeen single source radar recording was also examined but it too showed the ac disappearing at the same time. Although displaying height (Rad Alt) and Alt, Tornado HUDs do not display real time or position other than from a 'bullseye', so it was not possible to use this information to assist in making an estimation. However, it was considered most likely that the Tornado remained on the APP controller's radar display for some time after disappearing from the recording but, since the Tornado crew declared that they were going en-route (though not at that time changing frequency or squawk), the controller would have been unable to provide the crew with more information regarding the position or track of the C130s (notwithstanding the HQ Air comment about the descriptive terminology regarding their relative tracks). Although the controller informed the Tornado crew that there were 2 C130s, he did not inform them that they were in 1nm trail and it seems that the Tornado crew assumed that they were in 'closer' formation as is often the case when flying night missions; it appeared that they were never aware that the C130s were flying in 1nm trail. Further, although they were passed TI and overheard the TI regarding them being passed to the C130s, they did not assimilate that the C130s presented a significant collision risk on their Southbound track if the Tornado climbed above their intended operating height of 500ft agl.

One advisor commented that a DS might have been more appropriate for the C130s while in IMC; however, they were formation flying on a tactical exercise sortie, self-positioning for an 'internal aids' approach to Lossiemouth and a DS might not have allowed them sufficient tactical freedom to accomplish their mission requirements. In any case, the only other traffic on the Lossie APP radar picture was the Tornado, apparently descending to low level, of which they were aware. It was clear to Members that the avoidance passed to the C130s by the APP controller after the Supervisor intervened, was too little and too late to have had any meaningful effect.

The Secretariat's assessment of the Tornado HUD video was verified by an independent expert; unfortunately there was no audio recording and the TFR E-scope is not recorded. The Board acknowledged that the Tornado pilot was a student and that the entire sequence of events happened very quickly (the ac were closing at about 660kt (11nm/min) and the maximum detection range of the Tornado TFR is 6nm. The Board accepted that:

As far as can be determined from the video the Tornado TFR was operating correctly with no failures at the time of the incident.

In the lead up to the incident the Tornado autopilot and TFR engaged at 3000ft (alt) and initially the ac was descending correctly to low level in 'auto-TF'

While in the descent, 13 sec after engagement, the TFR detected something (i.e. terrain, an ac or weather) that generated a normal auto-TF climb command producing at 20° nose-up attitude.

The ac climbed with auto TF engaged then levelled at an alt of about 5600ft when auto-TF was discontinued and the ac flown manually initially remaining the same alt

The Lossie METAR showed no probability of weather 'thick enough' to produce such a climb.

The C130 was not seen on the Tornado HUD recording at any time. This was consistent with the pilots' reports of a thin cloud layer between the ac and the Lossiemouth METAR showing the cloud as being broken at 3400ft.

Bearing the facts above in mind it was the opinion of the Secretariat, substantiated by the independent expert, that shortly after engagement, the Tornado TFR had 'seen' the lead C130, demanded a climb and attempted to climb the Tornado over the ac by the 'Set Clearance Level' height set at the time (presumed to be 500ft). This opinion was given further credence by respective alts of the ac at the presumed time of crossing [Tornado from the HUD and the C130 Lead from Mode C].

Since the pilot encountered the unexpectedly high angle climb and after passed through the Minimum En Route Alt for the leg, he disconnected the autopilot and recovered the ac to level flight at 5600ft alt (4790ft agl) manually; again no other ac was visible on the HUD video. It was assumed that this would have been just as he passed very close to the trailing C130 crossing from its 1030 to its 0430, as seen by the pilot.

Analysis was not able to determine either the lateral or vertical separation as there was no information regarding the precise time or position of the CPA or any Mode C information from the No2 C130 [the leader was at about 5100ft alt].

The Board noted that both ac had been operating legitimately under VFR in Class G airspace where the principal method of collision avoidance is 'see and avoid'. The cloud layer between the ac prevented either pilot from being visual with the opposing ac until the last moment and the Board considered it unlikely that C130 No2's avoidance would have had time to take effect before the CPA; therefore there had been a risk that the ac would have collided. Members also observed that the sequence of events had taken place very quickly when the Tornado crew was in a very high workload situation. This had prevented them from conducting a full analysis of the situation they faced which might have led to their having better SA.

Members agreed with the points identified by the Tornado crew in their post flight analysis, particularly that it is unwise to commence automatic TFR flying on, or close to, the approach lane to an active airfield.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado crew climbed into conflict with the MC130P which they did not see.

Degree of Risk: A.

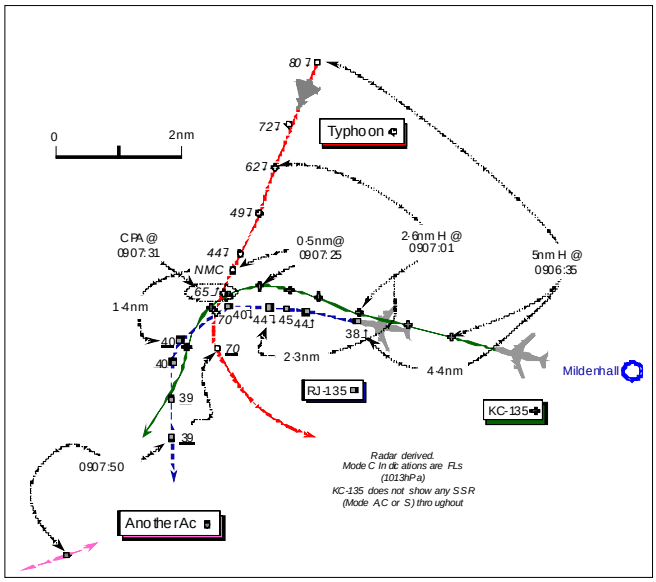
AIRPROX REPORT No 2012060

AIRPROX REPORT NO 2012060

Date/Time: 27 Apr 2012 0907Z

Position: 5223N 00018E (7nm WNW of Mildenhall)

Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	KC-135R	Typhoon T Mk3
Operator:	Foreign Mil	HQ Air (Ops)
Alt/FL:	FL40↑	↓2400ft
	SAS	QNH (1009hPa)
Weather:	IMC In Cloud	IMC In Cloud
Visibility:	Nil	Nil
Reported Separation:		
	<100ft/<50m H	NK
Recorded Separation:		
	Contacts merged (KC-135/Typhoon)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KC-135R PILOT reports he was departing from Mildenhall under IFR as the No2 of a flight of 2 ac lead by an RJ-135. The flight was in receipt of a TS from Lakenheath DEPARTURES (DEPS) whilst executing the Mildenhall 7 SID to the W. [Although the pilot reports that the assigned squawk was selected with Mode C on, with enhanced Mode S and E-TCAS fitted, no SSR was evident from the KC-135 until after the Airprox occurred, only the formation leader's RJ-135 was squawking.]

Whilst climbing to their requested level block of FL90-100 their level was restricted by DEPS to FL40-50 because of transit traffic – the Typhoon - descending towards them from the N. During the climb to FL40 they entered cloud at about 3000ft ALT and remained IMC throughout. Flying about 1½nm behind the lead RJ-135, heading 285° some 4nm WNW of Mildenhall, a TCAS TA was enunciated for traffic descending towards them. Within a few seconds the TA became a DESCEND RA commanding a 6000ft/min descent, which was complied with before the RA abruptly changed demanding a CLIMB at 6000ft/min; however, he was unable to accomplish the demanded ROC because of the ac's gross weight and energy state. Seconds later the intruder ac – the Typhoon – 'dropped off' their TCAS scope and was then seen indicating 5100ft (1013hPa), above them to the S.

The other ac was not seen visually but from his ac's TCAS display was 'listed' as closing to a range of 0.01nm at the same level (<100ft) – the Typhoon being displayed on top of their ac symbol. He assessed the Risk of collision as 'high'. They climbed through FL50 while avoiding the Typhoon and levelled off at about FL54 before regaining level flight at FL50. Lakenheath DEPS was advised to 'mark their tapes' and an Airprox was subsequently filed after the sortie.

The amber strobes were selected to bright & steady, with the nav lights, tail stinger light and landing light on.

UKAB Note (1): The UK MIL AIP (AD) specifies the Mildenhall 7 Departure for RW29 as: 'Ahead to intcp MLD 281R, at MLD 6d right on Hdg 025° to intcp MLD 327R; cross NORD/MLD 23d FL80− FL90. If onward clearance not received, maintain FL90 and advise ATC.'

THE TYPHOON T Mk3 PILOT reports he was flying dual, whilst inbound from Coningsby to Northolt IFR under a TS from London MILITARY. The assigned squawk of A6051 was selected with Mode C on; Mode S is not fitted.

Routeing from Marham via Barkway, descending at 300kt from 10000ft to an altitude of 2400ft, as instructed by the controller, upon reaching 4000ft at a position 7nm WNW of Mildenhall a level-off was initiated due to the proximity of the Mildenhall MATZ and the fact that they were unable to maintain VMC. At the same time, TI was passed from London (Mil) about traffic 2nm to the E, believed to be climbing through 3000ft for 3500ft; to avoid the

traffic, which was not seen, an immediate climb to 7000ft was executed. Further traffic updates were given to maintain clear of the traffic and the flight was continued under a DS. Because of the cloud layer, the KC-135 was not seen visually; no contact was observed on the AI radar. He assessed the Risk as 'medium'.

THE LAKENHEATH DEPARTURES CONTROLLER (DEPS) reports with RT transcript, that Mildenhall TOWER called for a departure release for the RJ-135 flight from RW29. MARSA – Military Accepts Responsibility for Separation of Aircraft - was being applied between the RJ-135 and KC-135 flight elements. Shortly after releasing the flight, he observed a fast moving radar track squawking A6051 – the Typhoon - about 15nm N of Mildenhall descending through FL110 Mode C heading SW. At 0905, the RJ-135 crew called DEPARTURES, was radar identified, placed under a TS and a climb to FL80/70 issued due to the A6051 observed descending out of FL100. At 0906, he issued a 'traffic advisory' to the RJ-135 flight on the A6051 code and assigned a level of FL40 [for the RJ-135 and 3000ft QNH for the KC-135]. A L turn onto a heading of 180° was issued to the RJ-135 flight at 0906:52 as the A6051 code and the radar contact on the second element of the flight – the KC-135 flown by the reporting pilot - were on a converging course. As the flight started the L turn, the A6051 code continued to descend out of FL53. At this point, he issued a traffic alert and instructed an immediate turn onto a heading of 180° and to maintain FL40, but a few seconds later, the KC-135 crew reported a TCAS CLIMB to avoid the Typhoon. Some 30sec later, the TCAS RA was complete and the KC-135 crew were given a separate clearance to proceed en-route as per their FPL.

During this entire event, the assistant controller was attempting to contact London (Mil) - LJAO - for coordination. The LJAO line was not answered for about 3min. He believes this entire situation could have been averted if LJAO had answered the line so that co-ordination could have been effected.

UKAB Note (2): The DEPS RT Transcript reflects that at 0907:35, the KC-135 crew reported on the RT without a C/S, *"T-C we're TCAS climb"*. DEPS perceived this to be from the RJ-135, acknowledged the call and then passed TI on 'Additional traffic 2 miles ahead, not above 2000ft'. At 0907:55 the RJ-135 crew reported *"we're level"* [at FL40] before at 0908:16, the KC-135 crew advised, "[KC-135 C/S] *recovering 4-0-0 (sic) after TCAS climb request a vector and a squawk".* The KC-135 was subsequently identified and placed under a TS by DEPS before it was established that the flight were no longer 'MARSA', a vector issued and TI passed on the Typhoon *"..4 miles east of you at flight level 7-0".* With the KC-135 crew reporting in IMC until passing FL80, further TI and vectors were subsequently issued for the re-join.

THE LATCC (MIL) LJAO NE TACTICAL CONTROLLER (NE TAC) reports that he was working 3-4 ac on frequency. In the same airspace, LJAO E was extremely busy with multiple F-15s conducting GH, tanking on AARA 8, and FIR transits. On frequency at the time of the Airprox were: the subject Typhoon conducting general handling in East Anglia before transiting to Northolt; a foreign air force ac being handed over to LJAO SE; Typhoon (B) formation from D323B to Coningsby and a BE200 on a NAVEX in East Anglia. The geographical split of traffic was in excess of 100nm. Due to the traffic loading, there was a PLANNER in situ to facilitate handovers and coordination.

Typhoon (B) formation free-called in D323B for recovery to Coningsby and a squawk was issued. As the subject Typhoon crew completed their GH, he instructed them to take up their own navigation to a point 10nm N of BKY under a TS and descend initially to FL100. The unrelated Typhoon (B) formation was identified when he saw the squawk change, but he got no response to the transmission before he issued TI to Typhoon (B) formation on a non-squawking contact.

Luton had requested a radar handover on the subject Typhoon at 10nm N of BKY, at 2400ft Luton QNH (1009hPa) and these details as well as the squawk and frequency were written in the scribble line on his electronic fps (EFS). Instructing the Typhoon crew to set the Luton QNH (1009hPa) and descend as requested by Luton to 2400ft, he issued a terrain alert before an ac appeared on the radar screen climbing out from Mildenhall wearing an LJAO E squawk – the RJ-135 - which he had not noticed initially. Typhoon (B) formation re-established 2-way comms and was released 'own navigation' to Coningsby. At this point he saw the RJ-135's Mode C indicating 3800ft and climbing. The subject Typhoon was approaching 7000ft in descent and he called the RJ-135 as climbing traffic. At this point, he opined that he should have stopped the Typhoon's descent to prevent any potential confliction; however, he was distracted by the BE200 on handover from Cranwell. He called the RJ-135 to the Typhoon crew again, but did not initiate a stop of his descent, he then observed the RJ-135's Mode C descending to avoid the Typhoon. Upon reaching 4500ft the Typhoon crew requested a climb to 6000ft together with an upgrade to a DS. The Typhoon crew was instructed to climb to 6000ft and the DS provided by giving the Typhoon crew an avoiding

action turn onto a heading of 140° and calling further traffic [Another ac on the diagram] 9nm to the SW squawking A7000. A silent handover of the foreign AF ac was then initiated to LJAO SE. The KC-135 then climbed out from Mildenhall squawking a Lakenheath SSR code [after the Airprox had occurred] and began to climb towards the RJ-135. Both ac then turned towards the Typhoon so he gave further avoiding action onto a heading of 360°. The two ac continued to turn towards the Typhoon and a further avoiding action turn onto 040° was given; the Typhoon crew then requested a climb to 10000ft to gain VMC. At this point, NE PLAN was co-ordinating the Typhoon against the Lakenheath traffic. Instructing the Typhoon crew to climb, once the pilot informed him that he was VMC and was clear of all traffic he turned the Typhoon back towards BKY and instigated a descent to 7000ft prior to a handover to Luton.

The busy traffic picture across LJAO E and NE, coupled with the lack of available manpower on the day certainly played a part in the occurrence; however had there not been a PLANNER in place, prompting his actions and priorities, he may not have been able to call the traffic and initiate avoiding action in good time. Additionally, whilst the Typhoon was under a TS, he could have better implemented his 'Duty of Care' towards the Typhoon by stopping the ac's descent earlier.

LATCC (MIL) did not obtain a report from the LJAO NE PLANNER (NE PLAN).

THE LATCC (MIL) LJAO SUPERVISOR reports that the LJAO North Bank was extremely busy at the time of the Airprox. LJAO E Sector was fully manned with the addition of an extra controller on the overload console to accommodate a surge in traffic levels. The NE Sector was manned with TACTICAL and PLANNER controllers, both of whom were relatively inexperienced, but with only 4 ac on frequency they did not appear to be operating at full capacity. At the time of the Airprox his focus was on the E Sector due to their high traffic loading and he was unaware of the large geographical split that the NE sector was experiencing. The high traffic loading on the Unit resulted in no controllers being available to open a second TACTICAL position on the NE Sector while breaks were accommodated.

He was made aware that the Typhoon was manoeuvring to allow the RJ-135 to climb out from Mildenhall but was informed that the Typhoon pilot was visual with the RJ-135 so was not overly concerned at the time. Following a call from Lakenheath informing him that they were filing an Airprox he reviewed the radar replay. This revealed the geographical split on NE Sector of over 100nm and the fact that another flight had failed to respond to NE TAC's instructions and had distracted the controller's attention to the N, away from the Typhoon operating to the S. At the time the instruction to descend to 2400ft was passed to the Typhoon crew, the RJ-135 was painting on the radar recording but TI was not passed at this stage due to the distraction of the other flight. When NE TAC passed TI to the Typhoon the crew responded 'roger', which was misinterpreted by NE PLAN as the crew being visual with the RJ-135; this influenced the SUP's level of concern regarding the incident. The SSR data block for the RJ-135 indicated that the flight was going to climb to FL190 and was due to be handed over to LJAO. At this point NE TAC should have stopped the descent of the Typhoon until the potential confliction was resolved. He would also have expected Lakenheath to have requested co-ordination from LJAO on seeing the Typhoon descending close to their climb out. NE TAC did reiterate TI on the RJ-135 to the Typhoon crew as they continued their descent. At approximately 4500ft the Typhoon crew requested a climb to 6000ft and an upgrade to a DS. This was applied and an avoiding action turn onto 140° was issued against a A7000 squawk further to the SW – Another ac. The RJ-135 and the KC-135 that had departed Lakenheath squawking A0432 followed a similar track to the Typhoon, which resulted in further avoiding action and a climb to 10000ft before the situation was eventually resolved.

BM SAFETY MANAGEMENT reports that the Typhoon was operating IFR in receipt of a TS and latterly a DS from LATCC (Mil) LJAO NE; the KC-135 was operating IFR, in receipt of a TS from Lakenheath DEP.

The Typhoon crew had been conducting GH in the vicinity of East Anglia and the incident sequence commenced at 0903:37 as the Typhoon crew reported their GH was complete, "*requesting descent Flight Level 1 hundred direct BARKWAY*" inbound to Northolt. At this point, the Typhoon was 3.6nm NW of Marham; the KC-135 formation was not visible on radar.

LJAO North Bank's workload was high; the East Sector was fully manned with an extra controller on the overload console. The NE Sector had TAC and PLAN in place, both of whom were relatively inexperienced. The SUPERVISOR has stated that his main point of focus was the E Sector due to the surge in traffic levels affecting their workload. NE TAC reported their workload as high to medium. At the start of the incident sequence, NE was

controlling 3 speaking units within relatively close proximity; the subject Typhoon, a medium level transit around Rutland and East Anglia and a high-level transit necessitating a handover to LJAO South. At 0904:00, an unrelated FJ formation – Typhoon (B) formation - free-called LJAO NE requesting an ATS in transit from D323B to Coningsby. This additional task created a 110nm split between the Typhoon (B) formation and the subject Typhoon, significantly increasing NE TAC's workload and task complexity. Subsequent to completing their written report, NE TAC has related that whilst some of their traffic was within LJAO East Sector AoR, they and NE PLAN had decided to maintain control of the traffic due to the ongoing workload issues on E Sector.

Following landline liaison with Luton RADAR, at 0905:30 NE TAC transmitted to the Typhoon crew, "*instructions from Luton, taking your own terrain clearance, descend 2 thousand 4 hundred feet, 1-0-0-9.*" Initially the descent instruction was readback incorrectly which was detected by NE TAC and a correct readback obtained from the crew; the exchange of RT was complete at 0905:53. At the point that the descent instruction was issued, the Typhoon was 10.8nm NNW of Mildenhall at FL100, and the KC-135 formation was not visible on the LJAO NE controllers' display. Extrapolation of the Typhoon's track demonstrates that it would have passed 6.3nm through the extended centre-line of RW29 at Mildenhall. The dimensions of that portion of the Combined MATZ directly relating to Mildenhall are a circle 5nm radius centred on the airfield and non-standard stubs extending 5nm either side of the RW centre-line (see Figure 1), extending from the surface to 3000ft above Lakenheath's A/D elevation of 32ft.

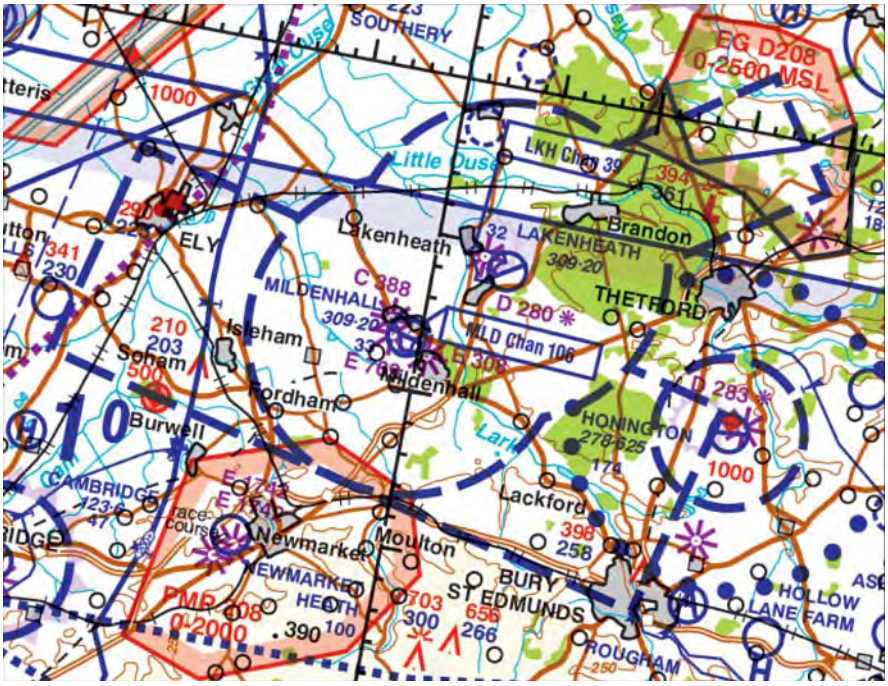


Figure 1: Combined MATZ RAF Lakenheath/RAF Mildenhall.

The lead RJ-135 became visible on radar at 0905:37, 1.3nm WNW of RAF Mildenhall and 9.9nm SSE of the Typhoon.

Between 0906:03 and 0906:27, NE TAC was involved in an exchange of RT with the unrelated Typhoon (B) formation to the N. At 0906:29, NE TAC passed accurate TI to the subject Typhoon crew on the RJ-135 stating, "*traffic left 11 o'clock, 5 miles, crossing left right, flight level 3-5, climbing flight level 1-9-0*", which was acknowledged. The LJAO SUPERVISOR reports that they were informed that the Typhoon was visual with the RJ-135 and having reviewed the incident, believed that NE PLAN had erroneously interpreted the Typhoon crew's acknowledgement of the TI at 0906:29 as a declaration that they were visual with the RJ-135. This suggests that the SUPERVISOR and NE PLAN were maintaining a dialogue over the traffic situation on the NE Sector and that NE PLAN informed the SUPERVISOR that the Typhoon was visual. Whilst the Typhoon pilot has stated that they initiated a level-off prior to the TI being issued due to their proximity to the Lakenheath/Mildenhall CMATZ, this is not apparent on radar. [The Typhoon's descent is not arrested until just before 0907:31.]

Meanwhile at 0906:44, a primary (PSR) contact appears on the radar recording 1.6nm in trail of the RJ-135, falling exactly at the end of the lead ac's radar trail, which is the reporting pilot's KC-135. At this point, the Typhoon was descending through FL75, tracking SW'ly, 3.5nm NNW of the RJ-135 and 4.3nm NW of the KC135.

Military Manual of Air Traffic Management (MMATM) Chapter 11 Para 43 states that:

'formations should be considered as a single unit for separation purposes provided that the formation elements are contained within 1nm laterally and longitudinally, and at the same level or altitude. Within Class F and G airspace only, at the controller's discretion, these limitations may be increased to 3nm and/or up to 1000ft vertically.'

MMATM Chapter 11 Para 46 states that outside CAS:

'the lead aircraft [in a formation] **should** squawk Mode 3A and C. If the stream extends for 3nm or more, the last aircraft **should** also squawk.'

Between 0906:50 and 0907:02, NE TAC was involved in an exchange of RT with the ac conducting the medium level transit and then, at 0907:09, provided an accurate update of the TI to the Typhoon on the RJ-135; no mention was made of the KC-135. At that point, the Typhoon was 1.7nm NW of the RJ-135 and 1.8nm NW of the KC-135, tracking SW'ly and descending through FL51. The RJ-135 was at FL40 and had entered a L turn passing through WSW; the KC-135 was tracking WNW'ly. The Typhoon crew acknowledged the TI as they descended through FL45 and stated at 0907:19, that they were, "*re-climbing 6 thousand feet and requesting Deconfliction Service*"; lateral separation was now 1.5nm against the RJ-135 and 1nm against the KC-135.

Responding to the Typhoon crew's request for a DS, NE TAC stated at 0907:27, "[Typhoon C/S] *roger Deconfliction Service avoiding action set heading 1-4-0 degrees traffic was right 1 o'clock 5 miles crossing left right indicating 2000 feet*." This deconfliction advice was against an un-related conflicting ac [Another ac] 6.4nm SW of the Typhoon, tracking ENE'ly, indicating 2100ft; no reference was made to the KC-135 which was 0.6nm ESE of the Typhoon, tracking WNW'ly, nor the RJ-135 which had precipitated the Typhoon pilot's decision to climb and request DS.

The CPA between the Typhoon and the KC-135 occurred at about 0907:31, whilst NE TAC passed deconfliction advice to the Typhoon. No lateral separation was discernible on radar and vertical separation was un-recordable as the Typhoon's SSR Mode C had dropped out as a result of their avoidance climb. [UKAB Note (2): The Stansted 10cm Radar Recording shows the Typhoon climbing through FL65 at this point, before levelling at FL70.]

In terms of the ATM aspects of this Airprox alone, a key issue is that NE TAC and PLAN did not see the PSR contact of the KC-135. Based on examination of the radar data at the Swanwick Radar Replay facility, the yellow cross representing the PSR-only contact of the KC-135 falls exactly within the trail of the lead RJ-135 (represented by yellow vertical lines) and remained within that trail throughout the incident sequence. BM SM attempted to emulate this scenario and, even in an artificial zero-workload environment, those controllers involved failed to acquire the PSR-only contact.

BM SM contends that as a result of the large range scale that NE TAC was operating to due to the geographic spread of their traffic, the workload generated by that traffic and the lack of colour differentiation between the radar contact and the trail, NE TAC was unable to detect the PSR-only contact of the KC-135. Moreover, whilst some further optimisation of the surveillance display may have been possible, this would not have affected the ergonomic issues associated with the display of PSR-only contacts and the improvement in detectability that such manipulation would have achieved is arguable.

BM SM Recommendations:

RAF ATM Force Cmd is requested to:

Ensure that BM pers at LATCC (Mil) and ScATCC (Mil) are briefed on the issues raised by this investigation, specifically the difficulties of detecting PSR-only contacts when using large range-scale settings.

Task the ARCS IPT to investigate the ergonomic issues associated with the presentation of PSR-only contacts.

HQ USAFE-UK comments that this Airprox has highlighted a number of both procedural and systemic shortcomings which will be subjects for discussion during the meeting of the Airprox Board. That said, the Airprox would not have occurred had coordination taken place before the Typhoon was cleared to descend to 2400ft QNH, a course of action which appeared to take no account of the Lakenheath/Mildenhall CMATZ.

HQ AIR (OPS) comments that better communication between the Lakenheath DEPS controller and the LJAO NE Sector would probably have prevented this incident from developing; it is disappointing that there is no explanation as to why LJAO NE Sector did not answer the landline! The Typhoon crew appeared to do all that was asked of them by ATC yet they came close to a tanker ac that they did not see, either visually or on their AI radar. However, given the Wx conditions, a DS for the Typhoon may have been more appropriate; this would have required the LJAO controller to seek deconfliction on the Tanker with Lakenheath and so would probably have averted this Airprox. Furthermore, it behoves all aircrew to use all means available, when IMC, to detect other ac and avoid potential collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The formation departed in-trail with the RJ-135, squawking with Mode C, leading the KC-135 that was maintaining about 1½nm spacing from the lead ac during the period of the Airprox. The HQ-USAFE Advisor accepted that the absence of a squawk from the KC-135 was an important factor in this Airprox in Class G airspace just above the Lakenheath/Mildenhall Combined MATZ. The MMATM stipulates that formations can be considered by ATC as a single unit 'for separation purposes' provided that the formation elements are contained within 1nm laterally at the same level; at the controller's discretion, within Class G airspace these limits could be increased to 3nm and/or 1000ft vertically. Furthermore, if the stream extends for 3nm or more, the last ac should also squawk. Therefore DEPS was operating within these parameters in compliance with the MMATM and there was no requirement to issue a squawk to the KC-135. However, this Airprox illustrated the importance of a squawk for conspicuity purposes for the benefit of other ATSUs. The BM SM report shows how the LJAO NE Sector controllers – both TAC and PLAN – were unable to detect the PSR-only contact of the KC-135 because of the lack of colour differentiation between its PSR contact and the RJ-135 SSR track history trail; this, coupled with the way that the PSR tracks are represented on the LJAO displays, made the KC-135 virtually invisible to NE TAC. BM SM advised that the ARCS IPT had reviewed the ergonomic issues associated with the presentation of PSR-only contacts, who stated that changing the size/shape or colour of PSR returns without introducing further complications or additional clutter was challenging, but the difficulty/cost of making changes should not be a barrier if considered warranted. However, the ATM Force contended that there is no requirement to change the way in which PSR contacts are displayed to LJAO controllers. The Board remained unconvinced and Members recognised that military ac, specifically KC-135 tankers, regularly depart from Mildenhall in a stream formation and in the main, following a prenote, would be handed to LJAO for an ATS after departure - as was the formation involved here. Controller Members considered it good practice that the trailing ac in a stream formation is allocated a squawk when ac are more than 1nm apart and the only method by which LJAO controllers could readily detect and identify formation elements would be if trailing ac are squawking. This was at odds with the current guidance contained within the MMATM, so the Members were convinced that this whole topic should be reviewed. Consequently, the Members agreed the first of two Safety Recommendations associated with this Airprox: The Board recommended that the MoD review the SSR requirements for stream formations.

NE TAC's instruction to the Typhoon crew to descend to an altitude of 2400ft followed on from the pre-note to Luton RADAR. LJAO has no mandate to control traffic in the Class A LTMA and the normal routeing inbound to Northolt is to follow the 'C' Arrival, which requires ac to transit Class G airspace clear beneath the 2500ft base of the LTMA, via BARKWAY VOR, under a radar service from either Luton RADAR or Essex RADAR. The military area controller Member emphasised this was the only way into Northolt for non-airways traffic arriving from the N. Hence a descent to 2400ft clear of other traffic was essential prior to the hand-over and had to be accomplished before the LTMA boundary, where all other GA traffic is also being squeezed into the available airspace. The BM SM Advisor opined that this routeing is fraught with difficulty; the density of traffic in the remaining Class G airspace beneath the LTMA provided a significant challenge for area controllers especially when controlling hi-speed fast-jet traffic. The Board noted that this Airprox was the second of two cases involving traffic under the control of LJAO for a Northolt 'C' Arrival assessed at this meeting. Consequently, in the light of these two Airprox, it was suggested

by the Board's ATC Strategy and Standards Advisor that the use of this routeing and the provision of ATSs should be reviewed. Members concurred and a second Safety Recommendation was agreed: The Board recommended that the CAA should arrange, under the auspices of the ASI, a workshop of ATC stakeholders to review the arrangements and ATC provision for Northolt 'C' arrivals via BARKWAY.

The BM SM report shows that on its projected track the Typhoon would have passed through the climb-out to Mildenhall's RW29 at a range of 6.3nm in the descent, potentially flying into the CMATZ. The RJ-135 was showing on the LJAO display when the descent instruction was issued some 2min before the Airprox occurred but the KC-135 was not and the Typhoon had subsequently remained above the CMATZ because the Typhoon crew had themselves become concerned and requested a climb and upgrade to a DS. The absence of co-ordination beforehand was noted but a controller Member suggested that co-ordination was not required because the VFR Typhoon crew had only requested a TS and were responsible for their own separation. However, the civilian area controller Member was certain that LJAO NE Sector should have co-ordinated with DEPS; other controller Members agreed that liaison with DEPS should have been effected by NE PLANNER who could then have co-ordinated the Typhoon against the departing formation: it was unprofessional to descend traffic through a major military A/D's climb-out without checking beforehand if any departures were imminent and resolving any perceived conflict. The RJ-135 flight had been pre-noted to LJAO and Members agreed that good practice would dictate that co-ordination should have been effected by NE PLAN. Moreover, it was evident that DEPS had been trying to initiate co-ordination for some 3 min after he first saw the potential for a conflict, but had been frustrated in his attempts because LJAO did not answer the landline. The disappointing absence of a report from the PLANNER controller was crucial here and the reason why DEPS had been unable to communicate with the Sector was not clear - BM SM advised that the landline recordings were no longer available and had been erased. Nevertheless, Members remained concerned that NE TAC had not stopped the Typhoon descending toward the Lakenheath/Mildenhall CMATZ and through the climbout lane without any form of co-ordination or traffic information being passed by NE Sector, in the knowledge that traffic was departing and climbing. NE TAC's awareness of the RJ-135 was evident from the TI passed to the Typhoon crew at a range of 5nm because it included information that the ac was climbing to FL190; this was not evident from the ac's Mode S Selected Level [SEL] suggesting that NE Sector had accessed the flight data relating to the flight passed to LJAO by Lakenheath in their prenote, which would have shown the KC-135 in the flight of two ac. The Typhoon crew's response to the TI was evidently interpreted incorrectly by NE PLAN who erroneously informed the SUP they were visual with the RJ-135. This same interpretation was presumably also accepted by NE TAC and any concern the controller might have had over the proximity of the RJ-135 would have been allayed, albeit that he was unaware of the KC-135. NE Sector was undoubtedly extremely busy, as was the Unit as a whole, and had a very difficult split of traffic as a result of the free-call from the Typhoon (B) formation 100nm away to the N which 'tipped the balance' in NE TAC's workload it was suggested. The USAFE-UK Advisor recognised this, but was concerned with the supervision of the Unit at the time and was critical that further assistance was not provided to NE Sector, calling upon those controllers on a break if necessary. However, the SUP reports that his focus was with the E Sector at the time due to their high traffic loading and was unaware of the large split on NE Sector. This 100nm split was clearly a factor in distracting NE TAC from the conflict developing with the RJ-135; NE TAC acknowledges that he should have stopped the Typhoon's descent, but was distracted by the hand-over of the BE200. However, when prompted by the Typhoon crew – now IMC in cloud - requesting a DS and climb, NE TAC, passed TI on unrelated traffic 5nm away rather than update the crew on the position of the RJ-135 that was only 1·5nm away about 400ft below it in cloud; NE TAC remained unaware of the KC-135 1nm away from the Typhoon because it was not clearly displayed. The subsequent avoiding action L turn onto 140° inside the RJ-135 was issued by NE TAC to the Typhoon crew about 4sec before the merge between the Typhoon contact and that of the KC-135 that is clearly discernible on the radar recording, but which is shown in a different format to that displayed to NE TAC.

The Typhoon is shown no lower than FL44; the pilot reports he had levelled off at 4000ft ALT due to the proximity of the CMATZ and was unable to maintain VMC, the crew being aware from the last of the two transmissions of TI from NE TAC only that the RJ-135 was near at 1100ft below their level. Pilot Members agreed that the Typhoon crew's request for a DS was made somewhat late and the level-off was evidently of very short duration as the radar recording revealed a quick reversal into a climb over three sweeps. Consequently, having entered cloud just before the CPA, the crew was unable to see the reported RJ-135, did not detect the trailing KC-135 on their AI radar and remained unaware of the conflict with the KC-135 throughout the 'merge'. Although the KC-135 was not squawking Mode A/C, the crew had Mode S selected 'on', thus availing them the advantage of displayed TCAS data. DEPS reports that they attempted to prevent the developing conflict by restricting the RJ-135 flight's levels and subsequently issued a turn in avoidance. However, by this time the KC-135 crew was IMC in cloud, had received a TCAS DESCEND RA followed rapidly by a reversal into a CLIMB RA, demanding a ROC of 6000ft/min,

which the pilot was unable to comply with because of the ac's gross weight and energy state. Therefore, although TCAS had ably assisted their SA it was unable to resolve the conflict with the agile Typhoon. Pilot Members suggested that the KC-135 crew should also have requested a DS before they entered cloud as a TS was also inappropriate to their needs in IMC.

The radar recording shows that both the KC-135 and Typhoon returns merged in azimuth with little discernible horizontal separation. Plainly the absence of a Mode C indication from the KC-135 did not allow its level to be compared accurately to that of the Typhoon. Moreover, the absence of a Mode C level from the Typhoon just before the merge was indicative of a rapid reversal of the descent into a climb with the Stansted 10cm radar, which has a higher data update rate, showing the Typhoon climbing through FL65 at the CPA. The KC-135 pilot quotes the minimum separation between his ac and the Typhoon registered on his TCAS as 0.01nm horizontally – 20yd - and less than 100ft vertically. However, Members found it difficult to resolve the reported 100ft vertical separation with the maximum level of FL54; it is not clear at what point the KC-135 ascended to this level and thus his ac's range from the Typhoon. Whilst the minimum vertical separation could not be determined the USAFE-UK Advisor opined that it was seen by Lakenheath RAPCON to be a very close encounter. The KC-135 crew followed DEPS instructions, under a TS, but was unable to manoeuvre their ac in response to the final TCAS CLIMB RA rendering the system ineffective; in the event the KC-135's lower than demanded climb rate may have resulted fortuitously in greater separation when the Typhoon climbed abruptly and steeply to achieve VMC. Nevertheless, the Typhoon crew had followed NE TAC's descent instructions and flew into close proximity with the KC-135 that neither the controller nor the crew were aware of. Neither aircrew saw each other's ac. Weighing all these various factors carefully for relevance, the Board agreed that all of them had contributed to causing a hazardous conflict in Class G airspace. However, it was the workload and performance within LJAO that created the conditions which led to the Airprox. With the NE Sector busy working traffic over a large geographic split, initially unaware of the pre-noted departure from Mildenhall and required to hand over the Typhoon to Luton RADAR, TAC's instruction to the Typhoon to descend through the climb-out lanes of the CMATZ without any form of liaison, either by traffic information or direct co-ordination with DEPS, was the critical element that joined all the contributory strands together, from which the conflict resulted. The Board concluded therefore, that the Cause of this Airprox was that LJAO did not liaise beforehand about the Typhoon's flight in close proximity to the Mildenhall CMATZ. Chance played a significant part in keeping these two ac apart and with both crews IMC in cloud the Board was unequivocal that an actual Risk of collision had existed in these circumstances.

Post Meeting Note (1): The Typhoon is not fitted with an ACAS and Members were disappointed to learn that there are currently no plans to fit one in the future. The HQ Air (Trg) Member had suggested that if the Typhoon was fitted with a Mode S/TCAS system it would, in all probability, have detected the presence of the KC-135's Mode S, alerted the Typhoon crew to its proximity, and generated a co-ordinated RA that would have resolved the conflict - see Post meeting Note (2). Therefore, Members were asked to consider whether they would support a third Safety Recommendation viz: that the MoD review the requirement for Typhoon ac to be equipped with a suitable Mode S/TCAS system. A number of Members responded favourably to the proposal; however, it did not receive unanimous approval. Moreover, with only one Airprox of this nature it was considered that there were insufficient grounds upon which to forward a recommendation in this instance. However, the topic will be kept under review and should further examples be identified then it could be re-examined by the Board in the light of that additional data.

Post meeting Note (2): Further consultation with TCAS experts has revealed that the enhanced ModeS/TCAS (E-TCAS) – fit of some military ac, including the KC-135R, includes a number of role specific enhancements that are not included in more conventional TCAS II equipments fitted to CAT ac. The UKAB has been advised that it was foreseen that a cluster of TCAS fitted ac – ie a formation - could cause another TCAS unit to unnecessarily limit its interrogations and thus reduce the protection that TCAS equipage provides. E-TCAS was therefore developed, which overcomes this problem while still allowing TCAS-fitted military ac to fly in formation. With E-TCAS, when flying in formation mode, the lead ac has TCAS and Mode S operating in normal active mode, but the remaining formation elements operate in a passive mode. TCAS surveillance is performed by the lead ac and the information is passed by a data-link to other formation ac. The other formation elements (knowing the relative position of the lead ac and the other non-formation ac that the lead aircraft has under surveillance from the Mode S data link) determine for themselves whether any other ac under surveillance by the lead ac's TCAS constitute a 'threat' to the individual formation elements. If another ac does constitute a threat then the individual formation ac will no longer remain passive and start standard TCAS active interrogations and generate the appropriate alerts.

As the TCAS equipage of the 'threat' ac is known to the formation ac:

If the 'threat' ac is not TCAS-equipped, then the formation ac will not 'enable' its own responses to Mode S interrogations because the threat ac cannot interrogate the formation ac and an un-coordinated RA will result if necessary.

If the threat ac is TCAS-equipped, then the formation ac will communicate a Resolution Advisory Complement (RAC) message containing also its Mode S address to the 'threat' ac. The formation ac will then enable responses to addressed Mode S interrogations because the threat ac will be expected to start actively interrogating the formation ac and a co-ordinated RA will result if necessary.

In the case of the Non TCAS-fitted Typhoon and the E-TCAS fitted KC-135R there would, therefore, be value in the Typhoon being TCAS equipped and the RAs on the two ac would have been co-ordinated providing greater prospect that any collision risk would be successfully resolved.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: LJAO did not liaise beforehand about the Typhoon's flight in close proximity to the Mildenhall CMATZ.

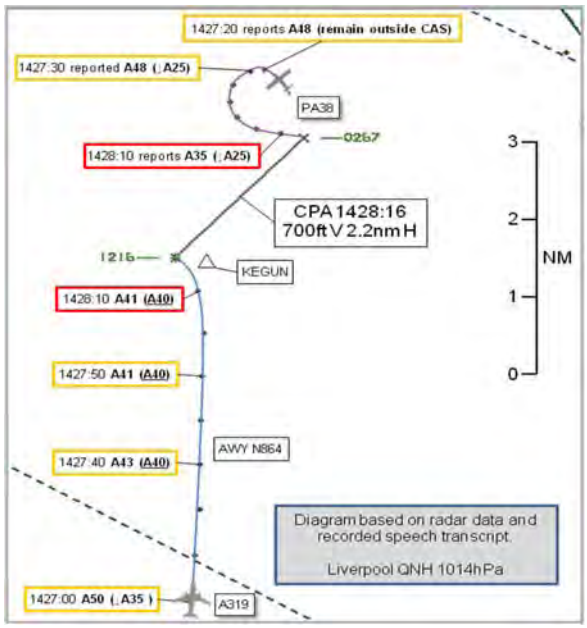
Degree of Risk: A.

Recommendation: i. The MoD reviews the SSR requirements for stream formations.

ii. The CAA should arrange, under the auspices of the ASI, a workshop of Aers TC stakehold to review the arrangements and ATC provision for Northolt 'C' arrivals via BARKWAY.

AIRPROX REPORT NO 2012061

Date/Time:	6 May 2012 1428Z (Sunday)	
Position:	5312N 00309W (ivo KEGUN)	
Airspace:	AWY N864	(Class: A)
	Reporting Ac	*Reporting Ac*
Type:	A319	PA38
Operator:	CAT	Civ Pte
Alt/FL:	4000ft QNH (1014hPa)	4800ft QNH (1013hPa)
Weather:	IMC In Cloud	VMC CLBC
Visibility:	NA	10km
Reported Separation:	600ft V/2nm H	NK
Recorded Separation:	NK V/2.2nm H	



BOTH PILOTS FILED

[UKAB Note(1): A319 altitudes are Mode C derived, in the format '<time> **<altitude> (<current clearance>)**'. PA38 altitudes are as reported by the PA38 pilot, in the format '<time> reports/reported **<altitude> (<current clearance>)**'.]

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports descending in AWY N864 inbound to Liverpool John Lennon Airport approaching RP KEGUN (12nm S WALLASEY) whilst IMC in cloud in receipt of a RCS from Liverpool APP (119.850MHz). All external lights and IFF modes 3A/C and S were selected 'on', with SSR code 1216 selected.

When passing altitude 6000ft (with clearance to altitude 3500ft on Liverpool QNH 1014hPa) he '... encountered proximate traffic on radar 12 o'clock position at 7.5nm closing'. Liverpool APP informed him that the traffic was a light ac [the subject PA38] maintaining altitude 1800ft. ATC then requested the PA38 pilot confirm his altitude, which was reported as 4800ft. As the intruder ac approached 2nm on TCAS he instructed the FO [PF] to take avoiding action by turning immediately L. He informed Liverpool APP that they were turning L and was instructed to keep turning L for avoiding action. Liverpool APP instructed the PA38 pilot to descend immediately to 2000ft [pilot report states 2500ft] and leave CAS. Shortly thereafter, normal vectors were resumed.

THE PA38 PILOT reports holding [in a L turn] passing through 186° at 85kt, level at 4800ft on QNH 1013hPa whilst operating VFR in VMC and under a BS from Liverpool APP. External strobe and navigation lights and SSR Mode 3A/C were selected 'on'. The ac is not fitted with Mode S. After inadvertently entering Class A airspace to '... avoid high ground of Welsh hills ...' he conflicted with an incoming airliner and immediately descended to altitude 2500ft as instructed by ATC. The transponder was '... set in Alt mode ...', he thought, but seemed to be inoperative.

[UKAB Note(2): The PA38 operator stated that the transponder in this aircraft is Mode A capable only and is labelled as such in the cockpit]

ATSI reports that an Airprox was declared in the vicinity of RP KEGUN, at 4000ft in AWY N864, when an Airbus A319 and a Piper PA38 came into conflict. The A319 was operating IFR on a flight from Jersey to Liverpool and was in receipt of a RCS from Liverpool Radar on 119.850MHz. The PA38 was operating VFR on a local flight from Liverpool and was in receipt of a BS from Liverpool Radar on 119.850MHz.

AIRPROX REPORT No 2012061

[UKAB Note(3): UK AIP, page AD 2-EGGP-1-5 dated 16 Dec 10, para 2.18 – ATS COMMUNICATION FACILITIES states that Liverpool Approach and Liverpool Radar have the common frequency 119.850MHz. Throughout the course of the incident the A319 pilot used the C/S "*Liverpool Approach*" and the PA38 pilot used the C/S "*Liverpool Radar*".]

The Liverpool METAR was reported as follows:

METAR EGGP 061420Z 15004KT 110V230 9999 FEW040 11/M03 Q1014=

[UKAB Note(4): The Hawarden METAR was reported as follows:

METAR EGNR 061420Z 18006KT 9999 SCT048 10/00 Q1014=]

The PA38 pilot departed Liverpool at 1323 on a local flight and was given a clearance to leave the Liverpool CTR [Class D airspace] not above altitude 1500ft VFR, via Oulton Park VRP. Once airborne, he was transferred to Liverpool Radar. At 1326 the PA38 pilot contacted Liverpool Radar and was instructed to report leaving Oulton Park. At 1331 he reported at Oulton Park and the service was changed to a BS.

At 1408:10 the PA38 pilot called Liverpool Radar, stated that he was at Wrexham, and requested a SRA. He was instructed to route towards Flint, remaining clear of Hawarden ATZ, to squawk 0267 and to hold '... at the Flint area ...'. The base of AWY N864 above Wrexham is altitude 4500ft. The PA38 was not displaying Mode C level information.

At 1415:00 the Liverpool Radar controller asked the PA38 pilot to report his altitude. The pilot replied, with an accent that made the transmission somewhat unclear, that he was at, "... *four thousand nine hundred feet on your QNH*". The Liverpool Radar controller replied "... *Roger if you just remain outside controlled airspace at Flint*", which was acknowledged by the pilot. The base of controlled airspace above Flint is altitude 3000ft. One minute later the Liverpool Radar controller advised other traffic returning to Hawarden that, "*... there will be a PA38 operating in the Flint area last reported not above one thousand, er correction, nine hundred feet*". At 1418:50 the PA38 reported overhead Flint.

At 1424:30 the pilot of the A319 contacted Liverpool Radar descending to FL60 inbound KEGUN. He was advised to expect radar vectors to the ILS, to continue on his present heading and to descend to altitude 5000ft QNH [1014hPa].

At 1426:10 there was a change of controller and the incoming Liverpool Radar controller asked the PA38 pilot to report his altitude. He replied that he was at 4800ft Liverpool QNH. The Liverpool Radar controller asked the pilot of the PA38 to say again and the PA38 pilot replied, "*four thousand eight hundred feet*". The Liverpool Radar controller responded in a surprised tone, "*four thousand eight hundred feet did you say*" to which the pilot replied at 1426:30, "*Affirm, four thousand eight hundred feet*". The controller then replied, "*One thousand eight hundred feet that's copied thank you*".

The incoming controller's written report stated that the PA38 had been handed over at a reported level of 1900ft. It also stated that both the incoming controller and the outgoing controller, who was still at the desk, heard the reply from the PA38 as, "*one thousand eight hundred feet*". When the controller readback the PA38's level as 1800ft the pilot did not correct it so the controller assumed it was correct.

At 1427:00 the Liverpool Radar controller cleared the A319 to descend to altitude 3500ft and passed TI on the PA38 as being in the A319's 12 o'clock at a range of 7nm and an altitude of 1800ft. The A319 pilot reported that he had the traffic on TCAS in his descent clearance readback. At 1427:20 the PA38 pilot transmitted, "... *our altitude is four thousand eight hundred four one two three four thousand*". The Liverpool Radar controller informed the PA38 pilot that he was inside CAS (at 1427:30), instructed him to descend immediately to altitude 2500ft and recleared the A319 pilot (at 1427:40) to stop descent at altitude 4000ft. At 1427:50 the Liverpool controller passed updated traffic on the PA38 now descending from altitude 4800ft and the pilot of the A319 requested a L turn and concurrently reported that he was turning L onto a hdg of 320°. The controller acknowledged the call from the A319 pilot and passed avoiding action [at 1428:00] of a L turn onto a hdg of 290°. At 1428:10 the Liverpool controller requested the PA38 pilot report his altitude to which he replied, "*Three thousand five hundred and descending*". The Liverpool controller requested that the PA38 pilot expedite his descent, which was acknowledged.

Separation was lost; the CPA was 2.5nm and 600ft (vertical separation based on the PA38 pilot's report at the time avoiding action was taken). Minimum separation required was 3nm/1000ft.

[UKAB Note(5): The CPA of 700ft V and 2.2nm H was calculated from the radar recording and a conservative estimate of the PA38 altitude at 1428:16]

When the pilot of the PA38 first reported to Liverpool Radar that the ac was at 4900ft [at 1415:00] the transmission was fairly weak and, together with the pilot's accent, ATSI considered that the distinction between 4900ft and 1900ft was somewhat unclear.

The PA38 was inside CAS without a clearance. The base of CAS was 3000ft and having instructed the pilot to remain outside CAS, the controller had an expectation that the PA38 was at a level below CAS.

After the controller handover had taken place and the oncoming controller requested the PA38 pilot to state his level, it is very likely that there was a high degree of expectation bias that the PA38 was level at 1800ft rather than 4800ft. The incoming controller expected the PA38 to be outside CAS and had just been told at handover that the PA38 was at 1900ft.

Even after the Liverpool controller had queried the PA38's level as being 4800ft, both the incoming and outgoing controllers misheard the pilot's reiteration of his level as 1800ft. When this was readback to the pilot it was not immediately corrected so the controller assumed it was correct.

The controller was alerted to the situation by the pilot of the PA38 reiterating his level as being 4800ft. When the controller realised the level of the PA38 was conflicting with the A319, instructions and TI were issued to resolve the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Members discussed the issue of the controllers' confirmation bias at length and were of the opinion that the poor R/T readability and controller expectation of the PA38 pilot's flight profile contributed to the breakdown in separation. Additionally, controller Members opined that a check of the PA38 pilot's altitude in the 11½ minutes between the misheard responses at 1415:00 and 1426:30 would have been prudent. Members also opined that assumptions were made by all parties: for example the PA38 pilot's assumption that he had a functioning SSR transponder Mode C and hence that the controller was aware of his altitude; also the reasonable expectation that the PA38 pilot would continue to operate iaw his VFR clearance by remaining clear of CAS.

Notwithstanding earlier miscommunication, the situation was eventually resolved by the PA38 pilot reiterating his altitude in a clear and unmistakeable manner and the controller taking positive control of the situation with deconfliction instructions to both ac. The A319 pilot was also able to use his situational awareness from both the RT and TCAS display to pre-empt the controller's avoidance action, thereby increasing the range at CPA. Whilst the PA38 pilot continued to erode CPA range by continuing his L turn, his rate of descent, estimated at 2000fpm

from the radar replay, resulted in a minimum range separation of 2.2nm and an estimated height separation of at least 700ft. As such, the Board considered that no risk of collision existed.

[UKAB Post-meeting Note: The PA38 pilot did not agree with UKAB Note(2) and stated that the SSR transponder was not labelled as being Mode A capable only at the time of the incident. Although the Board has photographic evidence that the transponder is now labelled it has not been possible to resolve these differences].

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA38 pilot entered CAS without clearance and flew into conflict with the A319.

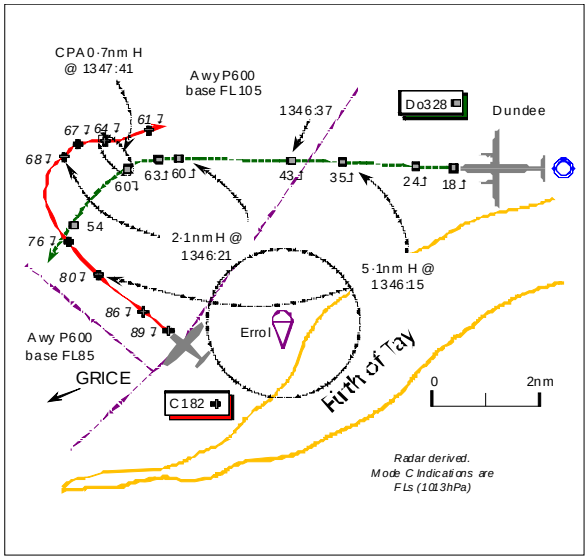
Degree of Risk: C.

AIRPROX REPORT NO 2012062

Date/Time:	6 May 2012 1347Z (Sunday)	
Position:	5627N 00316W (8nm W of Dundee.)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Do328	C182
Operator:	CAT	Civ Club
Alt/FL:	↑FL80	7000ft↓
	SAS	agl
Weather:	VMC CLOC	VMC CLOC
Visibility:	10km	10km

Reported Separation:
<50ft V/250-300m H 1000ft V/2nm H

Recorded Separation:
400ft V/0·7nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DORNIER Do328 PILOT reports he departed from RW27 at Dundee, maintaining RW track to avoid parachuting to their L, climbing to FL110 on track GRICE as per the initial clearance prior to switching to Leuchars RADAR on 126·500MHz for a TS. Their CAS joining clearance was then amended and Dundee ATC instructed them to stop their climb at FL80, until recleared by Leuchars RADAR. Dundee ATC reiterated the warning of parachuting activity and the position of the parachute dropping ac was given as '1nm E of ERROL at FL90. They contacted Leuchars RADAR who provided a TS and, at Leuchars suggestion, contacted Scottish CONTROL as they were advised the parachute dropping ac was operating on 124.500MHz. Approaching a position 8nm W of Dundee heading 274°, climbing at 170kt, a TCAS contact appeared and a TA was rapidly followed by an RA. The A/P was disconnected and the demanded descent initiated in accordance with the RA. As the ac descended, a L turn of approx 30-40° was commenced. The 1st Officer briefly glimpsed the other ac – a blue and white high-wing single-engine C182 – passing down their starboard side at an estimated range of 250m, descending, less than 50ft below his ac. Once CLEAR OF CONFLICT was enunciated the climb was resumed and ATC notified that an Airprox would be filed. He assessed the Risk as 'high'.

The Do328 is coloured white; the HISLs, landing and taxying lights were all on. The assigned squawk of A4377 was selected with Modes C and S on.

THE CESSNA C182 PILOT reports he was on a parachute dropping flight from Errol A/D with a jump height of 9000ft agl. He was in communication with the Drop Zone on VHF and Dundee ATC on 122.90MHz. A squawk of A0033 (para dropping) was selected with Mode C; neither Mode S nor TCAS are fitted. The ac is coloured white; it was not specified if HISLs are fitted.

Winds were from the N; therefore the exit point was approximately ½nm N of Errol A/D and within the NOTAM'd parachute dropping zone. Due to high cloud covering the S side of the A/D a run-in into wind would not be possible as the drop zone would not be visible to either him or the parachutists; therefore he elected to run-in crosswind on a heading of about 270° to remain VMC. As requested by Dundee, he called them to advise that he was dropping and again when the parachutists had departed from his ac and were in the descent, which is SOP. After the parachutists had exited, he turned onto a N'ly heading and began his descent in VMC and also to avoid the Class A airspace at FL85 to the W of Errol A/D. Shortly after initiating the descent, turning through 360° at 140kt, he noticed another ac – the Do328 - in his 3 o'clock, low in a LH climbing turn about 1.5 to 2nm away and so he maintained his heading as the Do328 entered cloud behind him to the S. He estimated the minimum separation as 1000ft vertically and 2nm horizontally and the Risk 'none' as the Do328 was already flying away from him.

He monitors two radios during parachute flying and plans his descent accordingly, but he did not hear and was not aware of an ac departing Dundee, but this may be due to the door of the ac being open and the noise that it creates.

An Airprox was not filed at the time as the Do328 was, in his view, a safe distance away and turning away from him.

UKAB Note (1): The UK AIP at ENR 5-5-3-2 promulgates the free-fall drop zone at Errol, Tayside, as a circle 1.5nm radius centred on 562418N 0031055W up to 5500ft (†) ALT, active normally during daylight hours Wed-Sun & PH. Within Remarks it is noted that: activity is notified on the day to Scottish Area Control; † Drops may be made from above ALT 5500ft with Scottish Area Control (Prestwick) permission.

THE DUNDEE COMBINED AERODROME AND APPROACH CONTROLLER reports that he was on duty when the Do328 departed from Dundee. At the time Errol Parachute Centre - 6nm to the WSW of Dundee - was active with a C182 at 9000ft QNH (1015hPa) under a BS. ScACC TAY Sector issued a clearance for the Do328 to join airways on track GRICE, to climb and maintain FL110. Subsequently, he co-ordinated this clearance with Leuchars ATC, who gave a local restriction of not above FL80 until further advised by Leuchars RADAR. The Do328 crew was requested to contact Leuchars RADAR after departure. As the Do328 lined up on RW27, he issued TI about the C182 paradropping at Errol at 9000ft ALT. The crew of the Do328 asked for clarification on the C182's position and when asked, the C182 pilot reported he was 1nm E of Errol, which was acknowledged by the Do328 crew. The Do328 then got airborne and appeared to be maintaining runway track. As the Do328 was climbing out, the C182 pilot reported drop complete. He acknowledged this transmission and passed TI to the C182 pilot about the Do328 just airborne from RW27 climbing FL110, but he received no acknowledgement of the TI from the C182 pilot. Once the Do328 was established in the climb at 1346Z, he instructed the Do328 crew to contact Leuchars RADAR. About 30min later a colleague received a call from the Do328 reporting that they had experienced a TCAS RA on departure from Dundee, while switching from the Leuchars frequency to the TAY

The 1320Z Dundee METAR: 22011KT 180v260 9999 SHRA FEW016CB SCT022 BKN042 05/01 Q1015=.

THE PRESTWICK CENTRE (PC) TAY SECTOR TACTICAL & PLANNER CONTROLLER (TAY SC) OJTI reports he was mentor to a trainee who had control of the Sector. The Do328 departed Dundee under IFR, bound for London City Airport to join CAS at GRICE. In response to the crew's initial call, the trainee instructed them to squawk 'ident' and immediately issued TI and avoiding action on a conflicting contact – the C182 - that was not under the control of TAY Sector. The Do328 crew responded by advising that they had received a TCAS RA, which they followed. Once clear of the conflicting traffic, they resumed their original FPL routeing. The Do328 PIC subsequently advised that he would be filing an Airprox. STCA was not triggered, he thought.

ATSI reports that the Do328 departed Dundee for an IFR flight to London City and had just established communication with Prestwick Centre (PC) TAY Sector on 124.5MHz. The Do328 was squawking A4377. The C182 pilot was operating VFR on a para-dropping flight at Errol aerodrome and in receipt of a BS from Dundee on 122.9MHz. The C182 was squawking A0033 with Mode C.

The TAY Sector was being operated as combined TACTICAL and PLANNER positions by an OJTI and trainee who was validated on another Sector but extending his qualification onto the TAY Sector and was near to validation standard. There were no reported distractions or unserviceabilities. Additionally, a separate TAY PLANNER controller had been brought onto the Sector to relieve a spike in workload. In the opinion of the TAY OJTI the traffic volume and complexity were medium-high. Prestwick Multi-Radar Tracking (MRT) was in use.

The Dundee controller was providing combined Aerodrome Control and Approach Procedural Services without the aid of surveillance radar, the latter consisting of either a Basic or Procedural Service.

The Dundee METAR:

1350Z 12004KT 090V180 9999 SHRA FEW016CB SCT022 BKN042 05/02 Q1014=

1320Z 22011KT 180V260 9999 SHRA FEW016CB SCT022 BKN042 05/01 Q1015=

Aside from the investigation into the Airprox it was discovered that the AIP entry for Errol incorrectly stated that drops above 5500ft would be with the permission of Scottish Area Control. The CAA has now directed AIS to remove this entry at the next available opportunity.

At 1304 UTC Errol Paradropping club telephoned Prestwick Centre notifying them of their intention to perform 1 drop up to FL90 within the next hour. The Prestwick Centre representative stated that the appropriate sector would be informed. The TAY OJTI reported being aware of paradropping activity at Errol by way of information on a pink flight progress strip and noted that the Errol Paradropping ac, remaining wholly outside CAS, rarely called the TAY Sector frequency. There is no requirement for the TAY Sector team to monitor ac activity outside CAS.

Dundee ATC telephoned TAY Sector Support requesting clearance for the Do328 at 1322. The SSR code was issued and, in accordance with normal practice, Dundee rang-off in anticipation of TAY calling back with the complete clearance.

At 1324:20, the C182 called Dundee reporting, "*out of Errol for paradropping*". The Dundee controller passed the QNH and a BS was agreed. Upon correctly reading back the QNH the C182 pilot reported, *"climbing to 9 thousand feet*." The Dundee controller requested that the pilot, "*report running in for the drop*." There are no Dundee MATS Part 2 procedures for handling paradropping aircraft operating out of Errol.

At 1334, the TAY Planner telephoned Dundee and passed the Do328's clearance: "[Do328 c/s] *is cleared to join controlled airspace on track to GRICE climbing to maintain FL1-1-0, squawk 4-3-7-7, 124.5*."

In accordance with the requirements of the Letter of Agreement (LoA) between Dundee ATC and Leuchars, the Dundee controller called Leuchars APPROACH at 1335 and notified them of the Do328's departure from RW27. The Leuchars controller requested to work the Do328 and details were passed, including the Do328's clearance of FL110 on track GRICE. After the details were passed the Leuchars controller added, "*…climb not above flight level 8-0 initially*". The Dundee controller acknowledged this, stating, "*I'll need to co-ordinate that with Scottish I'll call you back if there's any problem."* Leuchars replied, "*it's just up to the airway*". ATSI noted no other traffic in the vicinity that may have affected the ability of the Do328 to join CAS as cleared by TAY.

At 1336:11, Dundee spoke to the TAY trainee regarding Dundee's co-ordination with Leuchars (not above FL80), which was acknowledged by the TAY controller. The TAY controller requested some clarification, "*he's coming to me from Leuchars is that correct?"* This was confirmed as correct by the Dundee controller. The TAY controller then asked, "*he's not above 8-0 then",* which the Dundee controller confirmed was the case.

The C182 reported commencing its drop at Errol at 1340:10 and was requested to report when complete by the Dundee controller.

As the Do328 taxied for departure the Dundee controller informed the Do328 pilot that the surface wind - 130°/5kt - now favoured a RW09 departure. The Do328 pilot reported being happy to continue with a departure from RW27.

At 1341:00, the Dundee controller passed the Do328 crew their clearance, "*…clear to join controlled airspace on track GRICE climb maintain flight level 1-1-0…frequency after departure when advised will be Leuchars Radar 126.5 followed by Scottish Control 124.5."* This was read-back correctly. The following local restriction was then passed, "*…local restriction from Leuchars after departure climb not above flight level 8-0 until further instructed by Leuchars Radar…"* Again, this was read-back correctly. Other than local restrictions, there are no published standard departure procedures for Dundee.

At 1342:50, as the Do328 lined-up on RW27, the Dundee controller advised, "*..Errol parachute centre is active just now Cessna 1-8-2 currently carrying out paradrop from 9 thousand feet."* This was acknowledged by the Do328 pilot who then asked, "*do you know the location of the drop centre please?"* The Dundee controller instructed the Do328 to standby and then, at 1343:20 requested the C182 pilot report his exact position. This was given as, "*1 mile to the east of the field* [Errol] *dropping overhead*." [The controller clarified that this was to the E of Errol airfield and asked the Do328 crew if they copied this report over the RT from the C182 pilot. The Do328 crew acknowledged *"yep..1 mile east of Errol where the paradrop is* [Do328 C/S]." At 1343:40, the Do328 crew was cleared for take-off. The C182 pilot's written report stated that the prevailing winds were from the N; however, due to cloud cover S of Errol a crosswind run in was executed in order to maintain VMC.

Leuchars ATC then called Dundee at 1343:40 stating, "*I've got nothing to effect now if he wants to go straight to Scottish…".* The Dundee controller responded, "*Okay I – he's just about to start rolling so once he's airborne and settled down I'll er give him unrestricted climb flight level 1-1-0".* After this call terminated the Dundee controller immediately telephoned TAY, informing the trainee controller, "*reference* [Do328 c/s] *Leuchars have now said there's no restriction on the climb so are you still happy with flight level 1-1-0".* The TAY trainee agreed that this was satisfactory and the Do328's airborne time was exchanged.

The TAY OJTI reported that it was their impression the Do328 would be transferred direct from Dundee without working Leuchars. The PC MATS Part 2 and the LoA between Leuchars and PC states that Dundee departures will be transferred to TAY Sector by Leuchars Approach Control when clear of Leuchars traffic.

The C182 pilot reported drop completed and descending at 1344:45. The Dundee controller responded by passing traffic information, "*…Dornier 328 just airborne off 2-7 now in the climb flight level 1-1-0."* There was no acknowledgement from the C182 pilot, which may have been due to the ambient noise in the ac as indicated in the pilot's report. The C182 pilot reported that after all the jumpers had exited the ac the C182 was turned onto a N'ly heading and descent commenced in order to maintain VMC and avoid CAS W of Errol.

The Do328 pilot reported maintaining a runway heading on departure in order to avoid Errol to the ac's left.

The Do328 first appeared on the TAY controller's situation display at 1345:33 as it passed 1800ft Mode C. At 1345:50 the Dundee controller transferred the Do328 to Leuchars ZONE. Immediately before this the controller had received an initial call from other commercial traffic out to the W. Shortly after this the A/D declared RW09 as the duty runway.

The Do328 crew called Leuchars ZONE at 1346:01 (Figure 1), "…*passing er flight level 3-3 climbing flight level 8-0 maintaining a runway heading runway 2-7 Dundee."* The Leuchars controller responded, at 1346:15, stating, "*…Leuchars ZONE identified, traffic service, traffic left 11 o'clock 4 miles crossing left right...parachuting aircraft flight level 8-0 descending."* The pilot acknowledged the service level.

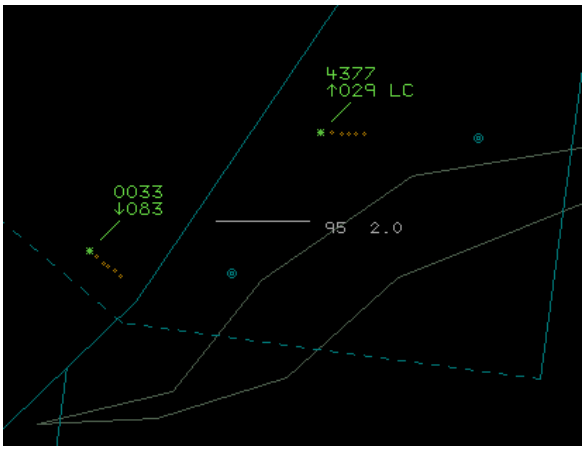


Figure 1: 1346:01UTC

Low level STCA activated on the TAY controller's situation display at 1346:37. The C182 was in the Do328's 11 o'clock, range 4.5nm, to cross L to R. The Do328 was climbing through FL43 and the C182 was descending through FL76.

At 1346:38, Leuchars ZONE advised the Do328 crew, "*Scottish are working that aircraft would you rather speak to them now*". The Do328 crew responded, "*yes please*," and the flight was transferred to Scottish CONTROL at 1346:46.

The Do328 crew called the TAY Sector at 1346:58, passing FL54 for FL80. At 1347:23, the TAY trainee instructed the Do328 crew, "*…squawk ident and..the believed to be you* (sic) *you've got traffic looks like a paradropper in your 12 o'clock range 2 miles if not seen turn left heading 1-8-0 degrees.*" (See Figure 2 below.) This was answered with the Do328 pilot stating, "er *TCAS,"* and at 1347:40, "[Do328 C/S] *TCAS RA.*"

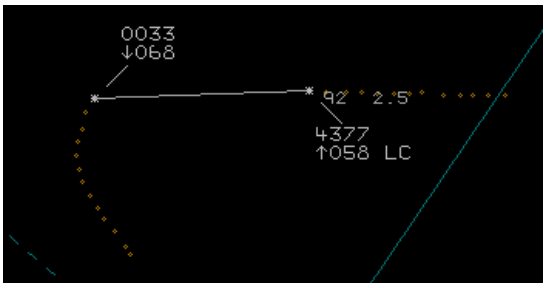


Figure 2: 1347:17UTC

High level STCA activated at 1347:24. The Do328 reached FL63 before descending to FL60 and turning to the L. At 1347:42, the CPA was reached when the separation between the ac was 0.7nm and 400ft. See Figure 3.

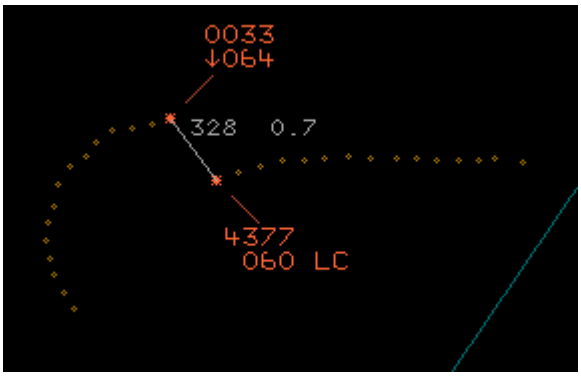


Figure 3: 1347:42UTC

The TAY trainee acknowledged these calls and provided supplementary, updated TI. The Do328 crew reported clear of traffic at 1348:04 and, "*resuming climb*." The TAY trainee then validated and verified the Do328's SSR information and further clearance to FL110 was issued.

The Do328 subsequently joined CAS, was placed under RCS, climbed to FL210 and transferred to the next en-route sector at 1353:20.

The C182 reported to Dundee complete for the day at 1353:47 and left the Dundee frequency.

Following this incident, Prestwick Centre undertook to seek to achieve an agreement between Errol, Dundee, Leuchars and PC with regard to the operation of paradropping ac out of Errol.

The incident occurred in Class G uncontrolled airspace where the responsibility for the avoidance of collision rests ultimately with the pilot. The Do328 crew arranged their departure to be on RW track, rather than towards GRICE, based on the information they had received with regard to the C182. The Do328 crew and the Dundee controller were subsequently unaware that the C182 had flown to the N, crossing the Do328's track, for a VMC descent.

The C182 pilot indicated that ambient noise in the cockpit was high; therefore it is likely that the C182 pilot was unaware of the Do328's actual departure. Additionally, as the C182 was under a BS from a non-surveillance equipped ATSU, the pilot could not expect any form of update on the Do328's position once airborne.

Neither of the surveillance equipped units knew that Dundee was in contact with the C182 pilot; therefore any possible means of effecting co-ordination with the C182 pilot was removed, nor were TAY or Leuchars aware of the C182 pilot's intentions.

The sequence of actions required of the Dundee controller to facilitate the Do328's departure involved multiple parties and co-ordinations: the request for clearance, issuing the clearance, co-ordinating with a neighbouring unit, relaying local restrictions to the Do328, informing TAY of Leuchars' requirements and passing traffic information between the Do328 and C182. As the Do328 rolled for take-off, the local restriction was cancelled and the Dundee

controller informed TAY of this, but omitted to inform the Do328 crew and inadvertently transferred the Do328 to Leuchars. This may have been compounded by the call of the other commercial traffic.

Since the encounter was at FL60 and below the level to which the Do328 was climbing, the fact that the Dundee controller did not cancel the level restriction with the Do328 is not considered to be a factor.

The Dundee controller transferred the Do328 to Leuchars in error. However, Leuchars ZONE acted upon the Do328's unexpected call by issuing TI on the C182. Since the first unit after transfer was surveillance equipped and the Leuchars controller reacted effectively, the transfer error made by the Dundee controller is not considered to be contributory.

The Leuchars ZONE controller believed that the C182 was working TAY. It is not known what information led the Leuchars controller to believe this. As the distance between the Do328 and C182 decreased the Do328 accepted the frequency transfer to TAY. This may have been predicated on the belief that TAY was working the C182. The Do328 did not request a service upgrade for deconfliction advice from Leuchars.

The TAY controller was expecting the Do328 to call on departure from Dundee and was unaware that the Do328 had been transferred to Leuchars. The Do328 crew eventually called TAY Sector 44sec before the CPA occurred with the C182. The TAY controller acted promptly and in an appropriate manner for an ac that had not yet been identified.

Prestwick Centre has indicated to ATSI that work is in progress to achieve a formal agreement between all the ATSUs concerned.

The Airprox occurred in Class G airspace W of Dundee at FL65 when the C182 pilot, executing a descending R turn to maintain VMC, came into proximity with the Do328 climbing to FL80.

Whilst not contributory to the Airprox, it is considered that the arrangement for service provision to both ac was not as efficient as it could have been. In Class G uncontrolled airspace pilots are not obliged to be in contact with an ATSU; however, given the relative position of Dundee, Leuchars, Errol and CAS it is considered that the possibilities for improving airspace utilisation in the area should be addressed by the inter-unit liaison now underway.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

It seemed to some Members that the Dundee combined Aerodrome/Approach controller was not best placed to provide an ATS to the C182 para-dropping flight at Errol. As the unit is not equipped with surveillance radar, the Dundee controller could only provide information about traffic known to Dundee. Leuchars, the LARS provider in this vicinity equipped with primary surveillance radar and SSR, seemed far better placed to provide an effective ATS, especially when para dropping was taking place from FL90 as here. The Board was reassured to learn, therefore, that as a result of this Airprox an agreement has been reached between the respective ATSUs and henceforth Leuchars will provide an ATS to para-dropping flights operating at Errol.

It was evident that the Dundee controller was careful to ascertain the location of the C182, which at the time had been 1nm E of Errol, and ensured that the Do328 crew was aware of it. Consequently, when the Do328 crew departed off RW27 any potential for a conflict with the C182 operating in the free-fall drop zone might not have been apparent to the Do328 crew as they remained westbound well to the N of Errol. A pilot Member suggested that the Do328 crew might not have been familiar with the location of Errol adjacent to the their route, but a CAT pilot Member contended that this was a regular service and the crew would have been completely aware of the significance of the para-dropping activity; moreover, they had maintained a westerly track to maximise their separation from the free-fall drop zone. When the C182 pilot reported to Dundee ATC that the para-drop was complete and that he was descending, the Dundee controller passed TI about the departing airliner but the C182 pilot did not hear it, apparently because of the excessive noise from the open door. The Board was concerned that the C182 pilot had not heard this TI as it could have helped forestall the Airprox and a pilot Member suggested that a noise-cancelling headset would be worthwhile. Members contended that what was missing was further

information from the C182 pilot that he had flown away from the free-fall drop zone and was descending through the extended centre-line to RW27. Whilst some controller Members were aware that it is commonplace for para-drop ac to descend in a steep and tight orbit close to the DZ above the parachutists, and this was what the Dundee controller might have assumed, a GA pilot Member explained that might be so for turbine powered ac, but a normally aspirated piston engine C182 cannot be descended rapidly because of engine-cooling issues and so the C182 pilot's descent here was not abnormal. Another GA Member opined that, whilst the C182 pilot had not done anything wrong, it was a question of airmanship and he should have pre-warned Dundee what he was doing. Whilst the C182 pilot's transmission came before the Do328 crew had switched en-route to Leuchars, it would not have been apparent to the Do328 crew that he was intending to descend in a wide arc through the climb-out for RW27, which is where the Airprox occurred some 8nm W of Dundee. Dundee would have been completely unaware that the C182 had flown away from the drop-zone, but a pilot member thought that the controller should have repeated the TI about the departing Do328 when no response was received from the C182 pilot.

Whilst the Board appreciated that Leuchars had advised Dundee ATC that there was no need for the Do328 crew to call ZONE and the intermediate stop at FL80 had been lifted, the Dundee controller still inadvertently switched the Do328 to Leuchars. Although not expecting the Do328 crew to call, ZONE had swiftly appreciated that there was a conflict between the Do328 and the descending C182, promptly passed TI in response to the crew's initial call, but then swiftly switched the flight to TAY Sector at PC. The RT extract in the ATSI report reveals that ZONE incorrectly perceived that the C182 para-dropping flight at Errol was under the control of TAY Sector. It was not clear why the Leuchars controller perceived this was so, but the BM SM Member contended it was from the incorrect UK AIP entry. Another Member thought that TAY had an implicit responsibility to traffic joining CAS. However, the NATS Ltd Advisor pointed out that TAY have no responsibility for separation outwith CAS and the joining clearance issued by the PLANNER takes no account of other traffic operating in Class G airspace at all. A controller Member noted that Leuchars ZONE had free-called the Do328 across to TAY Sector whilst the flight was in conflict with the C182; this was not good practice and irrespective of the TS that had been imposed on the crew, the Board agreed that it would have been more helpful if ZONE had retained the Do328 under their control until the conflict was seen to have been resolved. It was suggested that this quick transfer between radar units might have been a contributory factor, but as ZONE had subsequently declined the flight with no traffic of their own to affect its departure from Dundee, the controller might legitimately have switched the flight straight to TAY without identifying the ac or passing TI at all. Members agreed it was not helpful, but neither was it contributory. As it was, the TAY Sector trainee quickly spotted the conflict and conscientiously proffered TI and an avoiding action turn to the Do328 crew, although he was under no responsibility to do so. This avoiding action was being offered at the same moment as the RA was triggered as the crew acknowledged with *"..TCAS".* The Board discussed responses to a TCAS RA and a simultaneous avoiding action turn issued by a radar controller, which a CAT pilot Member explained could be accomplished with no difficulty in the Do328. However, the Member stressed the importance of using the stipulated RT phraseology when crews were suddenly confronted with a TCAS RA, especially taking care to advise the controller 'clear of conflict' when it was safe to do so and that they were returning to their assigned level after the conflict. This is critical as this is the cue to the controller that he may issue instructions once more to the flight.

In a CAT pilot Member's view, given the information available, the Do328 crew could not have done anything differently throughout the period of the conflict and he suggested that this was a conflict in Class G airspace resolved by TCAS. However, the radar recording shows that the Do328 had only started to descend just before the ac passed abeam one another and other Members agreed that, together with TCAS, the TAY trainee's avoiding action advice was also instrumental in preserving horizontal separation of 0·7nm at the closest point. The C182 pilot was not aware of the Do328 before he spotted it in his 3 o'clock about 1.5 to 2nm away in a LH climbing turn, but did not perceive the need to take avoiding action himself as the Do328 passed astern; this was probably just as the Do328 1st Officer saw the C182 at the minimum range of 0.7nm, thus somewhat more than his estimate of 250-300m during his brief glimpse of the C182. The Board concluded, therefore, that this Airprox was the result of a conflict in Class G airspace resolved by the TAY Sector and the Do328 crew using TCAS. The combination of TI from ZONE and the displayed TCAS information primed the Do328 crew to expect an RA, thereby enabling them to react promptly when it was enunciated ensuring vertical separation did not reduce below 400ft. This coupled with TAY's avoiding action instruction and the visual sighting by the C182 pilot convinced the Board that there was no Risk of a collision.

AIRPROX REPORT No 2012062

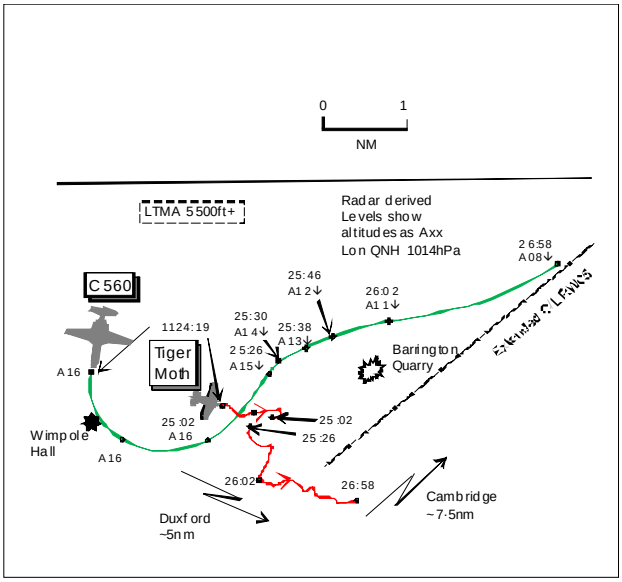
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace resolved by the TAY Sector and the Do328 crew using TCAS.

Degree of Risk: C.

AIRPROX REPORT NO 2012063

Date/Time:	6 May 2012 1125Z (Sunday)	
Position:	5208N 00001E (8nm SW Cambridge - elev 47ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C560XLS	Tiger Moth
Operator:	Civ Comm	Civ Trg
Alt/FL:	1600ft	1500-2000ft↓
	QNH (1014hPa)	QFE
Weather:	VMC CLBC	VMC HAZE
Visibility:	10km	10km
Reported Separation:		
	Nil V/2-300m H	500ft V
Recorded Separation:		
	<0·25nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C560XLS PILOT reports inbound to Cambridge under IFR and in receipt of a DS, he thought, from Cambridge Approach, squawking 1416 with Modes S and C. The visibility was 10km flying 1200ft below cloud in VMC and the ac was coloured white; lighting was not reported. Earlier they had been released by London and cleared to leave CAS when descending to 3000ft in order to carry out the NDB/DME approach for RW05. They were informed by Cambridge ATC about many light ac in the vicinity of the aerodrome. They were No 3 for the approach and were able to spot the 2 previous ac visually and a couple of others in the vicinity using TCAS. Flying in the middle of "this great circus", both crew member's eyes were looking outside watching for traffic; the AP was on. Following the procedure NDB/DME RW05 they turned from the outbound radial to join the FAT, level at 1600ft when suddenly they spotted a yellow Tiger Moth flying across the final approach on a converging track at the same level; this traffic was not reported by Cambridge. Even though they didn't receive any TCAS alerts, they disconnected the AP to be ready to react in accordance with SOPs. The Tiger Moth then started to perform a series of loops in front of them still on a converging track with the bottom of the loops at their level (1600ft). Turning through heading 140° at 160kt they increased their rate of turn in order to maintain horizontal separation and started to descend before the FAF to maintain vertical separation. The Tiger Moth passed 200-300m clear at the same level and he assessed the risk of collision as high. They reported the situation to ATC, informing them about the Tiger Moth performing aerobatics in the middle of the instrument approach final without TCAS. ATC replied that they were not informed about the ac and it was not in RT contact with Cambridge. It was difficult to estimate how close the Tiger Moth was but it was close enough to identify the ac type. After landing he had a gentlemanly discussion with the Tiger Moth pilot and informed him that performing aerobatic flight on IFR FAT was maybe not the safest place to do it and the other pilot apologised. The Capt later spoke to ATC who pointed out the problem of Class G airspace and explained, for safety reasons, Cambridge had asked the authorities many times to change from Class G to D but for cost saving consideration it had been refused. This situation brought to light that the Company use many airports in Class G airspace (Cambridge, Oxford, Farnborough plus others) where light ac without TCAS and radio could cross fast jet ac flying an IFR approach. Even if crews are informed of the risk with TCAS 'hotspots' on a feasibility briefing, the speed difference between ac, high density of VFR traffic around those airfields and heavy workload of crews performing an IFR approach in the middle of VFR flights will certainly create a major event one day.

THE TIGER MOTH PILOT reports flying a dual training sortie from Duxford, VFR and not in receipt of an ATS; no transponder was fitted. The visibility was 10km in haze in VMC and the ac was coloured yellow. Returning to Duxford from just S of Wimpole Hall [9nm SW Cambridge] he was out of sight of Cambridge owing to haze. Just about 2-3nm SW of Barrington Quarry [on C/L RW05] descending from 2000ft heading 115° towards Duxford after looking out he elected to demonstrate a loop. While upside down at the top of the loop heading 295° at 40-45kt he saw a fast-moving twin engine ac, which had obviously approached from behind, passing probably >500ft

below in the opposite direction, presumably on a long straight-in approach for Cambridge RW05. He assessed there was no risk of collision. After landing he was asked to ring Cambridge ATC and he spoke to the other pilot who stated that he had seen his Tiger Moth in good time and made a slight adjustment to track and that he would not be filing an Airprox. Hence he had not made a record of heights/times/headings at the time and he then went away on holiday, which delayed him replying when requested to complete a report form. He went on to comment that normally he would not be in RT contact with Cambridge owing to the difficulty of communication from an open cockpit while also talking to his student. He suggested that, particularly at weekends, Cambridge should advise Duxford by landline of any inbound commercial traffic likely to make a straight-in approach for RW05, with approximate timings, so that Duxford can advise his company pilots of this before take-off. Also, ac making a straight-in approach to Cambridge from the W and not under radar control could be held higher (>3000ft) until closer to Cambridge to avoid VFR non-radio traffic operating in the 500-2000ft band to the W.

THE CAMBRIDGE APPROACH SUPERVISOR reports acting as the OJTI for an ADC trainee and was in a position to observe/monitor the APP. The C560 proceeded beacon outbound for a procedural NDB approach for RW05. At 1125 whilst outbound the C560 crew observed a yellow Tiger Moth flying aeros and asked whether ATC were aware of the ac, which they were not. When in the base turn onto final at 1600ft the Tiger Moth converged with the C560 whilst inverted. He believed the miss distance was minimal. From the ATM he saw the C560 turn slightly to avoid. The Tiger Moth did not appear to be squawking. After searching they acquired the Tiger Moth visually from the VCR and eventually it was traced to Duxford. The C560 pilot visited the Tower and ATC arranged for the Capt to speak to the Tiger Moth pilot.

ATSI reports that an Airprox was reported by the pilot of a Citation C560XLS (C560) when it came into proximity with a Tiger Moth 8nm SW of Cambridge Airport at approximately 1600ft amsl.

The C560 was under IFR, inbound Cambridge from Cork and was in receipt of a PS from Cambridge Approach on 123·6MHz.

The Tiger Moth was operating VFR on a training flight and was not in receipt of an air traffic service. The Tiger Moth was not transponding Mode A or C.

The Cambridge Approach controller was providing a PS, without the aid of surveillance equipment. Cambridge Airport and its surrounding airspace (from beneath altitude 5500ft) is Class G.

The NDB DME approach for RW05 at Cambridge requires ac to proceed outbound from NDB(L) CAM on QDR 241° (Cat A B) or 246° (Cat C D) descending to not below 1600ft (1565). At I-CMG D8.5 turn L to intercept the FAT not below 1600ft (1565) at I-CMG D5.5. FAT is offset 1·5° R of RW C/L.

ATSI had access to: the reports of both pilots, form SRG1602 from Cambridge ATC, transcription of Cambridge frequency 123·6MHz, recording of Duxford Information frequency 125·9MHz and recorded area surveillance.

Meteorological information for Cambridge was: METAR EGSC 061120Z 06004KT 350V140 9999 SCT028 09/02 Q1014=.

The Tiger Moth departed Duxford at 1106 (UTC). The C560 flight called Cambridge Approach at 1116:10. The ac was descending through 6000ft for altitude 3000ft and was 5nm S of Cambridge inbound to the CAM NDB. The Cambridge Approach controller responded *"…procedural service non radar cleared to the Charlie Alpha Mike at altitude three thousand feet Q N H one zero one four no delay expected".* The C560 crew read back *"Three thousand feet Cambridge er N D B call you er call you ou out outbound er and we have Papa ???? ???? Q N H one zero one four".* The C560 flight was then cleared for, "…*the N D B approach runway zero five,*" and instructed to report outbound.

The C560 passed overhead the CAM at 1117:32. The controller then requested a level report from the C560. The pilot reported passing 3600ft. At 1118:10 the controller instructed the C560 flight, "…*descend with the procedure report base turn complete*."

The C560 then manoeuvred to the NE, maintaining altitude 3000ft, before calling beacon outbound and descending to altitude 1600ft at 1120:30. Surveillance replay shows the C560 pass O/H the CAM in a SW'ly direction at 1121:07 with Mode S SFL indicating 1600ft.

At 1121:07 the Tiger Moth was 9·5nm WSW of Cambridge airport. The Tiger Moth appeared on the surveillance replay as a primary position indication symbol only.

At 1122:40 the controller requested a level report from the C560 and the pilot reported at 1600ft. The Tiger Moth, having flown on a SE'ly track, was now in the C560's 12 o'clock position crossing R to L at a range of 3·7nm. The Tiger Moth's position was approximately 8·5nm from the CAM NDB.

As the C560 levelled at altitude 1600ft 5·7nm outbound, the pilot requested his number in the sequence for final approach. At 1123:10 the controller replied, "…*there's two aircraft in the right hand circuit runway zero five at the moment I believe you're number three in traffic.*" This was acknowledged by the C560 pilot. At this time the Tiger Moth was in the C560's 12 o'clock at 3nm.

At 1124:20 the C560 reported, *"Er we are turning on we're on base turning final and er we have traffic in sight er three hundred feet above us (C560 c/s).*" Additionally, the pilot also reported it as, "…*little yellow airplane*". The C560 was halfway through the base turn: the Tiger Moth was in its 10 o'clock position range 1·7nm tracking SE'ly. The controller informed the C560 pilot that that traffic was not known to ATC.

The C560 pilot then expressed his concern that the C560 was catching the Tiger Moth from underneath and that he, the C560 pilot, hoped the Tiger Moth pilot could hear him. The C560 was completing its base turn and the lateral distance between the 2 ac was decreasing.

At 1125:00 the C560 pilot reported that the Tiger Moth was doing "acrobatics" in front of the C560. The relative positions of the 2 ac are shown in Figure 1 below, with the C560 transponding SSR code 1416.

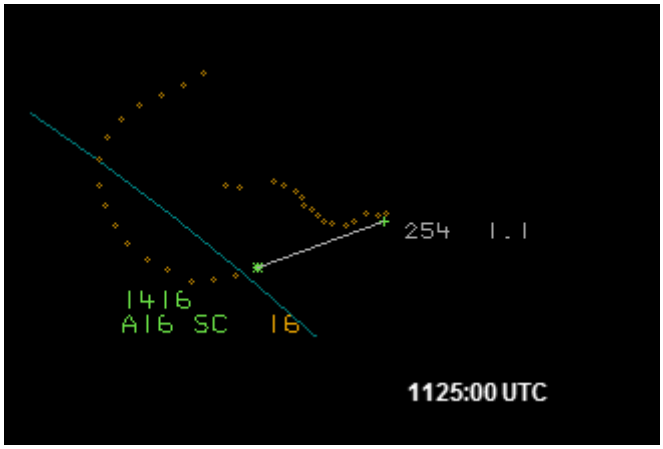


Figure 1

The Tiger Moth's manoeuvres were such that its position could not be resolved by the available surveillance equipment and it disappeared from the surveillance replay at 1125:02. At 1125:20 the C560 pilot reported that the acrobatic manoeuvres and very close position of the Tiger Moth were not very safe.

[UKAB Note (1) The C560 continues on a NE'ly track and commences descent at 1125:26 as the Tiger Moth's primary only track reappears 0·75nm to its SSW tracking SW'ly. The CPA occurs during the Tiger Moth's radar fade period but taking into account the relative speeds it is estimated the ac passed within 0·25nm of each other. The Tiger Moth's primary radar return exhibits severe track jitter; however, it is seen to track generally SE towards Duxford before fading completely at 1126:58 with 4nm to run.]

After eventually visually acquiring the Tiger Moth from the Tower, the controller offered to make enquiries as to its identity.

Between 1125:20 and 1127:00 the surveillance replay showed that the C560 manoeuvred 0·5nm to the L of the FAT before re-establishing on final at 4nm.

The Tiger Moth flight called Duxford Information at 1131 as it rejoined the aerodrome traffic pattern.

The Cambridge Approach controller believed that, and informed the C560 pilot that, the C560 was No 3 in traffic following 2 other known ac operating in the aerodrome traffic pattern. The controller was unaware of the presence of the Tiger Moth.

The C560 pilot may have believed that, prior to the Tiger Moth's manoeuvring, the C560 was following the Tiger Moth in the traffic pattern. The Tiger Moth was flying L to R across the procedural FAT for RW05 at Cambridge. When the C560 pilot realised that the Tiger Moth was not in the traffic pattern, action was taken to manoeuvre the C560 such that it avoided the Tiger Moth.

The final approach for Cambridge RW05 is entirely within Class G uncontrolled airspace where collision avoidance rests ultimately with the pilot of the ac. Under a PS pilots can only expect that a controller may pass TI on ac known to the controller. There was no requirement for the Tiger Moth to be in contact with an ATSU.

The Airprox occurred 8nm SW of Cambridge Airport at approximately 1600ft amsl in Class G uncontrolled airspace when a C560 inbound to Cambridge on the NDB(L) DME RW05 procedure came into proximity with a Tiger Moth, which was unknown to Cambridge ATC.

As the Tiger Moth flew across the procedural FAT for Cambridge RW05, the C560 pilot manoeuvred the ac to avoid the Tiger Moth before re-establishing on final to land.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

With this incident occurring in Class G airspace, the pilots of both ac were responsible for maintaining their own separation from other traffic through see and avoid. It was noted that the C560 crew, in their CA1094, reported being in receipt of a DS whereas the Cambridge controller had informed the crew that they were under a "PS, non-radar" in response to their initial call. The level of service was not read back but from the crew's written report, it was clear they were aware of their responsibilities and the need to maintain a good lookout. However, the C560's ETA was within the promulgated hours of 'Radar' being available, and Members were concerned that the flight was not afforded a radar service to assist the crew's SA with respect to unknown traffic. Clearly if Radar is not available, the outage should be NOTAM'd to that effect or the AIP entry should be changed to reflect the hours of availability. The ATSI Advisor informed Members that this anomaly was the subject of an ATSI Recommendation, following the same service shortfall highlighted in a previous Airprox (2011069); the ATSU, in consultation with the CAA ATSD Southern Regional Inspectorate, was tasked to review the provision and promulgation of the Unit's radar services. Subsequently the AIP entry for 'Director' was amended to 'Available by arrangement subject to traffic' but the entry for 'Radar' remained unchanged. The Chairman was tasked to write to Cambridge ATC to seek clarification of ATSU's service provision.

Post Meeting Note: The ATSI Advisor proffered to follow up the ATSI recommendation with Southern Regional Inspectorate and inform the Board of any progress made.

The C560 was inbound IFR and following the NDB/DME IAP for RW05, not a straight-in approach as thought by the Tiger Moth pilot. This procedure requires the ac to route outbound from the CAM NDB to the WSW descending to 1600ft before turning L at 8.5nm range towards the inbound approach path. Therefore the C560's flight profile was dictated by the IAP so the Tiger Moth pilot's suggestion of inbound traffic remaining high until closer-in, in this case, was untenable. Also Members thought that the Tiger Moth pilot's suggestion of Cambridge informing Duxford the approximate timings of inbound RW05 traffic was unworkable, it being too generic to be useful or warrant further progression. However, pilot Members opined that, subject to Company approval, the C560 crew, although IFR, could have requested a visual approach, if the Wx was suitable, which could allow the flight to remain closer to Cambridge without the need to fly the full IAP. It was during the turn towards final when the C560 crew first saw the Tiger Moth transiting SE'bound through the RW05 FAT, its presence not apparent from their TCAS (no transponder on the Tiger Moth), and its pilot not in RT contact with Cambridge ATSU. Members understood the inherent difficulties with the Tiger Moth pilot (open cockpit) establishing 2-way contact with Cambridge; however, Members agreed with the C560 crew that carrying out aerobatics on the FAT was not best practice/good airmanship. Had the Tiger Moth pilot contacted Cambridge this would have given ATC and the C560 crew the 'heads-up' of his presence and intentions and, conversely, the C560's intentions would have been

apparent to the Tiger Moth pilot from the RT exchanges. Irrespective of these elements, Members believed that 'the system' (see and avoid in Class G airspace) had worked. Although the Tiger Moth pilot had not seen the approaching C560 as it approached from behind or when clearing the area visually prior to commencing aerobatics, only acquiring it when inverted at the top of a loop as it passed in the opposite direction 500ft below, it was felt that this was understandable given the geometry of the encounter. The C560 crew visually acquired the Tiger Moth as it crossed from L to R ahead and then took avoiding action on it by increasing their rate of turn to the L when it commenced aerobatics on the FAT, estimating 200-300m separation at the CPA. Taking these elements into account the Board elected to classify this Airprox as a conflict between IFR and VFR traffic close to the RW05 FAT in which the actions taken by the C560 had ensured that any risk of collision had been effectively removed.

Members noted the comments made by the C560 crew with respect to Cambridge ATC requesting a change to the classification of the airspace. Any change is subject to an aerodrome operator or ANSP submitting an application to the CAA taking into account numerous factors and complying with the requirements laid down in CAP724, The Airspace Charter, and submitting an application in accordance with an Airspace Change Proposal.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict between IFR and VFR traffic in Class G airspace in the vicinity of Cambridge RW05 FAT, resolved by the C560XLS crew.

Degree of Risk: C.

AIRPROX REPORT No 2012064

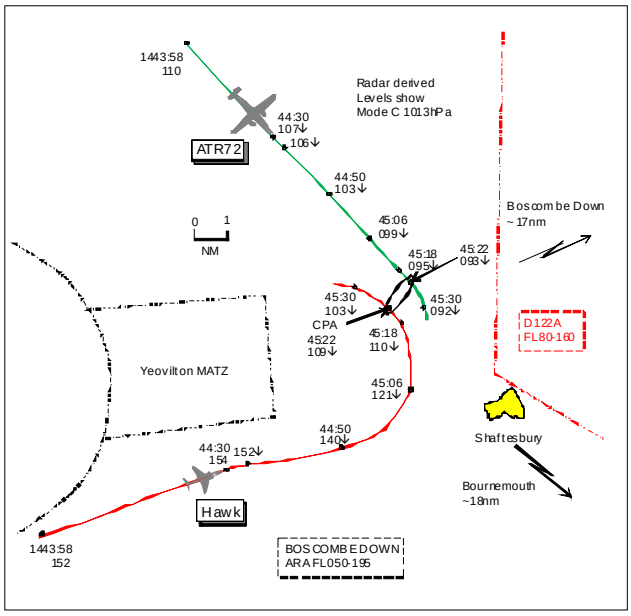
AIRPROX REPORT NO 2012064

Date/Time: 11 May 2012 1445Z

Position: 5103N 00215W (22nm NW Bournemouth)

Airspace: Boscombe Down ARA (Class: G)

	Reporting Ac	*Reported Ac*
Type:	ATR72	Hawk T Mk1
Operator:	CAT	HQ Air (Ops)
Alt/FL:	FL90↓	FL100
Weather:	VMC CLBC	VMC NR
Visibility:	>10km	
Reported Separation:	NR	Not seen
Recorded Separation:	1600ft V/0·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATR72 PILOT reports inbound to Bournemouth, IFR and in receipt of a DS from Western Radar squawking an assigned code with Modes S and C. Heading 140° at 270kt descending through FL90, he thought, to FL70 traffic appeared on TCAS descending towards them from the SE. TCAS then generated an RA 'descend' commanding a ROD 2000-3000fpm; the time between the traffic first appearing and the RA was approximately 10sec. The RA was followed and 5sec after the RA was generated the Western controller told them to take "urgent avoiding action turn R heading 250°" which was actioned. The TCAS RA changed to 'adjust v/s' before 'clear of conflict' was received. The visibility was >10km flying below cloud in VMC but the conflicting traffic was not seen visually. The controller then informed them they were clear of traffic and to fly heading 180° but almost immediately changed the clearance to "avoiding action turn L 090°". No further TCAS TAs or RAs were generated and the flight continued before landing at Bournemouth without further incident. He assessed the risk as medium.

THE HAWK T MK1 PILOT reports flying a dual advanced training sortie from Boscombe Down and in receipt of a BS from Boscombe Approach squawking an assigned code with Modes S and C. The sortie involved some benign manoeuvring and some aerobatics and, in accordance with the FOB standard, a BS was provided although normally he would upgrade to a TS but he forgot. During the sortie when about 20nm W of Boscombe, within the Boscombe Down 'triangle' at about FL100 traffic was called to him by ATC but he was unable to obtain visual contact with it. At the time he was doing light to moderate manoeuvring. Post sortie he was informed that an Airprox had been filed by the pilot of the other ac.

THE WESTERN RADAR CONTROLLER reports working on Radar 1 position with an Allocator in position. The ATR72 was routeing from BCN direct to Bournemouth in the descent to FL170. On leaving CAS he gave the flight a DS and instructed the flight to descend to FL110 to remain clear of the Bristol CTR. He had observed 2 ac squawking 2652 [actually 2626] and 2602 [the Hawk] departing Boscombe Down heading W, 2652 [2626] was observed maintaining FL100 and 2602 was seen to maintain FL140. As soon as the ATR72 was clear of the CTR he gave the flight descent to FL70. The 2652 [2626] turned to the R (N'ly) and proceeded to track E. The Allocator telephoned the Boscombe controller and coordinated the 2602 [the Hawk], he thought [actually the 2626], not above FL100 with the ATR72 not below FL110 until clear, he thought. He duly changed the ATR72's cleared level to FL110 and shortly after this the 2652 [2626] squawk turned to the L (again N'ly) and proceeded to track W so he instructed the ATR72 to descend to FL70. Whilst these events were taking place, he had been monitoring the Hawk which had been tracking W until approaching airway N864 whereupon the flight turned around to head in an E'ly direction, tracking just N of L620. It had been operating initially at FL140 and had climbed to FL150. As the flight had not deviated from this level or heading and that it was passing >10nm ahead of the ATR72's track and 5000ft above it, he did not attempt coordination with the Boscombe controller. As the 2602 [the Hawk] crossed

through the 12 o'clock of the ATR72, which was descending through FL100, the 2602 was seen descending rapidly and turning towards the N. He gave the ATR72 flight an avoiding action turn onto heading 250° to take the ac out of conflict. As he was attempting to give TI he saw the 2602 [Hawk] turning further W and he informed the ATR72 crew that the traffic was passing close down their RHS. At this time both ac were between FL90-100 approximately 1-2nm apart. He amended the heading to 180° judging this to be a better resolution heading, with the 2602 [Hawk] continuing to turn and then track W, before issuing the ATR72 flight an E'ly heading to gain as much separation as possible in the shortest time. The ATR72 crew told him that they had experienced a TCAS RA and would be filing a report. As soon as the ATR72 was clear of the conflicting traffic he changed its squawk to 7360 and transferred the flight to Bournemouth.

UKAB Note (1): Danger Area D122A was not active.

ATSI reports that the Airprox occurred at 1445:22 UTC, 22·6nm NW of Bournemouth Airport, within Class G airspace, between an ATR72 and a Hawk Mk 1, Hawk (A).

The ATR72 was operating an IFR flight from Dublin to Bournemouth Airport and was in receipt of a DS from Western Radar on frequency 132·3MHz.

The Hawk (A) was operating from Boscombe Down squawking 2602, on a flight to the W and was in receipt of a B from Boscombe Radar. A second Hawk, Hawk (B) squawking 2626 was also operating in the area.

CAA ATSI had access to: RT recording of Western Radar; area radar recordings; written reports from both pilots and from the Western Radar controller. The QNH used by the radar system was 1025hPa. The Western Radar controller's workload was assessed as light.

The METARs for Bournemouth show: EGHH 111420Z 30015KT 270V350 9999 SCT038 14/05 Q1026= and EGHH 111450Z 31014KT 280V360 9999 FEW040 15/05 Q1026=

At 1426:43 the LAC Sector 23 assistant contacted Western Radar regarding the ATR72 leaving CAS at BCN inbound to Bournemouth. Western Radar agreed to provide a DS outside CAS, allocated FL170, with a squawk 3772 and frequency 132·3MHz.

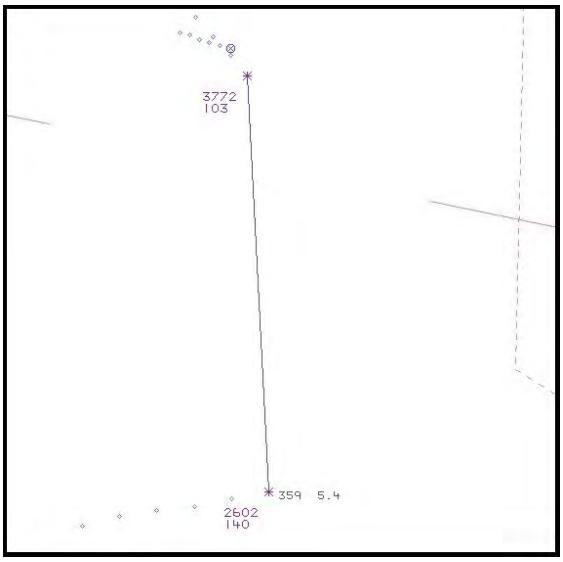
At 1436:57 the ATR72 flight contacted Western Radar descending to FL170 on a direct track to Bournemouth. The controller advised the ATR72 pilot to expect a DS on leaving CAS; this was acknowledged by the crew. As the ATR72 left CAS, the controller instructed the ATR72 flight to descend FL110 and shortly after gave further descent to FL70.

The controller's written report indicated that he had observed 2 ac departing from Boscombe Down on a W'ly track at FL100 (squawk 2626 Hawk (B)) and FL140 (squawk 2602 Hawk (A)). [Note: the controller's written report incorrectly referred to the 2626 squawk as 2652].

At 1442:23 the controller observed the 2626 squawk turn E'bound at FL100. The controller stopped the descent of the ATR72 flight at FL110 and requested coordination with Boscombe Radar. The Western controller passed details on the ATR72, which was passing FL126, and requested that Hawk (B) descend not below FL100. Boscombe Radar advised that Hawk (B) was unable, but would be not below FL80. However, the situation resolved itself, when Hawk (B) turned N and was no longer a potential conflict. The ATR72 flight was again given descent to FL70, *"…we've just coordinated the traffic he's going to avoid you"*. At this time, 1443:58, the radar shows Hawk (A) GS 460kt, in the ATR72's 2 o'clock at a range of 10·8nm, tracking ENE at FL152; the ATR72 is passing FL110 GS 300kt. The controller's written report indicated that he was monitoring Hawk (A) and judged that it would pass 10nm ahead of the ATR72 and 5000ft above. The deconfliction minima against uncoordinated traffic is 5nm laterally or 3000 ft vertically. The controller had no reason to anticipate the intentions of Hawk (A) but continued to monitor the flight and judged that it was not necessary to coordinate with Boscombe Radar.

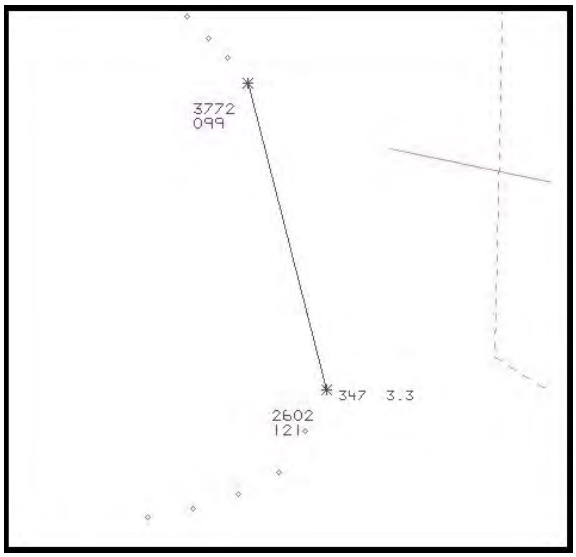
At 1444:30 radar shows the ATR72 at FL107 with Hawk (A) at FL154, now in the ATR72's half past one position at a range of 7·1nm crossing from R to L. Hawk (A) then commenced a descent.

At 1444:50 Hawk (A) is passing FL140 in the ATR72's 1 o'clock position at a range of 5·4nm as shown in picture 1.



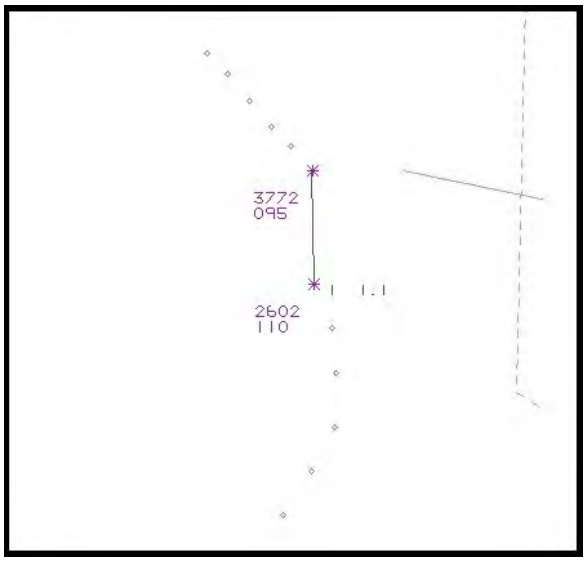
Picture 1 (1444:50) using Pease Radar & Gatwick 10cm

At 1445:01 the Western controller transmitted, *"(ATR72 c/s) there is traffic in your twelve o'clock in fact erm (ATR72 c/s) avoiding action turn right immediately heading er two five zero degrees."* The ATR72 crew responded, *"Right heading two five zero (ATR72 c/s)."* At 1445:06, picture 2 shows Hawk (A) continuing in the descent and turning L, with less than the required deconfliction minima.



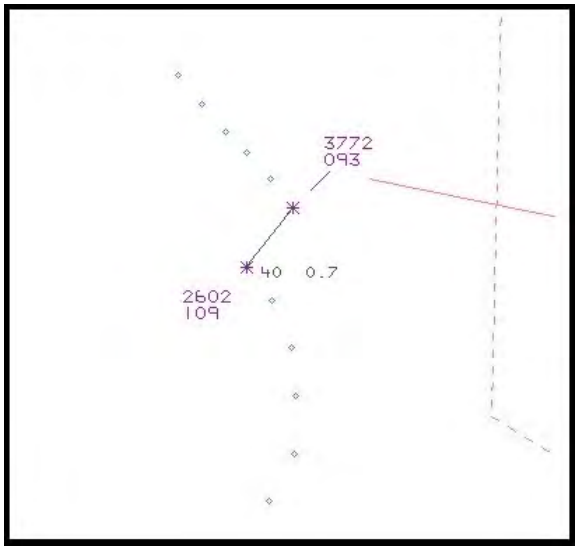
Picture 2 (1445:06)

At 1445:18 Hawk (A), at FL110, passes 1·1nm due S of the ATR72, at FL095, as shown in picture 3. This is considered to be the point at which the ATR72 received a TCAS RA as described in the ATR72 pilot's written report.



Picture 3 (1445:18)

At 1445:22 Hawk (A) continued in the L turn passing 0·7nm SW of the ATR72 on a reciprocal track (CPA) as shown in picture 4. The Western controller updated the ATR72 crew on the position of Hawk (A), amending the avoiding action turn by advising the ATR72 crew to fly S.



Picture 4 (1445:22)

At 1446:04 Hawk (A) commenced a manoeuvre, 4·2nm NW of the ATR72 and at one stage appeared to roll out towards the ATR72 before turning away. The Western controller concerned about the further intentions of Hawk (A) again amended the avoiding action and instructed the ATR72 crew to take up an E'ly heading.

The controller advised the ATR72 crew that the fast-jet was believed to be on a testing exercise and that information on the ATR72 had been passed to the military. The ATR72 pilot reported that he had received a TCAS RA.

Hawk (A) pilot's written report indicated that he had been passed TI on the civil ac by Boscombe Radar, but had not obtained a visual sighting of the ATR72.

The ATR72 flight subsequently routed direct to Bournemouth without further incident and at 1447:50 was transferred to Bournemouth Radar on 119·475MHz.

At 1449:30, in a telephone conversation, Boscombe Radar confirmed that the ac squawking 2602 was Hawk (A), and that it was, erroneously, in receipt of a TS [actually in receipt of a BS].

Hawk (A) had climbed to FL150 and turned E'bound. The controller judged that the track and level of Hawk (A) (if maintained) would pass 10nm ahead and 5000ft above the ATR72, which is greater than the required deconfliction minima for uncoordinated traffic. The unpredictable nature of the Class G environment can result in unknown and uncoordinated traffic quickly amending their flight profile and coming into conflict with other ac. Given the unpredictable nature of the airspace, coordination with Boscombe Radar may have resolved the situation.

In accordance with MATS Part 1, Section1 Chapter 10 Page 3 Para 5.2, controllers are individually responsible for deciding whether they need tactical coordination when offering services outside CAS. The controller very likely judged and felt confident that the deconfliction minima (3000ft) would be maintained, with the ATR72 descending from FL110 and the Hawk (A) observed to be maintaining FL150. When the Western Radar controller assessed Hawk (A) against the ATR72 he determined that coordination was not necessary at that time. Approximately 30sec later, as Hawk (A) approached within 6nm of the ATR72, it commenced a rapid descent and 15sec later at a range of 3·3nm, Hawk (A) turned L towards the ATR72 which was 2200ft below.

Given that Hawk (A) was initially approaching the ATR72's 12 o'clock on a track that appeared it might cross from R to L, the controller gave the ATR72 flight hurried TI and an avoiding action R turn, which also conformed with RoA, Rule 10 – 'When two aircraft are approaching head-on, or approximately so, in the air and there is a danger of collision, each shall alter its course to the right. At this point the ATR72 had received a TCAS RA 'descend descend' instruction.

Hawk (A) continued the L turn and passed SW of the ATR72 (CPA) down its RHS at a range of 0·7nm, with a vertical distance of 1600ft.

Once Hawk (A) had commenced the manoeuvre, there was very little time for the controller to take any effective preventative action. For ac operating within Class G airspace. CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment…'

The Airprox occurred when Hawk (A) descended and turned towards the ATR72, resulting in avoiding action and a TCAS RA. The following were considered to be contributory factors:

The controller was monitoring Hawk (A) and noted that it had not deviated from its heading or level and estimated that it would pass 10nm ahead and 5000ft above the ATR72 with greater than the required deconfliction minima.

The controller judged that coordination with Boscombe Radar was not required. The intentions of Hawk (A) were not known to the controller and given the unpredictable nature of the airspace, coordination may have assisted in resolving the situation.

The unknown nature of the airspace environment, together with the speed at which events occurred, reduced the controller's options and ability to maintain the required Deconfliction Minima.

BM SAFETY MANAGEMENT reports that this Airprox occurred on 11 May 12 between an ATR72 operating IFR in receipt of a DS from Western Radar and a Hawk operating VFR in receipt of a BS from Boscombe Radar.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Both pilots report VMC, with the ATR72 pilot reporting in excess of 10km visibility in nil Wx. APP's task complexity was reportedly low; workload was moderate with 2 ac on frequency, both flying flight testing profiles, the second ac was in receipt of a TS.

At 1442:52, Western Radar contacted Boscombe Radar to attempt to coordinate the passage of the ATR72 against the unrelated second ac on Boscombe Radar's frequency. As this unrelated ac manoeuvred away from the ATR72, no agreement was reached and the landline conversation was terminated at 1443:57. Western Radar

did not seek coordination with Boscombe Radar between the ATR72 and the Hawk. At this point, the Hawk was 10·9nm SSW of the ATR72, tracking ENE'ly, indicating FL152; the ATR72 was tracking SE'ly, indicating FL110.

At 1445:03, Boscombe Radar passed accurate TI to the Hawk flight on the ATR72 stating *"…traffic north, three miles, tracking south-east, flight level one hundred descending, believed to be under a Deconfliction Service, inbound to Bournemouth*" which was acknowledged. At this point, the Hawk's SSR Mode C was not displayed on the radar replay and the ac had entered a L turn passing through NE. However, the sweep at 1444:53 indicated the Hawk descending through FL138 with the next visible sweep at 1445:17 indicating the Hawk descending through FL111. The ATR72 was 1·3nm N of the Hawk, indicating descent through FL95.

The CPA occurred at approximately 1445:21 as the Hawk passed 0·7nm WSW of the ATR72; 1500ft vertical separation was indicated on SSR Mode C. The ATR72 does not appear to have taken any form of lateral avoiding action prior to the CPA, with a S'ly turn becoming evident on the radar replay at 1445:33. Whilst the ATR72 crew responded to a TCAS RA against the Hawk, neither the ATR72 crew nor the Hawk pilot visually acquired the other ac.

From an ATM perspective, Boscombe Radar fulfilled their Duty of Care towards the Hawk pilot by providing TI on the ATR72 at 1445:03. There are no RAF ATM issues that warrant investigation.

HQ AIR (OPS) comments that as they approached a N'ly heading the Hawk crew received TI indicating an ac 3nm N tracking SE. This would have suggested no conflict would be presented by continuing the L turn. The limitations of descriptors available to controllers meant this TI was slightly misleading but a safe separation was maintained, albeit a TCAS RA was generated and the Western Radar controller's attempt to maintain DS minima was frustrated.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

A CAT Member commented that the ATR72 flight had flown outside CAS, through the Boscombe ARA, by choice when a routeing within CAS, although involving more track distance, was available. Another CAT Member informed Members that Company SOPs, as part of their SMS, normally require flights in Class G airspace to be in receipt of a radar service which the ATR72 crew had secured from Western Radar whilst flying the direct track. Civil controller Members believed that Western Radar had acted appropriately, having seen Hawk (A) and assessed that it would pass well ahead and above without any need to coordinate with Boscombe Radar. Military Members thought this situation required a 'belt and braces' approach; Western Radar assumed Hawk (A) would maintain straight and level whereas coordination may have revealed Hawk (A)'s intentions and thus resolved the situation and negated the need to issue avoiding action instructions to the ATR72 flight when Hawk (A) descended and turned L unexpectedly. At this late stage Western Radar was using his best endeavours to achieve deconfliction minima, judging Hawk (A) was going to cross from R to L ahead and that a R turn was the best option. However, Hawk (A)'s flightpath triggered a TCAS RA in the ATR72, which the crew complied with, but as they did not inform ATC that they were reacting to a TCAS RA, Western Radar continued to attempt to turn the ATR72 when Hawk (A) manoeuvred. The ATR72 crew informed the controller of the TCAS RA only after the third avoiding action instruction had been issued. A military pilot Member thought that Western Radar had been unwise to assume that Hawk (A) would maintain its E'ly course and flight level as it is unusual for sortie profiles flown by Boscombe Down fast-jets to maintain straight and level, with ac more likely to be manoeuvring as the norm. The Board noted that when Western Radar had attempted to coordinate the ATR72 earlier against Hawk (B), his requested resolution was not accepted; when the alternative level restriction was offered by Boscombe Radar, the traffic situation had resolved itself and no agreement was reached. A controller Member opined that perhaps this lack of agreement may have swayed Western Radar's mindset such that he did not anticipate that coordination against Hawk (A) would be achieved. Although Hawk (A) was only in receipt of a BS, Boscombe Radar did provide the crew with a traffic warning on the ATR72. The information passed, using a relative bearing, may have swayed Hawk (A) pilot to continue his L turn through N towards the W as the ATR72 was perceived not to be in confliction to the N of his ac tracking SE'ly. It was noteworthy that despite the reported reasonable Wx, neither crews visually acquired each other's ac. However Hawk (A) was turning 'belly-up' to the ATR72 and the Hawk presented a small target aspect during its turn and descent towards the airliner whilst its crew was responding to the TCAS RA. A

controller Member wondered whether an Airprox report would have been filed had TCAS not been involved, the ac passing with reasonably large separation of 1600ft/0·7nm at the CPA, with the event being simply a TCAS sighting report. This view was not shared by the majority of Members who thought that the actions taken by all parties and the flightpaths flown by both ac had resulted in a conflict within the Class G airspace.

Turning to risk, Members could not agree. On deciding the risk category, some thought that this had been a benign event, where normal practices, safety standards and parameters pertained, i.e. risk E. Other Members thought that the ATR72's TCAS RA had not been a normal occurrence and agreed that in the scenario that unfolded, the actions taken by all parties had ensured there was no risk of collision, risk C. In the end, with no clear majority apparent, the Chairman asked Members to vote via a show of hands which led to a tie. In casting his deciding vote the Chairman was swayed by the second argument and classified the Airprox risk as C.

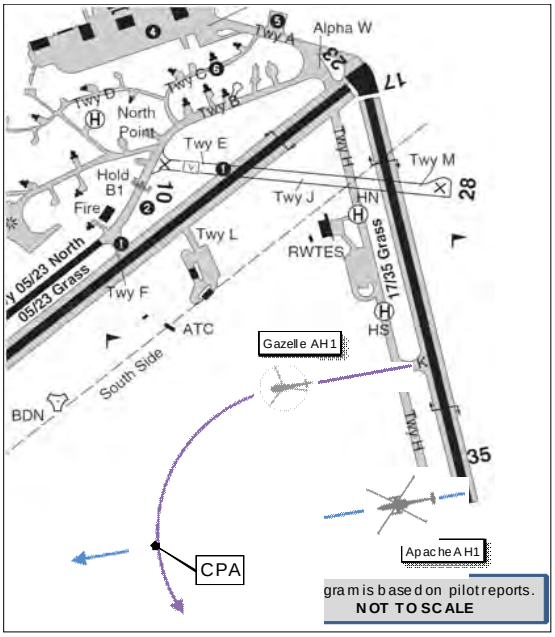
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT NO 2012065

Date/Time:	14 May 2012 2135Z (Night)	
Position:	5108N 00146W (1km WSW RW35 THLD Boscombe Down - elev 407ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Apache AH1	Gazelle AH1
Operator:	HQ AAC	HQ AAC
Alt/FL:	250ft↑	500ft
	QFE (1000hPa)	NR
Weather:	VMC NR	VMC NR
Visibility:	20km	NR
Reported Separation:		
	100 - 200ft V/H	200ft V/0m H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE APACHE PILOT reports flying a local night advanced training sortie using NVS and operating RW23 LHC 'South Side', with navigation and red anti-collision lights selected 'on'. The SSR transponder modes 3/A, C and S were selected on but TCAS was not fitted. In the hover over the RW35 threshold he conducted a lookout turn in order to obtain visual contact with a Gazelle helicopter he believed to be late DW or on L base; red lights were seen in that area. He completed the lookout turn, transitioned into forward flight into wind heading 260° and accelerated to 70kts. 'At circa [hgt] 250ft ...' [Boscombe Down QFE 1000hPa] the Gazelle appeared in his 5 o'clock position approximately 100-200ft above him and turning over the top. He stopped climbing and extended into wind to achieve greater separation. The Gazelle then moved to operate RHC to the N of RW23.

He observed that the Gazelle's anti-collision lights did not appear to be functioning, that its navigation lights blended into the clutter of other lights on the airfield, that it did not stand out from the backdrop of a very well lit up area around Boscombe Down and that operations on the South Side were being conducted 'negative R/T'.

He assessed the risk of collision as 'High'.

THE GAZELLE PILOT reports conducting a NVG currency check operating 'on South Side circuit' with red upper anti-collision light, lower IR anti-collision light, position lights and IR searchlight selected on. The SSR transponder modes 3/A, C and S were also selected 'on'. He was the handling pilot for the sortie and was seated in the R seat, with the non-handling pilot (NHP) seated in the L seat. At approximately 2015 he was advised by ATC that 'negative R/T' was being used. He commenced LHCs at hgt 500ft [QFE 1000hPa] from/to the intersection of Twy K and RW35 using a hdg of about 260°, while an Apache was 'working RW23'.

On commencement of his 2nd cct the Apache requested to work South Side from/to the approach end of RW35, heading approximately 260°. He continued LHC while deconflicting with the Apache. After conducting a clearing hover turn and verifying that the Apache was on the ground, he commenced a take-off for a LHC. At about hgt 450ft he called 'clear me left' to the NHP who visually cleared the area into the turn, saw nothing and called 'clear' After approximately 20° of hdg change he called 'Apache' and commenced a gentle climb. Almost immediately both crew saw the Apache pass approximately 200ft below the ac from their L rear.

He assessed the risk of collision as 'Low'.

AIRPROX REPORT No 2012065

THE BOSCOMBE DOWN TOWER controller reports that an Apache pilot joined the cct and requested permission to conduct operations onto RW23. He authorised the pilot to join the light ac cct for RW23. The Apache pilot then landed and asked for takeoff clearance, which he gave. He noted that the Apache pilot was conducting LHCs instead of normal RH not above 500ft; however, he allowed the ac to continue because the cct was clear and he presumed the pilot's intention was to avoid overflying the sleeping quarters Northside. A Gazelle pilot, who had been working with Boscombe APP to the W of the A/D, then called for recovery to the South Side for a crew change so he held the Apache pilot when he had landed on RW23 and asked him to report ready for departure.

Following the crew change the Gazelle pilot requested take-off, remaining South Side, which he granted. The Apache pilot then called for departure from RW23. He informed him of the Gazelle remaining South Side and that 'from now on' he would be cleared RW23 RHCs in order to deconflict laterally from the Gazelle. The Apache pilot agreed and stated that he was visual with the Gazelle. The Apache then 'surprisingly' requested join South Side, reconfirming that he was visual with the Gazelle. He informed the Gazelle that the Apache had requested to join South Side and was visual with him and the Apache then stated that they would be operating by the RW35 threshold. The controller again asked the Apache pilot if he was visual with the Gazelle to which he replied 'affirm'. After 3 verbal confirmations that the Apache pilot was visual with the Gazelle, he permitted the ac to work autonomously South Side, in accordance with the Flying Order Book (FOB), Chap 6, Para 7m:

'When RWY 17/35 is not in use, helicopters may operate South-Side autonomously between ground level and 500ft QFE …; when operating autonomously pilots are to maintain a listening watch on Stud 3 at all times, except when ATC approve otherwise.'

After a short period the Gazelle pilot requested to cross and re-cross the Main; the controller asked him if he was visual with the Apache to which the pilot replied affirm'.

Both ac were operating VFR in the visual cct. He had given ample opportunity for the Apache to deconflict with the Gazelle by instructing the pilot to operate North Side and then on 3 occasions ensuring that he was visual with the Gazelle. He also followed the SOP for South Side operations by allowing them to work autonomously. At no point did either pilot request a position report of the other ac, or ask to revert to positive R/T.

[UKAB Note(1): The Boscombe Down weather was reported as follows:

METAR EGDM 142150Z 25007KT CAVOK 06/05 Q1014 BLU NOSIG].

THE BOSCOMBE DOWN ATC SUPERVISOR reports that he received a request, via the ATC Switchboard, that Middle Wallop was requesting to operate at Boscombe during their own night flying period; since a Gazelle from Boscombe was planned to carry out NVG Ops at the airfield this request was refused. Later that afternoon a further request came from Stn Ops that Middle Wallop was requesting that they operate an ac at Boscombe. Stn Ops called RWTES and it was agreed that they would de-conflict and that they were content to operate alongside the Apache. With all parties happy and Middle Wallop aware that a Gazelle would be conducting NVG operations, in order to be flexible he agreed to permit the Apache to operate during Boscombe night flying.

BM SAFETY MANAGEMENT reports that this incident was between a Gazelle and an Apache in the visual circuit at Boscombe Down airfield at night in VMC, with both ac conducting NVG training. The ac were operating 'negative R/T', in accordance with the Boscombe Down FOB.

The ATC Supervisor rostered for the morning of the incident reported that he was contacted by the Apache unit seeking permission for their ac to operate at Boscombe Down that night, iaw FOB Order 20; however, Order 20 relates to the operation of Middle Wallop based Apaches at Boscombe Down when ATC is closed. Since the Gazelle was planned to operate that night and would be operating under NVG, permission for the Apache to operate was denied. That afternoon, the ATC Supervisor received 2 further requests for the Apache to operate at Boscombe Down that night. The first request was made in accordance with Order 20 and was again refused for the same reason; the second request was made through Boscombe Ops. Boscombe Ops liaised with the Gazelle's unit and obtained their agreement for the Apache to operate at Boscombe and to 'de-conflict' with the Gazelle; on that basis, given that Order 20 no longer applied, the ATC Supervisor agreed to permit the Apache to operate at Boscombe Down that night.

The incident sequence commenced at 2121:59 as the Gazelle got airborne to conduct left-hand circuits, remaining South-side, from the intersection between Twy K and RW35 (see Figure 1). The Gazelle sought confirmation from the ADC that they could operate negative R/T, which was confirmed at 2123:30. The then extant Boscombe Down FOB, Order 6, Para 7 m (i), stated that '…helicopters may operate South-side autonomously between ground level and 500ft QFE…When operating autonomously pilots are to maintain a listening watch on [the TWR freq]'; the FOB did not differentiate between day or night in this order.

The Apache had been flying left-hand circuits to RW23 and, at 2125:18, was given clearance to take off and instructed to, "*make this a 23 normal right-hand circuit with a Gazelle operating south-side*"; the pilot replied "[c/s] *visual, cleared for takeoff and right hand circuit*". At 2125:39, the Apache pilot requested a, "*change of intentions, request left-hand circuits, visual with the Gazelle, for a join south-side*". The ADC instructed the Apache to, "*join south-side, 1 Gazelle*". At 2126:04, the ADC advised the Gazelle pilot that, "*the Apache on the runway is about to get airborne and join south-side, visual with yourself*" which he acknowledged.

At 2129:46, the Apache stated that they were, "*established south-side to operate threshold runway 35"* (see Figure 1). The ADC asked them to, "*confirm visual with the Gazelle*" to which the Apache replied, *"[c/s] visual".* The ADC acknowledged this visual call and informed the Apache that they were, "*happy for you to work negative R-T south-side*", which was read-back by the pilot.

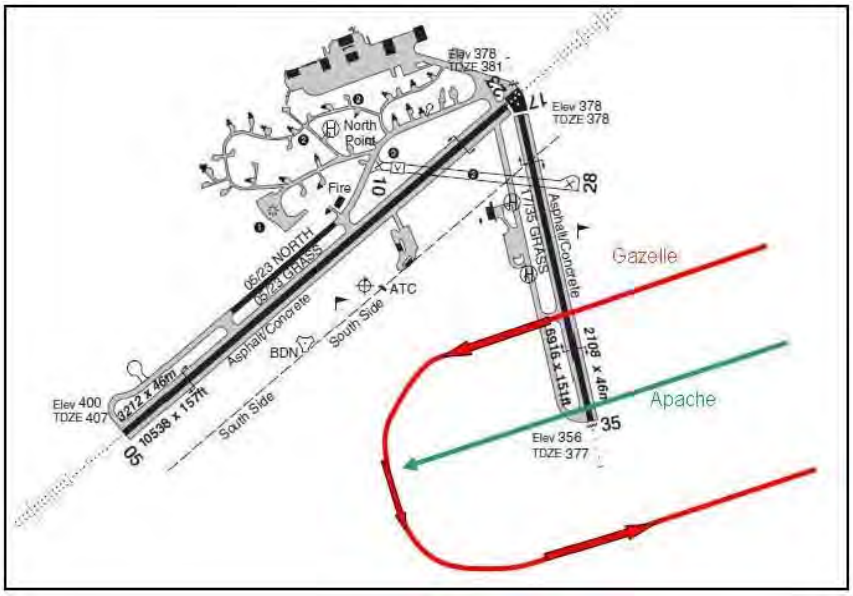


Figure 1: Boscombe Down with Operating Locations of Gazelle & Apache

Based upon the reports of the pilots and the R/T transcript, the Airprox occurred at some point between 2130:05 and 2138:36 as the Gazelle climbed over the Apache, which had recently transitioned to forward flight and was climbing through 250ft.

[UKAB Note (2): The incident took place below the base of recorded radar cover].

The Apache crew reported that they believed they had visually acquired the Gazelle downwind/left-base; however, subsequently, they have reported that they mistook environmental lighting in the area around the airfield for the Gazelle lights. Moreover, they stated that they believed the Gazelle's anti-collision lights (strobes) were not operating.

From an ATM perspective, the Supervisor permitted the Apache to operate at Boscombe Down only having confirmed that the Gazelle's unit was happy for the Apache to operate. At the time the ADC authorised the Apache to operate negative R/T; this was done in accordance with extant unit orders. Moreover, the ADC ensured that both aircrews were aware of each other's ac and that the Apache pilot was visual with the Gazelle, prior to permitting the ac to operate negative R/T; consequently, ATM was neither a causal nor contributory factor in this

Airprox. The environmental lighting around Boscombe Down caused the Apache crew to misidentify the Gazelle and, contributed to by their operating negative RT, fly into conflict with the other ac.

Boscombe Down has amended the FOB to state that negative R/T may not be utilised at night when more than one ac is operating south-side.

[UKAB Note (3): Boscombe Down conducted a flight safety investigation into this incident, which is reproduced below].

THE BOSCOMBE DOWN FLIGHT SAFETY OFFICER comments that on 14 May 2012 a Rotary Wing Test and Evaluation Squadron (RWTES) Gazelle (XX443), with 2 POB, was conducting an NVG currency sortie in the dedicated helicopter area (Southside) of the visual circuit at MOD Boscombe Down. Concurrently an Apache AH1 (XJ170), from 7 Regt AAC Middle Wallop with 2 POB, was also Southside and conducting a Night Vision System (NVS) refresher sortie. Both aircraft were operating autonomously up to 500ft iaw the MOD Boscombe Flying Order Book (FOB) and conducting LHC into wind (approx 260°) centred on a position to the N of Twy Kilo on RW35 (Gazelle) and the threshold of RW35 (Apache) respectively.

2.Immediately prior to the incident, the crew of the Gazelle conducted a visual lookout turn, whilst in the hover on runway 35 main, and positively identified the Apache, hovering, on the threshold of runway 35. The Gazelle then transitioned on an approximate heading of 260° accelerated to 90 kts IAS and planned to level at 500ft QFE. A short time later, the Apache crew also conducted a lookout turn whilst on the threshold of runway 35 main and, believing that the Gazelle was late downwind/base leg, identified red lights towards that position. No further hazards were detected visually, on the aircraft radar or NVS and the Apache transitioned on an approx heading of 260° accelerated to 70 kts and planned to level at 300ft QFE. As the Gazelle approached 450ft the handling pilot (HP-right seat) called for the non-handling pilot (NHP) to clear him left which he did. The HP commenced a left turn and after approximately 20° of turn he saw the Apache approaching from the left rear of his aircraft, called it and instinctively commenced a gentle climb levelling at 600ft QFE. Simultaneously, as the Apache crew approached 250ft QFE they saw the Gazelle appearing from, what they perceived to be, their 5 o'clock position turning over the top as the Apache pilot started to level off. Both crews estimated the distance between both aircraft was between 100-200ft with little time for effective avoiding action.

NARRATIVE OF EVENTS

3.Gazelle Planning. A RWTES pilot instructor planned to fly 2 consecutive NVG currency sorties, transiting to and from Deptford Down landing strip in D124 within the Salisbury Plain Training Area, with an intermediate engine running crew change at MOD Boscombe Down. The Gazelle captain had been notified (via RWTES Ops staff) of, and raised no objections to, the Apache Practice Diversion (PD) to MOD Boscombe Down. Sortie planning was routine and the Apache sortie details were noted by the Gazelle crew on the Central Aviation Data System (CADS) during their planning and the sortie brief. Apart from a brief crossover period in the circuit, during the planned Gazelle intermediate crew change, there were no other conflictions with the Apache and no obvious requirement for further de- confliction with the Apache crew.

4.Gazelle Execution. The first Gazelle sortie departed to Deptford Down but, due to an administrative error, the crew found that no booking into Deptford Down had been made. They were able to negotiate a clearance and completed this sortie uneventfully prior to recovering to MOD Boscombe Down. During this period, the Apache had arrived into the MOD Boscombe Down circuit and was conducting circuits on runway 23 main with a left hand circuit to avoid domestic site disturbance. The Gazelle crew recovered to Southside and conducted an intermediate crew change whilst trying to secure a further slot at Deptford Down. This was unsuccessful and the captain replanned the sortie to remain Southside for approximately 20 mins on initial departure. Once airborne, the Gazelle captain requested negative RT iaw the MOD Boscombe Down FOB and this was approved by ATC. There was no direct discussion with the Apache crew following the decision to stay in the circuit rather than departing to Deptford Down. That said, both aircraft were visual with each other and on the same radio frequency whilst in the MOD Boscombe Down circuit. In addition, the ATC controller informed each aircraft of the other's presence and confirmed mutual visual contact on several occasions despite operating negative RT.

5.Although the Gazelle crew maintained visual separation on the Apache in the circuit, they were not fully aware of the Apache sortie profile or detailed circuit parameters. Immediately prior to the incident, the Gazelle crew had completed a lookout turn and identified the Apache on the 35 main threshold. They turned to the West and

commenced a transition which placed the Apache below, behind and to the left of them in a much more difficult position to see.

6.Apache Planning. The Apache crew had initially intended to conduct this sortie at Keevil but were unable to secure a booking for the period required. The alternative plan of using MOD Boscombe Down was pursued as the planned Gazelle sorties, as displayed on CADS, showed the Gazelle departing to Deptford Down. Therefore, there was no obvious need for direct pre-flight discussion or deconfliction with the Gazelle crew.

7.Apache Execution. The Apache crew visually joined an empty MOD Boscombe Down circuit. They were initially offered a direct join Southside but elected to position for runway 23 main with a left hand circuit to avoid local disturbance and to conduct running takeoff and landings; they completed several approaches culminating in a practice emergency and landing on runway 23 main. During this period, and whilst the Apache was conducting a practice emergency, the Gazelle recovered Southside for crew change and then joined Southside having changed their plan at short notice. After landing on runway 23 main, the Apache crew requested take off and were instructed by ATC to complete a right hand circuit due to the presence of the Gazelle Southside. The Apache wished to conduct field circuits at 200-300ft and, as these could not be flown over the domestic site, called visual with the Gazelle and requested left hand circuits; there was no information exchange on circuit parameters between the Apache crew and the ATC controller. The ATC controller cleared the Apache to join Southside and informed the Gazelle captain that the Apache was about to enter Southside. The Apache crew transmitted, "[C/S] *now established Southside to operate threshold runway 35*". The ATC controller confirmed that the Apache captain was visual with the Gazelle and then transmitted, "[C/S] *roger, happy for you to work negative RT Southside ...*". The Apache pilot accepted and responded "*negative RT and 23 Southside*". The Apache commenced to fly left hand circuits from the 35 threshold into wind and up to 300 ft QFE.

8.Immediately prior to the incident the Apache crew completed a lookout turn whilst hovering on the runway 35 main threshold and were unable to distinguish the Gazelle's thermal signature as they looked from the 35 threshold north towards the hovering Gazelle. This angle placed the Gazelle against a backdrop of multiple domestic site heat sources; no strobes or aircraft lights were seen with the unaided eye either, against the backdrop of multiple lights sources within the domestic area. The Apache crew identified some red lights towards the downwind position, on their left, which they perceived to be the Gazelle, which reinforced an incorrect mental model of the Gazelle's position. The use of negative RT procedures denied the Apache pilots the opportunity to update their mental model prior to transition, on a heading of 260°, towards the Gazelle which was climbing ahead and to their right. Furthermore, the Apache aircraft radar was experiencing clutter and did not provide any useful update.

9.Letter of Agreement (LOA). An LOA exists between MOD Boscombe Down and AACEN Middle Wallop which allows 7 Regt AAC Apache helicopters to conduct training both in and out of hours at MOD Boscombe Down. The LOA details operations and booking procedures and relevant orders are contained within both the MOD Boscombe Down and Middle Wallop FOBs. For out-of-hours operations (Order 20 MOD Boscombe Down FOB), requests should be made to MOD Boscombe Down Main Operations and up to 2 Apache aircraft are permitted to operate in the circuit with a requirement to make blind joining, circuit position and leaving RT calls. Apache operations under Order 20 are not permitted if MOD Boscombe Down is conducting flying operations.

10.The LOA also stipulates that requests for Apache operations at MOD Boscombe Down, in-hours, should be made to MOD Boscombe Main Operations and that "approval is on a case by case basis depending on the requirements of the MOD Boscombe Down programme and the time constraints for OIC Fg to coordinate and promulgate". This allows relevant deconfliction to be considered by ATC and supervisors. There is no mention of a PD booking process within the LOA as this would traditionally be made directly with ATC by visiting aircraft.

11.Booking-In Process. On the morning of 14 May, 7 Regt AAC operations staff made 2 out-of-hours (Order 20) night booking requests directly to MOD Boscombe Down ATC (contrary to the LOA). These requests were refused by 2 separate shift ATC supervisors as MOD Boscombe Down had planned night flying. That afternoon, a further request by 7 Regt AAC operations staff, for an Apache PD, was made to Main Operations at MOD Boscombe Down who then contacted RWTES operations and the ATC assistant seeking coordination and approval. PD timings were discussed. The RWTES Gazelle captain, who was planning to depart the circuit on both of his sorties, was informed of the PD by RWTES ops staff and raised no objections; the night ATC supervisor, aware of the previous Order 20 refusals, contacted MOD Boscombe Down operations to confirm that RWTES were content before agreeing to accept the PD. The MOD Boscombe Down Duty Flying Executive (DFE) was also informed of

the Apache PD booking. MOD Boscombe Down operations staff passed a PPR number to 7 Regt AAC operations at Middle Wallop and emphasised that the PD would be subject to in-hour rules. Although convoluted, the process worked; however, the DSS/OIC Fg was not aware and there was potential confusion within ATC and RWTES about the nature of the Apache booking by the use of the term PD.

12.ATC. The ATC supervisor had accepted the Apache PD having confirmed, via operations, that RWTES were content. The ATC controller initially attempted to de-conflict both aircraft by directing the Apache pilot to fly right hand circuits. Furthermore, the Gazelle pilot requested negative RT Southside and the ATC controller authorised this. When the Apache requested left hand circuits, the ATC controller re-cleared the Apache Southside and also transmitted "happy for you to work negative RT Southside" which was accepted by the Apache pilot. This was, at the time, iaw with the extant MOD Boscombe Down FOB; ATC supervision was based on the same mindset and both crews accepted the operating condition. Despite operating with negative RT procedures, the ATC controller made several calls to both aircraft to confirm visual contact with each other. The ATC controller was unable to see the Apache on the 35 threshold or the Gazelle hovering to the north of Kilo as this view was obstructed by the RWTES hangar and local topography, a known ATC blind spot. Furthermore, the use of IR aircraft lighting made visual acquisition more difficult. Having authorised negative RT, the ATC controller continued to monitor both aircraft as best as he could despite the limitation described. His expectation was that both aircraft pilots would exercise visual separation iaw Southside SOPs.

13.Supervision. OC RWTES was the on-call Duty Flying Executive (DFE) with 2IC RWTES acting as both the Duty Squadron Supervisor (DSS) and OIC Flying: a normal supervisory routine for night flying. The DSS/OIC Flying was present on the Squadron, attended the sortie brief and authorised both Gazelle sorties based on the plan to mount from MOD Boscombe Down and conduct both sorties to and from Deptford Down. Although the DFE had been informed, and both ATC and the Gazelle captain were aware of the planned Middle Wallop Apache PD booking into MOD Boscombe Down, there was a lack of clarity on the Apache's further intent following his PD; the DSS/OIC Fg remained unaware of the PD and could not recall this being mentioned prior to the incident.

14.The DSS/OIC Fg supervised both Gazelle sorties and was present in his office next to the RWTES Ops room monitoring the RWTES air to ground frequency. He was not immediately aware of the rapid change of plan for the second Gazelle sortie or the Apache joining Southside. That said, the operation of up to 4 aircraft Southside, at night, was allowed iaw the Boscombe Down FOB. Although internal RWTES Southside deconfliction was routine, on this occasion, there was no expectation that the RWTES Gazelle or another aircraft would be operating Southside simultaneously and consequently no airborne deconfliction was discussed. The Apache sortie was supervised, briefed and authorised iaw the Middle Wallop FOB and 7 Regt AAC orders. Again, there was no expectation by the Apache crew that a Gazelle would be operating Southside other than to depart and arrive from Deptford Down.

15.Orders.The orders relevant to the incident sortie aircraft are contained within References A to G. Apache aircraft may operate at MOD Boscombe Down either in-hours, subject to the MOD Boscombe Down FOB, or out-of-hours i.a.w. the LOA, which is cascaded to crews as Order 20 in the MOD Boscombe Down FOB and replicated in the Middle Wallop FOB.

a. Booking (In-Hours).There is some lack of clarity within the MOD Boscombe Down and Middle Wallop FOBs on booking procedures particularly for in-hours Apache operations, Southside, at night. PD bookings are usually made by other units directly to ATC. The MOD Boscombe Down ATC Order Book (100.100.9) gives guidance to ATC personnel on PD requests and approvals and specific guidance on the acceptance of Middle Wallop Apache helicopters Southside during normal working hours. This directs the ATC supervisor/ATCO IC "to consider the trials programme for Boscombe based aircraft". The LOA directs 7 Regt AAC to make requests to operate "alongside planned night flying" via MOD Boscombe Main Operations who should consider each case with an action on OIC Fg to coordinate and promulgate. Consolidation of relevant booking processes and requirements within the MOD Boscombe Down FOB, ATC Controllers Order book and the Middle Wallop FOB would ensure that all key stakeholders aid clarity and should be considered.

b. NVG Operations. The MOD Boscombe Down FOB Order 9 (5), Night Flying Procedures, states that "the mixing of NVG and non-NVG in the visual circuit is to be avoided" and states some restrictions if this is planned. However at 5(c) it states "No restrictions on helicopters operating Southside at or below 500ft". The Apache uses a FLIR NVS system that is unable to detect the lower IR strobes and spotlights, as displayed by the Gazelle, during this incident. Furthermore, there is a lack of detail on procedures for RW NVG operations Southside such as

weather limitations, NVG/NVS compatibility, maximum number of aircraft allowed and deconfliction requirements for visiting aircraft. A review of these orders should be considered.

c. Negative RT. The then extant orders permitted RW aircraft to operate autonomously Southside with negative RT by day and night. Operating by day with negative RT is beneficial and reduces the workload of crews and ATC controllers safely. However, by night this represents a significant loss of update information for crews and ATC controllers. NVG/NVS systems are able to provide visual mitigation but equipment limitations are well known and can be critical. The use of negative RT during daylight is routine within RW operations and training; however, there are few examples of its use for non-operational night tasks. The use of positive RT, or at least blind calls, during this incident would have provided a significant situational enhancement to both crews and the ATC controller.

d. MOD Boscombe Down Orders. It was noted that some unit order books replicated, in full or part, information or orders from AWCASOs and the MOD Boscombe Down FOB. Furthermore, some information relevant to a wider audience (unit deconfliction responsibilities and booking procedures contained within the MOD Boscombe Down and Middle Wallop LOA) was not visible to all. A review of the MOD Boscombe Down FOB and unit orders, to eliminate repetition and check relevant content, should be considered.

16.Weather. The weather conditions during this incident were not a factor but the moon was below the horizon and light levels were low (2 Millilux).

17.Aircraft.Both aircraft were fully serviceable although it was noted that the Gazelle had been flown on continuous operations from day into night. A routine check of the lower IR strobe lights and spotlight, by ground crew, prior to the first night sortie was not completed; however, they were checked by the ac captain during his pre-flight walk-around and by ground crew post flight and found to be serviceable. Furthermore, although the Apache crew reported that they did not see lights on the Gazelle with the NVS or visually, the upper red light was noted as serviceable by the Gazelle crew during the intermediate crew change immediately prior to the incident sortie.

18.Deconfliction. At the initial Apache booking stage, 2 MOD Boscombe Down ATC supervisors had rejected both Apache (Order 20) requests based on the guidance in ATC orders. A further request for a PD through MOD Boscombe Down Main Operations was subsequently approved. Although booking deconfliction involved the Gazelle captain, the DFE and ATC personnel, it was conducted indirectly and the RWTES DSS/OIC Fg remained unaware. There were no planned simultaneous Gazelle/Apache NVG operations on Southside and pre-flight deconfliction was conducted by both crews using the CADS system which indicated that both aircraft would be in the MOD Boscombe Down circuit for a short period as the Gazelle returned from Deptford Down. Further airborne deconfliction was, therefore, not planned and ultimately limited to see and avoid when both aircraft entered Southside. A requirement for positive DSS/aircrew/ATC night de-confliction, prior to operating more than 1 RW aircraft on Southside, would provide mitigation.

19.Situational Awareness (SA). The visual limitations inherent in operating at night on NVG/NVS are well known. Both crews were relying on visual updates and had been given some initial updates by the ATC controller on their respective positions. The use of negative RT denied both crews further update opportunities and although the Gazelle crew had positively identified the Apache immediately prior to the incident, it is clear that the crew mental picture within both aircraft had deteriorated. An expectation that the Gazelle was downwind was re-enforced by a mis-identification of red lights, which the crew believed to be the Gazelle's position. The decision to transition towards the unseen Gazelle was based on an incomplete and erroneous mental air picture. The Gazelle crew had right of way and were not expecting the Apache to approach; despite the extant responsibility of all pilots to avoid mid-air collisions, the Gazelle pilot was poorly placed to gain a visual update as the Apache closed from below and behind. Equally difficult, the Apache crew were faced with the approach of the Gazelle from above and the 5 o'clock position.

20. Collision Warning.Neither the Gazelle nor the Apache is fitted with a collision warning system, which would have increased the chance of detecting each aircraft.

21.See and Avoid Limitations. Both crews were reliant upon the See and Avoid principle as their primary deconfliction process during this incident. There are several recent military mid-air accident reports citing the limitations of the human visual and information processing system which are present to various degrees in all pilots. Clearly both crews involved in this incident did not see each other in time to take effective avoidance. Fortunately, on this occasion, the aircraft were not on a collision course.

DETERMINATION OF THE CAUSE

22.Cause. The cause of the incident between Apache [serial number] and Gazelle [serial number] was the controlled flight of both aircraft into the same geographical position, at the same time, as a result of both aircraft captains being unaware of the position and proximity of the of the other aircraft at the point of flight path convergence.

23.Contributory factors. The following contributory factors did not directly cause the incident but made it more likely to happen:

a. Negative RT. The lack of positive RT or blind calls, at night, denied both pilots and the ATC controller the opportunity to regain situational awareness and was a contributory factor in the incident.

b. Lack of additional deconfliction measures. The lack of positive, additional, airborne deconfliction measures for the Gazelle and visiting Apache, operating autonomously in Southside, was a contributory factor in the incident.

c. See and Avoid. The sole reliance upon the See and Avoid principle, which is subject to fundamental human and equipment limitations, was a contributory factor in the incident.

d. Incomplete Mental Air Picture (MAP). The pilots of the Apache and Gazelle were unaware of the actual position, proximity and track of each other, which led them to inadvertently fly flight paths that converged. The Gazelle pilot was initially aware of the position of the stationary Apache but the absence of further visual or radio cues led to a divergence of expectation and reality with respect to the position of the Apache following transition. The Apache pilot transitioned with an incorrect MAP and, in the absence of visual and radio cues, was unable to detect this error until he saw the Gazelle. An erroneous or incomplete MAP prevented both pilots from recognising that their separation was reducing and was a contributory factor in the incident.

e. Collision Warning. The lack of in-cockpit aids to alert the pilots to the proximity of each other was a contributory factor in the incident.

f. NVG Operations. The simultaneous operation of an NVG equipped Gazelle and an NVS equipped Apache (unable to detect the Gazelle lower IR strobe light and spotlight) in the RW Southside area of the MOD Boscombe Down circuit was a contributory factor in the incident.

g. Orders. A lack of specific procedures or limitations for NVG/NVS autonomous operations in Southside allowed both aircraft to fly independent and, generally, uncoordinated sortie profiles in the same airspace using negative RT procedures and was a contributory factor in the incident.

h. Communication. Although there were several opportunities for the DSS/OIC Fg to detect, or be informed, that an Apache PD had been accepted into MOD Boscombe Down, he remained unaware of this plan throughout and was, therefore, not in a position to consider or exercise any supervisory deconfliction between the Gazelle and Apache. The lack of communication, concerning the Apache PD, between the DSS/OIC Fg and other MOD Boscombe Down agencies (Ops, ATC, Gazelle crew, DFE) was a contributory factor in the incident.

OBSERVATIONS

24.The following observations were made:

a. Harmonisation of MOD Boscombe Down and Middle Wallop Flying Orders. It was noted that the booking process for Apache aircraft from Middle Wallop into MOD Boscombe Down was included in several documents (MOD Boscombe Down FOB, LOA, ATC Order Book and the Middle Wallop FOB) and contained some minor contradictory guidance and inconsistency.

b. OIC Fg Orders. It was noted that Order 1 para 5b(e) of the MOD Boscombe Down FOB stipulates that the night OIC Fg is to attend the Main Operations Room for a formal handover from the day OIC Fg by 16:30, unless specifically negotiated through SLOps. This action was not completed on the 14 May and knowledge of this requirement may have generally faded over time.

c. Aircraft Engineering.It was noted that a maintenance check of the Gazelle lower IR strobes lights and IR spotlight was not completed by ground crew when the aircraft operated from the day into night programme.

d. Southside. The MOD Boscombe Down FOB, Order 6 1 (a) defines Southside with reference to "within 1nm of the airfield boundary fence". The southern airfield boundary fence is an irregular shape and RW generally use the area down to the Andover – Salisbury railway line. A simpler definition stating and East and West boundary with the Southern limit as the railway line could be considered.

CONCLUSION

25.The main causal factor of this incident is considered to be the controlled flight of both aircraft into the same geographical location at the same time, separated by an estimated 100-200ft, as a result of both captains being unaware of the position and proximity of the other aircraft. The use of negative RT at night was significant and denied both captains the opportunity to update their MAP. This incident involved home based and visiting NVG/ NVS RW aircraft operating simultaneously, Southside at night and with negative RT. The inability of the Apache NVS to detect the lighting on the Gazelle and the lack of a mandated and flexible deconfliction process to cater for late notice/replanned sortie profiles added risk. On this occasion, it was fortunate that both aircraft flew a different circuit height otherwise the risk of collision would have increased.

RECOMMENDATIONS

26.It is recommended that:

a. All RW aircraft operating at night in the visual circuit at MOD Boscombe Down (Southside) are mandated to use positive RT with blind information calls by exception as a minimum.

b. A positive deconfliction process involving the DSS/OIC Fg, Aircrew and the ATC supervisor is mandated for all RW night operations Southside at MOD Boscombe Down when more than 1 RW aircraft is present.

c. A review of the relevant orders for RW Southside operations at MOD Boscombe Down is conducted to consider inclusion of weather limitations, maximum Southside capacity and NVG/NVS procedures and limitations.

d. Consideration should be given to fitting a suitable collision avoidance system to Gazelle and Apache aircraft as a priority.

e. A review of the process and orders applicable to Middle Wallop Apache bookings into MOD Boscombe Down is conducted to ensure consistency and clarity.

f. Ground crew are reminded of the requirement to conduct RW aircraft light checks iaw the appropriate servicing schedules prior to night flying.

g. All personnel conducting flying supervision at MOD Boscombe Down are reminded of their mandated responsibilities as promulgated in the MOD Boscombe Down FOB.

h. The MOD Boscombe Down FOB, Order 6 1(a) is reviewed to consider removing the reference to the southern airfield boundary fence, instead defining Southside by reference to geographical features.

i. A review of MOD Boscombe Down orders is conducted to check content for structure, relevance and currency and to remove repetitious or superfluous material.

REMARKS OF GAZELLE SQUADRON COMMANDER

This is a comprehensive report and I wholeheartedly support the conclusions and recommendations.

The pre-flight deconfliction was not robust enough to cater for unforeseen changes of plan, which resulted in two aircraft operating Southside without a clear understanding of each other's intentions. This made the requirement for in-flight deconfliction more critical. Reliance on 'see and avoid', whilst entirely appropriate for day operations,

was manifestly inadequate for night operations, particularly as it involved a mixture of home-based and visiting aircraft, and completely different types of electro-optical systems.

I support the requirement for clearer orders and more robust pre-flight deconfliction of night flying at Boscombe Down. However, the essential point is that when more than one aircraft is operating at the airfield at night, blind calls must be made as a minimum to provide shared situational awareness of position and intentions. Positive RT should be implemented when additional control is required.

REMARKS OF APACHE SQUADRON COMMANDER

Such a situation should not have occurred at an open airfield with ATC in operation. That said, there are a number of key points to be drawn out:

- At the time of the incident the Gazelle was conducting 500' circuits and the AH was conducting 300' circuits. It is therefore unlikely that there was a real risk of collision.

- Both aircraft commanders were surprised at each other's proximity. This resulted due to acceptance of negative RT and poor situational awareness / lookout.

- Whilst it was not possible or anticipated, thorough deconfliction should have taken place, led by ATC once it was clear both aircraft would be operating on the airfield.

I support CO RWTES' comment that blind calls are a minimum requirement when more than one aircraft is operating. Indeed, I would expect ATC to maintain positive control in these circumstances.

REMARKS OF STN CDR (Chief Test Pilot/Head of Flying)

Operating in the visual circuit at night with negative RT, coupled with the inherent limitations and certain incompatibilities of FLIR and NVG systems, led to a loss of situational awareness by both crews and the subsequent loss of separation. I am satisfied that all key factors have been identified and that the recommendations made address all of the issues. The following actions have been taken:

a. All aircraft operating at night, in the visual circuit, are mandated to use positive RT with blind information calls by exception as a minimum.

b. A positive deconfliction process involving flying supervisors, aircrew and ATC supervisors is mandated for night circuit operations.

c. A review and clarification of the booking process to be used by Middle Wallop staff has been completed and made available to relevant personnel.

d. A review of the relevant MOD Boscombe Down FOB orders has been completed.

e. The simultaneous operation 2 or more aircraft fitted with mixed media (NVG/NVS) in the night visual circuit is prohibited.

f. The procurement of a suitable monocular handheld NVG system, to aid ATC controllers to maintain visual contact with NVG/NVS aircraft, is being pursued.

g. Furthermore, current other work is already underway to fit a collision avoidance system to priority MOD Boscombe Down aircraft including the Gazelle.

Immediately following this incident, I imposed mandatory positive RT at night and paused Apache night flying pending the outcome of the Flight Safety investigation. I am now satisfied that all key recommendations have been addressed and that Apache operations may resume at MOD Boscombe Down under FOB Order 20. This was an uncomfortably close loss of separation between 2 aircraft operating in a familiar and relatively benign environment. The combination of several factors, including a late change of plan, created an increased threat of a mid-air

collision. Fortunately, on this occasion, the aircraft crossed paths with an estimated separation of about 150ft. It is vital that all relevant personnel learn from this incident and fully understand the required mitigations.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities. Radar video recordings were also available but the subject incident occurred below the base of recorded radar contacts.

Board Members commented on the restrictive lookout afforded by NVGs, pointing out that this incident highlighted their limitations and the danger of relying on them to maintain visual deconfliction during night-time operations. It was agreed that neither crew had sufficient SA, which was not assisted by the use of 'negative R/T'. The RN member stated that night operations at Merryfield were conducted 'negative R/T' if there was only one ac in the cct but that RT was used for position calls if there were more than one. FW Members questioned the use of 'negative R/T' in any circumstances and were informed by RW Members that RT calls could disrupt teaching objectives. However, RW members also stated that it would not be unusual for RW pilots to make unacknowledged position calls when in the cct area. Members agreed that there seemed to be a presumption that ac operating 'South Side' would operate 'negative R/T' and that the controller had allowed the ac to operate iaw the FOB, as it stood at that time. He also did all he could reasonably be expected to do to ensure the ac were visual with each other before allowing them to operate 'negative R/T'.

Board Members also commented on the chronology of events, particularly the change of plan of the Gazelle pilot, which then impacted on presumptions made during the Apache booking-in process. Whilst the flexibility shown by Boscombe in accommodating the Apache pilot's request to operate there is to be lauded, there was a subsequent breakdown in appreciation of the ramifications when the Gazelle pilot's plan changed. Both ac were now operating simultaneously in the visual cct at night using 'negative R/T'; a situation that was permitted by the relevant Boscombe Down FOB orders at that time and which lay outwith the controller's training or experience.

The Board also discussed at length the degree of responsibility of the crews, both of whom performed clearing turns before translating to forward flight. It was felt that the Gazelle crew's lookout was effective and that they had identified the Apache on the THLD of RW35. In contrast, the ambient and cultural lighting clutter experienced during the Apache crew's lookout resulted in confirmation of where the Apache crew believed the Gazelle to be, not its actual position; this was a classic instance of confirmation bias. The Board opined that had the Apache crew seen the Gazelle at Twy K the outcome would have been different. However, Members pointed out that whatever their respective responsibilities, the ac passed within 200ft of each other, without either crew being aware until the last moment.

It was also noted that a previous Board recommended that a helicopter ACAS be fitted following an Airprox involving a Chinook and an Apache [Airprox 2011/006 dated 24th January 2011]. The fitment of an ACAS would have probably increased crew SA in this incident such that the risk would have been substantially reduced.

[UKAB Post-meeting Note: Further Boscombe Down review of this incident has ascertained that the Gazelle lighting configuration is such that if **either** the upper **or** lower **IR** anti-col beacon is selected on then **both** upper **and** lower **visible** anti-col beacons are inhibited. The subject Gazelle's lighting system was tested and found to behave as stated. As the Gazelle pilot had selected the lower IR anti-col beacon on, both the upper and lower visible anti-col beacons were inhibited. The Apache pilot had 'observed that the Gazelle's anti-collision lights did not appear to be functioning' in his report. This was an unintended consequence of the deliberate selection of the lower IR anti-col beacon by the Gazelle pilot. Also, the Apache NVS EM spectrum coverage does not include that part of the spectrum within which the Gazelle IR anti-col beacons emit. Consequently the Apache crew could not detect the Gazelle IR anti-col beacon. This denied the Apache crew an additional source of SA as to the position of the Gazelle.]

AIRPROX REPORT No 2012065

PART C: ASSESSMENT OF CAUSE AND RISK

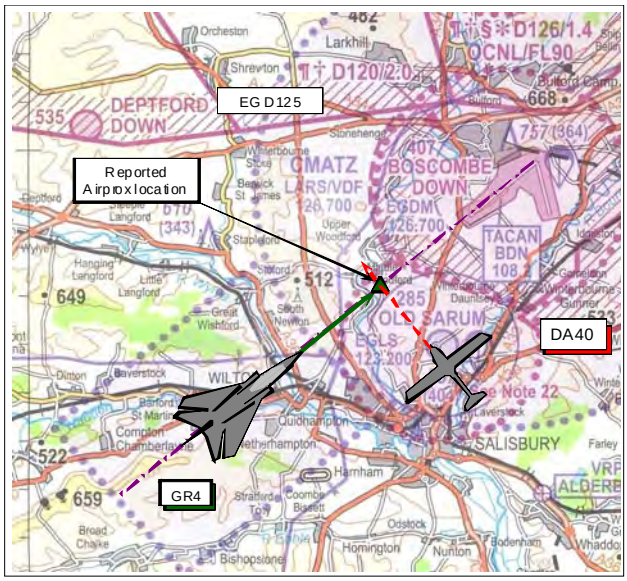
Cause: The Apache crew did not have SA on the position of the Gazelle.

Degree of Risk: B.

Contributory Factor: Selection of the Gazelle's lower IR anti-collision beacon automatically inhibited both visible anti-collision beacons.

AIRPROX REPORT NO 2012066

Date/Time:	17 May 2012 1137Z	
Position:	5107N 00149W (4nm SW of Boscombe Down A/D - elev 407ft)	
Airspace:	CMATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	DA40
Operator:	HQ Air (Ops)	Civ Club
Alt/FL:	1300ft↓	1650ft
	QFE (1002hPa)	QNH (1013hPa)
Weather:	VMC CLOC	VMC NK
Visibility:	12km	15km
Reported Separation:		
	100-200ft V	900ft V/600m H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports he was in communication with TOWER whilst inbound to Boscombe Down for a visual join through initials to RW05. His ac has a grey colour-scheme and the HISLs were on. A squawk of A2602 was selected with Modes C and S on; TCAS is not fitted.

Approaching the visual cct heading 050° at 450kt, level at 1300ft QFE (1002hPa), he saw a flash of a light-coloured, probably white, ac – the DA40 - about 100-200ft just below and some 50-100ft off to starboard. There was no time to take avoiding action; he saw the DA40 far too late being occupied in searching for cct traffic before the break to land as it passed below his ac with a 'very high' Risk of collision. ATC had given details of those other ac in the cct area that were on a standard routeing or lining up on the RW, but nothing was passed about any ac that would be crossing his approach path. He added the DA40 might have been obscured by the windscreen/HUD metalwork.

THE DIAMOND DA40 PILOT reports that he had departed from Shoreham bound for Old Sarum under VFR and was in communication with Boscombe Down ATC who monitored the whole incident. The squawk assigned by the Boscombe Down Controller was selected with Modes C and S on. The ac is coloured white and the HISLs were on; TCAS is not fitted.

Flying in a level cruise at about 1650ft QNH, heading 340° at 120kt, about 4nm SSW of Boscombe Down A/D [lat & long given], ATC informed them about the military jets and they were looking out for them. Two military jets *(sic)* were seen, which passed 900ft above and 600m ahead of his aeroplane; avoiding action was taken by descending with power selected to the idling position. He assessed the Risk as 'none', consequently, he finds it hard to believe that this was an Airprox - rather he thinks the military jet pilots wanted to frighten them.

THE BOSCOMBE DOWN LARS CONTROLLER (ZONE) reports that the DA40 pilot free-called Boscombe APP on 130.00MHz initially. APP instructed the DA40 pilot to free-call ZONE on 126.7, which he did, requesting penetration of the Boscombe ATZ en-route to view Stonehenge. The DA40 pilot was instructed to squawk A2650 and to remain S of Salisbury because a singleton Tornado GR4 was approaching Boscombe from the SW to join via Initials for RW05. The A2650 squawk appeared above Old Sarum A/D and he told the DA40 pilot again to hold S of Salisbury. The DA40 did not alter track and was getting closer to the centreline of RW05 so he suggested a southerly turn to avoid the Tornado and the Boscombe Down ATZ; the DA40 pilot advised he would look out for the fast-jet. At this point he struggled to regain communications with the DA40 pilot as the GR4 was getting closer; he then suggested to the DA40 pilot to take a R turn onto a southerly heading to avoid the GR4. The DA40 was then observed crossing the approach centreline about 2nm SW of Boscombe Down with the GR4 to the W of the DA40 with both ac's Mode C indications reading the same; the radar returns then merged. He tried several times

to contact the DA40 pilot with no response; the DA40 then flew N into Salisbury Plain Training Area (SPTA) - EG D125. The DA40 pilot was informed that he was in the Danger Area and to get out by turning S; the pilot responded that he would exit the Danger Area and wanted to fly back to Old Sarum. When the DA40 was S of the RW05 centre-line the pilot was told to free-call Old Sarum and to contact the Boscombe Down SUPERVISOR after landing.

THE BOSCOMBE DOWN ATC SUPERVISOR (SUP) reports that he was made aware of the DA40 squawking A2650 (Boscombe Down Conspicuity) overhead Old Sarum A/D, tracking NW indicating 1800ft Mode C (1013hPa) under a BS from ZONE en-route to Stonehenge. Because of the Tornado GR4 inbound via Initials to RW05, he instructed the ZONE controller to advise the DA40 pilot to remain S of Salisbury. The DA40 continued to track NW towards the approach some 2-3nm SW of Boscombe so the pilot was then instructed to take up a S'ly heading to remain clear of the inbound GR4 but at this point the controller was struggling to communicate with the DA40 pilot. The GR4 was tracking towards the DA40 at a fast rate, indicating the same height and the radar returns merged. The DA40 continued to track NW, penetrating the ATZ and the visual cct, before proceeding N into SPTA. The APP controller spoke to Salisbury OPS to inform them of the ac in their Danger Area. At this point we were able to contact the DA40 pilot and provided him with instructions to vacate the Danger Area and return to Old Sarum A/D.

He spoke with the pilot of the DA40 a short period later and explained what occurred. The DA40 pilot informed the SUP of his RT callsign; the pilot said he had been confused when instructions were passed using a different callsign and believed they were for another ac. He then spoke to the GR4 pilot who advised he was raising an Airprox report.

[UKAB Note: (1): APP replied to the DA40 pilot's initial free-call using an incorrect callsign and instructed him, using this C/S, to free call ZONE on 126·7MHz, which the DA40 pilot acknowledged. Thereafter, in response to the DA40 pilot's RT calls to ZONE, which used an all letter C/S, the controller replied using variously *"xx463"* and *"xxx463",* however, the DA40 pilot responded to the majority of these transmissions with the exception of those noted in the BM SM Report.]

BM SAFETY MANAGEMENT reports that both pilots report they were operating VFR in VMC.

The Met Office gives the Boscombe Weather as -

1050UTC: 25km visibility in nil weather, FEW cloud at 3500ft and BKN cloud at 9000ft and 13000ft.

1150UTC: 30km visibility in nil weather, FEW cloud at 3500ft, SCT cloud at 6000ft and OVC 10000ft.

However, the ADC reported that 'visual conditions made it very difficult to spot aircraft outside 3 miles…due to the cloud and…the light conditions.'

The GR4 crew was initially in receipt of a TS from DIR, left DIR's frequency 37sec before the CPA and called TWR 23sec prior to the CPA. The DA40 pilot was in communication with ZONE at the time of the Airprox, although no ATS had been agreed. [ZONE quotes in his written report that a BS was being provided to the DA40 pilot.] The pilot of the DA40 was a foreign national whose accent over the RT was felt by the BDN controllers involved to be 'difficult to understand.' The ADC reported that his perceived workload and task complexity were moderate; there were 2 ac on freq including the GR4. ZONE reported that their workload was low and did not report the task complexity; there were 2 ac on freq including the DA40.

The incident sequence commenced at 1132:55 as the DA40 free-called APP stating, "[DA40 C/S] *err D-A-40, V-F-R from Manston, 6 miles south of erm Old Sarum, is it possible to cross your airspace for sight-seeing at Stonehenge?*" In reply, APP requested that the DA40 pilot free-call ZONE and the ac left APP's freq at 1133:54. APP wrote out a flight-strip with the wrong DA40 callsign and handed this to ZONE stating, "*freecaller from Old Sarum*."

At 1134:04, the DA40 pilot free-called ZONE, stating at 1134:17, "[DA40 C/S] *DA40 from Manston, 3 miles south of Old Sarum, erm is it possible to cross your airspace for err sight seeing at Stonehenge?*" ZONE replied, "[wrong DA40 C/S] *squawk 2-6-5-0, hold south of Salisbury, one fast-jet recovering to Boscombe*." The DA40 pilot replied, "*sorry, please say again and erm slow*." At 1135:10, using a slower speaking rate, ZONE replied, "[wrong DA40

C/S] *squawk 2-6-5-0, can you hold south of Salisbury, one fast-jet recovering to Boscombe*." The DA40 read back the squawk, then apologised and asked ZONE to, "*please say again the rest of your message*." Using a more direct tone of voice, at 1135:39, ZONE re-stated to the DA40 pilot that they should, "*hold south of Salisbury* [Salisbury is approximately 4.5nm SSW of BDN]*, which is your current position, one fast-jet recovering into Boscombe now!*" The DA40 pilot immediately replied that they were, "*looking out for that track*." At this point the GR4 was 11.3nm SW of BDN, tracking 050°, indicating 2200ft, in receipt of a TS from DIR; the DA40 was not displayed on the radar replay, though the pilot subsequently reported flying at 1650ft QNH [about 1320ft QFE (1002hPa)]. The unit has stated that at the time of the DA40 pilot's initial calls to APP and ZONE, the DA40 was not painting on radar - a reasonable suggestion given the likely relatively low radar cross-section of a DA40. An alternative hypothesis proposed by the Unit was that the DA40's primary return was masked by the presence of multiple primary returns from ac operating in the vicinity of Old Sarum. Consequently, ZONE would only be able to determine the identity and location of the DA40 through its SSR return. Moreover, the unit has stated that Old Sarum traffic is required to arrive/depart from/to the S; consequently, even if the DA40 had painted on primary radar, it would not necessarily have been of concern to DIR until it had passed Old Sarum. Based on the DA40 pilot's reported speed, it is likely that at 1135:55 the DA40 was S of Old Sarum. The unit's investigation determined that ZONE's instruction to the DA40 at 1135:39, to, "*hold south of Salisbury, which is your current position*" was based on the DA40 pilot's reported position of, "*3 miles south of Old Sarum*", not a radar derived position.

Based upon the report submitted by the SUP and subsequent investigation by the unit, given that ZONE was a newly endorsed, ab-initio controller, the SUP was focussing the majority of his attention on ZONE, prompting them to re-iterate to the DA40 pilot the instruction to remain S of Salisbury.

At 1135:55, the GR4 crew left DIR's frequency having been given TI on an un-related ac crossing the extended centre-line on a SE'ly track indicating 2800ft; DIR has stated that they did not believe that there was any further traffic to affect the GR4 and did not recall seeing the DA40 on their surveillance display.

At 1136:09, the GR4 crew called TWR to request to join the visual cct. The ADC instructed the GR4 crew to, "*join runway 0-5, Q-F-E 1-0-0-2, one Tutor just lining up for departure on the main*", which was acknowledged immediately at 1136:17. Following this acknowledgement, at 1136:22, the ADC issued a take-off clearance to the un-related Tutor; the acknowledgement from the Tutor ended at approximately 1136:31. The ADC has stated that their focus was on sequencing this un-related Tutor with the recovering GR4.

During the ADC's transmission at 1136:16, ZONE transmitted to the DA40 pilot, "*suggest a southerly turn to the right to avoid the fast jet currently at your height, half a mile to the west*" which was not acknowledged. Subsequent investigation by the Unit has determined that this call was prompted by ZONE observing the DA40 squawking A2650 in response to ZONE'S code setting instruction; hence 1136:16 represents the first time that ZONE could positively determine the DA40's position. At this point, the GR4 was 6.7nm SW of BDN, tracking 050°, indicating 1800ft. Based upon analysis of the radar replay, the GR4 was no more than 2nm W of the DA40 at 1136:16.

Based upon the DA40's reported speed and previous position reports and analysis of the radar replay, it is likely that the CPA occurred at around 1136:32, 4.1nm SW of BDN, as the GR4 indicated descent through 1500ft. The GR4 pilot assessed that the DA40 passed 100-200ft beneath their ac and that they saw the DA40 at or about the CPA. The DA40 pilot assessed minimum separation as 900ft vertically and 600m laterally; however, this is not supported by the available evidence. Unfortunately, the DA40 pilot did not report the range at which they first sighted the GR4.

The primary causal factors in this Airprox were the flight of the DA40 into confliction with the GR4 and the DA40 pilot's decision not to follow the instructions from ZONE to hold S of Salisbury and, by inference, the extended centre-line. Whilst the suggestion has been made that the DA40 pilot did not understand ZONE's instructions, responses during the incident sequence and the DA40 pilot's written report suggest that this is not the case. It appears reasonable to argue, therefore, that the DA40 pilot made a conscious decision to continue their NNW'ly track into confliction.

In terms of the ATM aspects of this incident, "reflections" on best practice in this case are fraught with difficulty, given the potential for hindsight bias. Subsequent to the investigation by the unit and based upon the DA40 pilot's responses, the continued NNW'ly track and the time at which the DA40's assigned SSR code was observed, the radar control team realised at around 1136:16, that the DA40 pilot was not going to hold S of Salisbury. Moreover, as previously stated, the Salisbury/Old Sarum area is viewed by the unit as a geographic 'line-in-the-sand' that,

once crossed, precipitates further action. In this case, APP attempted to call the ADC on the landline; however, the ADC did not answer as they understandably prioritised issuing joining instructions to the GR4 crew and take-off clearance to the Tutor. An additional course of action that does not appear to have been considered would have been for the GROUND controller to have been passed the warning. Given that the DA40 was not following ZONE's instructions, once the GR4 crew left DIR's freq at 1135:55, the ATC personnel within the ACR were unable to affect the outcome of the Airprox.

The remaining ATM related safety barrier was the ADC. Notwithstanding that the ADC considered his workload and task complexity to be moderate, BM SM contends that the 2 ac on freq should not routinely have generated this perception. However, it is likely that the ADC's perception of workload is a description of the point event where they were engaged in the decision making process to sequence the GR4 and Tutor, rather than a descriptor of their workload and task complexity throughout the incident sequence. In terms of the ADC's taskload history during the latter stage of the incident sequence, there is a near-constant level of RT, which would have been associated with a requirement for the ADC to focus their attention visually on the GR4 and Tutor in order to sequence them. In so doing, it is reasonable to argue that the ADC's attention would not routinely have been drawn towards the Hi-Brite aerodrome traffic monitor and, given the reported conditions and the physical appearance of the DA40, it would be unlikely that the ADC could have visually acquired the DA40 4nm from BDN. Whilst best practice might suggest that the ADC could have utilised the Hi-Brite to identify the developing confliction and provide a warning to the GR4 crew, this observation is made with the benefit of hindsight. The timing of the sequence of events, combined with the requirements placed upon the ADC to deal with those events and the short window of opportunity afforded the ADC between 1136:16 and 1136:32, all militated against the ADC being able to affect the outcome of this occurrence.

UKAB Note: (2): This Airprox occurred outwith recorded radar coverage.

HQ AIR (OPS) comments that notwithstanding the fact that the DA40 pilot did not comply with ATC instructions (and subsequently penetrated an active Danger Area), ATC could have taken further measures to inform the GR4 crew of the presence of the errant DA40; the SUP could have made more of an effort to get a message to the VCR regarding the developing conflict, perhaps by using the Radar Clearance Line. This incident further highlights the need for a Tornado CWS to be fitted as soon as possible.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was explained to the Board that the correct all-letter C/S consistently used by the DA40 pilot, for whom English was not his first language and who reportedly had a strong foreign accent, had not been used when APP and ZONE replied to the DA40 pilot's RT transmissions. The Board understood how the pilot's accent may have been responsible for ATC's misunderstanding of his C/S and how this error was evidently perpetuated by APP in their liaison with ZONE and by recording the wrong C/S on the fps. However, the Members noted that, although the DA40 pilot may have been confused, he replied to the majority of ZONE's calls even when the wrong C/S was used and made no attempt to correct the controllers' error. With little other activity on ZONE's frequency, Members agreed it was not fundamental to the Cause; nevertheless, it was suggested that it could have had a bearing on the tardy responses from the DA40 pilot to some of ZONE's transmissions.

Whilst a Member noted that no 'contract' had been established between ZONE and the DA40 pilot over the provision of an ATS - the controller was endeavouring to provide a BS, he reports - Members recognised the limited mandate of the controller to pass executive instructions to the civilian DA40 pilot operating in Class G airspace under a BS. Ultimately, the DA40 pilot had remained outside the Boscombe Down ATZ, had chosen to call ATC, "…*3 miles south of Old Sarum..*" to ask if, "..*possible to cross your airspace for…sightseeing at Stonehenge?*" The Board noted that the DA40 pilot was not compelled to call Boscombe Down: the MATZ has no status as a controlled airspace, albeit it is a regulated airspace for military pilots and any instructions issued by ZONE to civilian pilots were advisory rather than obligatory. This prompted a discussion as whether a MATZ should be classified as Class D CAS for the benefit of civilian pilots, especially foreign pilots who have little conception of the status of a MATZ. However, a military controller Member highlighted that ZONE had not said 'no' to the DA40 pilot's request to fly to Stonehenge from his reported position 3nm S of Old Sarum, but then neither had ZONE acceded to the DA40 pilot's request. A Member opined that the foreign DA40 pilot showed little awareness of the

UK airspace structure, in that he appeared to have entered the Old Sarum ATZ before the conflict and subsequently infringed a promulgated Danger Area after the Airprox had occurred. A CAT pilot Member agreed that the DA40 pilot's SA was poor, but all of ATC's actions were predicated on an assumption that the DA40 pilot would comply with the controller's recommended course of action. Patently he did not, for whatever reason, and although the radar recording does not illustrate this encounter it seems that the DA40 pilot took no account of ZONE's requests to either hold S of Salisbury or turn S'ly to remain clear of the GR4, which could have forestalled the conflict. This suggested to some Members that the Cause of the Airprox was that the DA40 pilot did not comply with ATC's recommendation to remain S of Salisbury resulting in a conflict with the GR4. However, this ignored the GR4 crew's responsibility to see and avoid traffic in accordance with the RoA. Military pilot Members were critical of the GR4 crew for flying at such high speed as it was not necessary to run-in to the break at 450kt. This gave little opportunity for ATC to intercede effectively when things went wrong and here it was evident that DIR had switched the GR4 crew to TWR only 37sec before the CPA and the crew then called TWR only 23sec prior to the CPA. Whilst BM SM had established that ZONE might not have been able to identify the DA40 on radar any earlier than when the squawk became evident at 1136:16, with any primary contact not obvious amongst the background Old Sarum cct traffic, the ZONE controller and the SUP certainly knew there was a civilian ac in the vicinity to the SE of the RW05 centreline, on a heading to cross it toward Stonehenge, whose pilot did not seem to be responding to ZONE's requests. Furthermore, the DA40's altitude was never positively established before the Airprox. The Board understood this was a difficult situation for ZONE and the SUP, but it was unfortunate that ATC had not forewarned the GR4 crew to look out for the DA40; the Board considered that a warning, albeit with little notice, should have been feasible through DIR or the ADC. A controller Member opined that on the evidence provided in the BM SM report the ADC was not busy and could have responded if warned by the SUP. Notwithstanding the ATS provided to the GR4 crew by either ADC or DIR, if the GR4 crew had been told about the DA40 then they would have been primed to look for it and given the DA40 a wider berth. As it was, the GR4 crew remained unaware of the DR40 until it was overflown. The Board agreed that the lack of TI to the GR4 crew was a contributory factor.

However, in this VFR scenario in Class G airspace it was the crews involved who had the ultimate responsibility to 'see and avoid' each other's ac. Having been warned of the conflict with the GR4 by ZONE, the DA40 pilot reports seeing two military jets pass ahead of his aeroplane that were avoided by descending. This was vastly at odds with the GR4 pilot's view of the geometry of the encounter who saw the DA40 far too late and glimpsed merely a flash of a light-coloured ac just below and some 50-100ft off to starboard with no time available to take avoiding action. This suggested to other Members that the Cause was a sighting issue; the Board seemed divided on this point and a vote was taken, which by a significant majority finally resolved that the Cause was effectively, a non-sighting by the Tornado GR4 crew.

Turning to the inherent Risk, whilst occurring outwith recorded radar coverage, Boscombe Down ATC reports the radar contacts merged on their displays indicating the same level. This supported the GR4 pilot's recollection of overflying the DA40 by 100-200ft, but was at odds with the DA40 pilot's report that the two jets he saw passed 600m ahead and 900ft above as he descended to avoid them at idle power. It was only this reported avoiding action by the DA40 pilot that swayed the Board from concluding that an actual Risk of a collision existed. However, there was certainly only one jet flying in the vicinity at the time – the singleton GR4 - and the only other cct traffic was a Tutor. This suggested to some Members the DA40 pilot might be reporting a different encounter and that he might not have seen the GR4 flown by the reporting pilot at all. This anomaly could not be resolved, but it was accepted that these two ac were shown in close proximity on the Boscombe Down radar at the time with the GR4 pilot unaware of the DA40 until he overflew at high-speed, leading the Board to conclude that the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting by the Tornado GR4 crew.

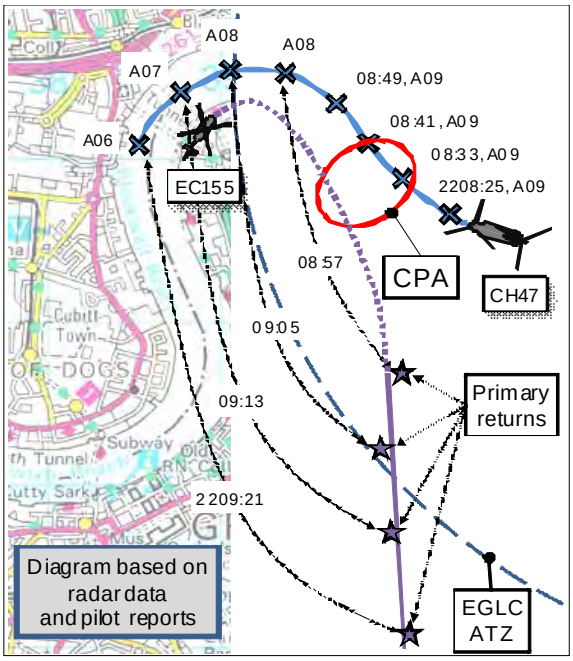
Degree of Risk: B.

Contributory Factors: Lack of Traffic Information.

AIRPROX REPORT No 2012067

AIRPROX REPORT NO 2012067

Date/Time:	21 May 2012 2209Z (Night)	
Position:	5130N 00000W (ivo O2 Arena - elev 15ft)	
Airspace:	LON CITY CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	Chinook	EC155
Operator:	HQ JHC	Civ Comm
Alt/FL:	1000ft	NR
	QNH (1011hPa)	QNH (1018hPa)
Weather:	VMC HZBC	VMC CLNC
Visibility:	9km	>10km
Reported Separation:		
	200ft V/400m H	NK
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHINOOK PILOT reports transiting E to W on the H4 helicopter route, under SVFR, he thought, with a RCS from Heathrow Radar, whilst conducting a night training sortie. The dark green ac had red HISLs and flashing position lights selected on, along with SSR transponder Modes A, C and S with a discreet squawk. Whilst inside the London City CTR, heading 285° at 100kts and altitude 1000ft, he observed a helicopter in his 10 o'clock position passing down the L side of the ac. Avoiding action was not taken as the ac vectors were diverging. The crew assessed that the two ac came within 400m laterally and 200ft vertically of each other. No radio calls were heard from the other ac prior to the incident and, when questioned on RT, the Heathrow controller reported not seeing either a primary or secondary contact on radar. One crewman (Rear Crew) was using NVG at the time and both pilots and the other crewman were Reversionary Night Flying [visual lookout without the aid of NVG]. During a post-flight telephone debrief the Heathrow controller stated that the other helicopter was not observed on radar until it was clear of CAS, S of the Crystal Palace masts [approximately 5nm S of the O2 Arena].

THE EC155 PILOT reports departing from the O2 Arena HLS in a climbing R turn en-route to a private landing site SW of Newbury under SVFR. The ac was dark blue in colour with navigation lights, HISLs and 2 x manoeuvre landing lamps selected on. The SSR transponder was on with Modes A, C and S selected, as was the TCAS equipment, he thought. His employer had been contracted to operate the EC155 between the London O2 Arena and a private landing site near Newbury for the period 17-23 May 2012. On the evening of 21 May the ac was parked at the O2 Arena helipad. At 2155 the crew, and a number of other individuals in attendance, initially heard and then observed a Chinook helicopter following the River Thames on the H4 helicopter route. It passed the O2 arena from W to E at an estimated height of 1000ft with no navigation or anti-collision lights visible and appeared to clear en-route to the E. He stated this was lower than the expected 2000ft prescribed for the H4 route.

After loading the passengers onto the ac, and whilst still on the ground, the PNF attempted to contact London City [118.075 MHz]; the lack of response confirmed that the A/D was closed. After lifting into the hover, a number of unsuccessful attempts were made to speak to a number of ATSUs and contact was eventually established with London Director on climb out.

He stated that the weather in the vicinity of the O2 Arena was good and that, given the noise abatement requirement to take off before 2215, he departed at 2207. After a good look out and no indication of any traffic on TCAS, he carried out a helipad take-off on an initial NE heading, turning R to route E around the O2 Arena and along the River Thames. He climbed above the S bank mast of the newly constructed and poorly lit Olympic cable car, before settling on a S'ly heading to 'depart the ATZ'.

[UKAB Note(1): The Olympic Cable Car is also known as the 'Thames Cable Car' or 'Emirates Air Line'. The picture below shows the cable car, looking SW towards the O2 Arena, from the N bank of the Thames (Attribution: Nick Cooper at English Wikipedia).

On T/O the ac was squawking 7000 and had navigation lights, white flashing HISLs and both landing lamps switched on. Passing altitude 500ft [QNH 1018hPa], heading S and clear of the O2 Arena, the HISLs were switched to flashing red, and the manoeuvre landing lamps were switched off. He delayed initial contact with London Director whilst a RT conversation was overheard between a Chinook pilot and the ATSU, suggesting that he had been an involved in an Airprox incident with an unknown ac. Subsequent reporting by the Chinook pilot suggested that he was flying E to W towards Barnes in the opposite direction to the earlier Chinook observed departing to the E from helicopter route H4.

He informed the ATSU [London Radar controller] of his intention to depart S and to 'leave the ATZ' before heading W to the private site via the Ockham beacon. He reported that a similar routine had been adopted on the 3 previous evenings, and acknowledged by the ATSU, due to difficulties experienced whilst trying to establishing RT communication whilst on the ground at the O2 Arena. He flew clear of the London Zone and completed the flight as planned, whilst maintaining RT contact with London Director until final approach to the private landing site. He reported that the Chinook was not observed at any stage during the take-off procedure, either visually or on TCAS. As the task was to be repeated the following evening the ac commander spoke to the ATSU by telephone and confirmed that there were issues with RT communication from the O2 arena whilst on the ground. A squawk was issued, to be set on start-up for increased conspicuity with the ATSU until RT communication was established after T/O.

[UKAB Note(2): The H4 Helicopter Route exists between RP 'BARNES' at its W end and RP 'ISLE OF DOGS' at its E end and follows the course of the River Thames. RP 'ISLE OF DOGS' is in the London City CTR, at a position just S of the Isle of Dogs on the junction of the E boundary of EGR160 and the River Thames, which is approximately 1½nm SSW of the O2 Arena. See Figure 1.]

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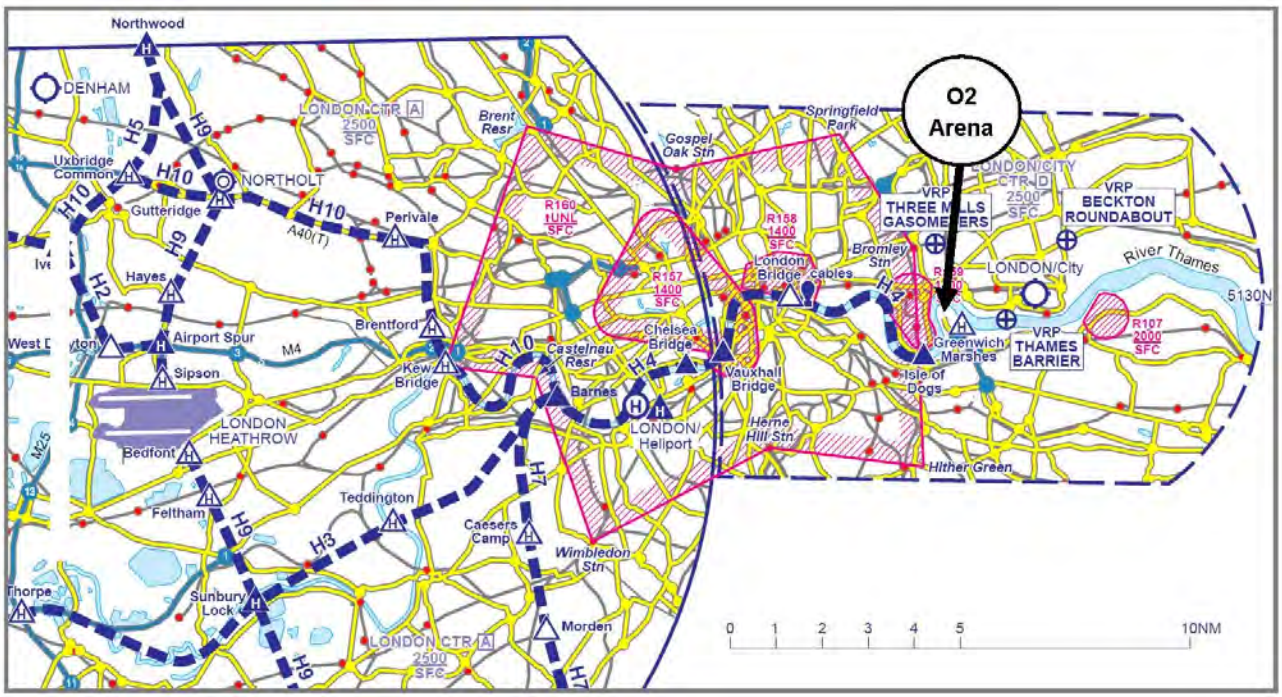

Figure 1: London CTR Helicopter Routes

The UK AIP EGLL AD 2.22 – FLIGHT PROCEDURES (AD 2-EGLL-1-20), para 9, 'Non-IFR Helicopter Flights in the London CTR', at sub-para (a), 'General Arrangements', sub-para (i) states:

'Non-IFR helicopter flying in the London CTR is normally restricted to flight at or below specified altitudes along defined routes. …'

At sub-para (b), 'Procedures for flight along Helicopter Routes', sub-para (iii) states:

'Maximum route altitudes are shown in column 3 at paragraph 11 [2000ft for route H4 between RP 'ISLE OF DOGS' and RP 'VAUXHALL BRIDGE' which is 3.5nm due W and on the boundary of the London CTR]. ATC will refer to these altitudes as 'Standard Operating Altitudes' when issuing clearances. Pilots may fly at altitudes below the maximum route altitude except for between Perivale and Chiswick Bridge on H10 where the maximum published altitude must be flown accurately. ATC may restrict aircraft to altitudes below the published route maximum as necessary to provide separation from other aircraft.'

At sub-para (c), 'Noise', sub-para (i) states:

'… [Pilots] are reminded that there is no relaxation from the need to comply with Rule 5 of the Rules of the Air Regulations 2007, which precludes flight closer than 500 ft to any person, vessel, vehicle or structure.'

UK AIP EGLC AD 2.17 – ATS AIRSPACE (AD 2-EGLC-1-5) states that the London/City ATS Airspace (CTR, CTA and ATZ) is active H24 and that, outside the hours of Heathrow Radar and Thames Radar, the controlling authority is Heathrow Director.

UK AIP EGLC AD 2.20 – LOCAL TRAFFIC REGULATIONS (AD 2-EGLC-1-7) para 5, 'Helicopter Operations', at sub-para (b) states:

'See EGLL AD 2.22 for details of helicopter procedures within the CTR.'

UK AIP EGLL AD 2.22 – FLIGHT PROCEDURES (AD 2-EGLL-1-20), para 9, 'Non-IFR Helicopter Flights in the London CTR', at sub-para (d), 'Air Traffic Control Clearance', sub-paras (i) and (ii) state:

'During the hours of operation of Heathrow Radar, pilots must obtain a Special VFR clearance. Heathrow Radar provides a service to transit aircraft operating in the London and London City Control Zones. …'

'Outside the hours of operation of Heathrow Radar, clearance for Special VFR flights within the London CTR must be obtained from Thames Radar. Outside the hours of operation of Heathrow Radar and Thames Radar, clearance must be obtained from Heathrow Director (LTCC).'

Unlike the AIP entry for the London CTR, the AIP entry for the London CTR does not explicitly provide telephone contact details for out of hours helicopter operations within the London City CTR but it does state that the London City ATS airspace is active H24 and that the out of hours controlling authority is Heathrow Director. The relevant London CTR entry is as follows:

UK AIP EGLL AD 2.22 – FLIGHT PROCEDURES (AD 2-EGLL-1-21) para 10, 'Helicopter Landings and Departures to/from sites within the London Control Zone', refers to procedures designed to ensure separation, avoid excessive airborne holding and reduce delays. Sub-para (b), sub-para (ii), states:

2. Before departure the pilot must contact ATC on the ground. If two-way contact with ATC cannot be established on the ground either directly or via relay from other aircraft, the pilot must remain on the ground and contact Group Supervisor Airports (number provided) to agree an exact departure time and initial altitude with the controllers concerned in order that separation can be ensured.

THE SWANWICK CONTROLLER reports he took over the LL APC position at 2205 with one helicopter on frequency [the subject Chinook] flying 'helicopter routes through the zones'. At about 2208, shortly after he had sat down and as he was arranging his workspace, the pilot of the Chinook, then passing W of the Isle of Dogs on helicopter route H4, he thought, reported that a Dauphin helicopter had passed down his L side. He saw that there were no primary or secondary radar contacts and asked the Chinook pilot to repeat his message. He then informed him of the 'lack of radar contact'. As the Chinook pilot was explaining the sighting and suspected track of the other helicopter, a primary only contact appeared slightly SE of the Isle of Dogs, tracking S and travelling fairly fast. He informed the Chinook pilot that he could now see a contact and then called over the Group Supervisor. The primary CAIT then activated on his radar.

[UKAB Note(3): The Controlled Airspace Infringement Tool (CAIT) is an automatic radar display system that highlights primary and secondary contacts that may be infringing CAS.]

The Chinook pilot reported that he would be filing an Airprox. Very soon after that the EC155 pilot called on frequency. The controller was expecting him to lift from the O2 Arena at 2230 so issued him a squawk code in an attempt to identify him. The squawk code did not appear on radar so he asked the EC155 pilot to report his position. He replied that he was E of the Crystal Palace masts which indicated that his was the ac previously identified as a Dauphin.

The EC155 pilot's position report placed him outside CAS and he requested a BS. As no squawk was showing on radar the controller informed him of this and requested he stop squawk. Immediately thereafter the squawk code appeared, so he told him to disregard the previous request, asked for his destination and issued a BS. The Chinook pilot then asked if the controller wanted to take details of the Airprox immediately; the Chinook pilot was given a local phone number and requested to call after landing. The Controller asked the EC155 pilot why he had not contacted him prior to departure or in the low hover. The pilot stated that he had not been able to make contact in the low hover. He informed the pilot of the requirement to obtain a clearance to operate inside CAS to which he responded that he operated 'in and out all the time' and had never had an issue.

[UKAB Note(4): The London City Airport METARs were reported as follows:

METAR EGLC 212150Z AUTO 30007KT 8000 OVC014/// 14/12 Q1010

METAR EGLC 212220Z AUTO 31005KT 7000 BKN012/// 14/12 Q1010]

[UKAB Note (5): The Rules of the Air Regulations 2007 (as amended), Section 6 (Visual Flight Rules), Rule 29 (VFR flight plan and air traffic control clearance in Class B, Class C or Class D airspace) states:

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Subject to rule 31, before an aircraft flies within Class B, Class C or Class D airspace during the notified hours of watch of the appropriate air traffic control unit, the commander of the aircraft shall

cause to be communicated to the appropriate air traffic control unit a flight plan which complies with paragraphs (2) and (3) (as appropriate); and

(b) obtain an air traffic control clearance to fly within that airspace.

ATSI reports an Airprox was reported by the pilot of a Boeing Chinook HC.3 (CH47) on Monday 21 May 2012 at approximately 2210 UTC when he came into proximity with a Eurocopter EC155 in the vicinity of the O2 Arena at North Greenwich, London.

The CH47 was on an advanced training VFR night flying exercise and in communication with LTC Heathrow Approach on 119.725MHz.

The EC155 was on a CAT flight from the O2 Arena and was not in contact with an ATSU at the time of the incident. The EC155 pilot report stated that the EC155 was operating Special VFR.

The private helipad at the O2 Arena is situated within the London City CTR and is unlicensed. Figure 2 below shows the location of the O2 Arena helipad ('Private Helipad') and Crystal Palace Masts. The notified frequencies are also highlighted. The private helipad is sited 140 metres from the W boundary of the London City ATZ.

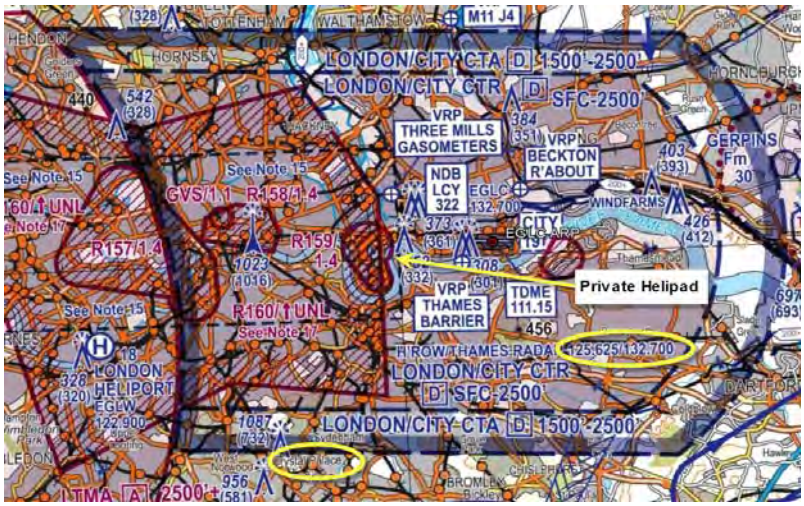


Figure 2: 1:250,000 VFR Chart

The LTC controller was providing combined Heathrow Approach and Heathrow SVFR services as "Heathrow Director" [119.725MHz]. There were no reported equipment unserviceabilities or communications or surveillance [radar] outages.

ATSI had access to reports from both pilots, the LTC controller's report, a transcript of frequency 119.725MHz, recordings of frequency 125.625MHz (Heathrow SVFR) and recorded area surveillance. Further information was also gained from a site visit to the O2 Arena and the CAA's Flight Operations Inspectorate (FOI) (Helicopters).

Meteorological information for London Heathrow was recorded as follows:

METAR COR EGLL 212150Z 32006KT 8000 SCT018 14/11 Q1011 NOSIG=

Sunset at the O2 Arena on 21 May 2012 was at 1955 UTC.

The EC155 pilot called LTC Heathrow SVFR [125.625MHz] at 1718 as he routed inbound North Greenwich from Newbury. Outside CAS, the EC155 pilot was under a BS. At 1726, as he entered the Class D airspace surrounding London City Airport, the service was changed to a RCS. The EC155 pilot was then transferred to

London City ATC. He let down at the O2 Arena at 1728 and reported to London City ATC that his departure time would be, "*twenty two thirty tonight will you be closed?"* ATC responded, "*most likely*".

The CH47 pilot had been in communication with Heathrow Director since 2142:40 and was routeing from near London Heathrow Airport out to the E of London. RTF recordings indicated he was flying at altitude 1200ft *"due cloud.*", E'bound in the vicinity of the Isle of Dogs at 2158. The EC155 pilot reported 'hearing' a CH47 pass E'bound at 2155, when on the ground at the O2 Arena helipad, prior to departure. Radar recording showed the CH47 pass abeam the O2 Arena helipad at 2159:40, at altitude 1100ft.

The Southend Wx was passed to the CH47 pilot at 2202:00 and the deteriorating Wx conditions forced him to abandon the E'bound flight. At 2203:40 the CH47 pilot received approval from the Heathrow Director to return W'bound through the helicopter lanes. The CH47 pilot had reached the E extremity of the London City CTR before turning back. He stated that the next call to Heathrow Director would be at London Bridge.

Helicopter Route H4 commences at the Isle of Dogs and follows the River Thames upstream, passing London Bridge. Between these two points the AIP notifies that the maximum operating altitude is 2000ft on the London Heathrow QNH.

A handover of Heathrow Director controller took place at approximately 2205. There were no transmissions on 119.725MHz between 2205 and 2208:40; except at 2205:49 when a split-second open microphone is heard on the recording.

Starting at 2208:40, the following exchange between the CH47 pilot and Heathrow Director took place:

CH47:"…*looks like a Dauphin's just passed down our left hand side*"

LL APC:"*What has sorry*"

CH47:"*Erm helicopter just passed down our left-hand side er running east*"

LL APC:"*Okay nothing seen on radar at all actually"*; "*I've not even got a primary contact there*"

CH47:"*Really he's just we're just north of the dome now and he's probably about a mile in our six o'clock running east down the river*"

LL APC:(2209:00) "*Okay…*"

At 2209:29, Heathrow Director informed the CH47 pilot, "*He's* [the EC155] *just started painting now.*" [The first position indication symbol of the EC155 appeared at 2208:57, 1.76nm from the London City ARP.]

The EC155 pilot called Heathrow Director at 2210:00 and the following details were passed, "*we're an E C 155 got airborne from the O two tracking southbound at one thousand feet request a Basic Service we're routeing towards the Ockham initially now to near Newbury.*" Heathrow Director instructed the EC155 pilot to squawk 7047 and at 2211:00 requested him to say again his position, which was given as, "*two or three miles east of the er Crystal Palace mast.*"

The EC155 pilot was asked to confirm that squawk 7047 was set as, at 2211:20, Heathrow Director informed the EC155, "*there's nothing showing on radar only a primary target…"* However, this was immediately followed-up with, "*it's just popped up now actually…*".

At 2212:40 a BS was agreed between Heathrow Director and the EC155 pilot. At this time the CH47 pilot also reported at London Bridge from where he was given onward clearance without further incident.

At 2213:00 the following exchange took place between the Heathrow Director and the EC155 pilot:

LL APC:"*Can you just er explain why you didn't call for lift* (2213:00) *er when you were in a low hover please*"

EC155:"*Well we couldn't get through to you in the low hover we did try*"

LL APC:"*Okay thanks just you passed pretty close to a … Chinook that was flying down H four at the time*"

EC155:"*Er yes we saw him er eastbound b- as we were starting up*"

LL APC:"*Thanks you are obliged to er to received* (2213:20) *a clearance before you enter the control zone*"

EC155:"*Okay … we've been lifting out of there every night we've not been able to get you on the ground*"

LL APC:"*… I don't know why that would be and I couldn't see you even painting on radar until you were well south of the river there*"

At 2226 Heathrow Director terminated service to the EC155 pilot and he reported changing to London Information.

Analysis

The London City CTR is notified as Class D airspace H24 from surface to altitude 2500ft. The London City ATZ is notified as Class D airspace H24 from surface to 2000ft aal. The notified operational hours of London City ATC are until 2130, Sunday to Friday. Radar services for London City airspace are notified in UK AIP AD 2-EGLC-1-5 (17 Nov 11) as:

Service Designation	Callsign	Channel MHz	Hours of Operation (summer)
RAD	Thames Radar	132.700	0530 - 2100
	Heathrow Radar	125.625	0600 - 1930
	Heathrow Director	119.725	2130 - 0530
	City Radar	128.025	As directed by ATC

Additionally, a note in the ATS Airspace notification instructs pilots that 'Outside the hours of Heathrow Radar and Thames Radar the controlling authority is Heathrow Director'. The notified Local Traffic Regulations state that AIP EGLL AD 2.22 should be consulted for details of helicopter procedures within the CTR. The diagram below shows the boundary of the London City ATZ in relation to the helipad (denoted by the yellow star):

Upon lifting from the helipad the EC155 pilot was within Class D airspace. Given the time of the lift the controlling authority for the airspace was Heathrow Director [119.725MHz]. However, it was noted that this option is not depicted on the 1:250,000 VFR chart graphic at Figure 2.

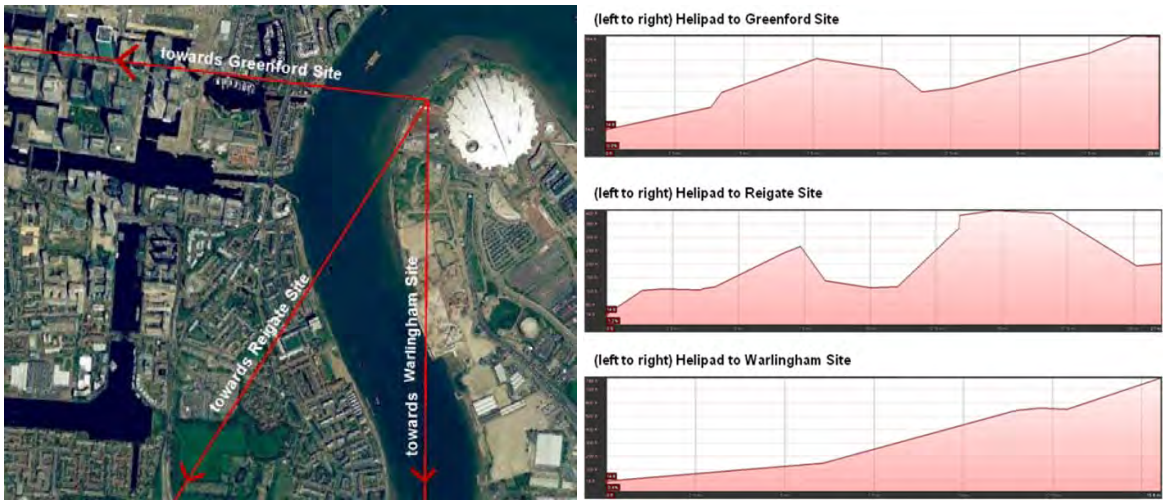
No SVFR clearance was issued to the EC155 prior to or during its transit of the London City ATZ or CTR.

The O2 Arena operators require full and comprehensive documentary submissions to be made to them in advance of any helicopter movement at their helipad; this includes appropriate insurance evidence, risk assessment, operating plan and a site visit by the helicopter operator prior to the movement. ATSI are aware that the EC155 operator complied with all the requirements for permission to use the O2 Arena helipad.

The CAA's FOI (Helicopters) reports that the operator has a long-term permission for self approval of operations in congested areas. The CAA is provided with a monthly usage report to monitor such operations.

Under the circumstances of this event it was impossible for the LTC Heathrow Director to provide any form of separation or warning to either ac.

The diagram below shows the relative directions of the receiver sites for 119.725MHz and 125.625MHz and indicative elevation profiles, which commence at the helipad location and terminate at the specified Receiver site (site location data supplied by ANSP):



RTF frequency 119.725MHz (LL APC N) is transmitted/received at sites near Warlingham and Greenford. RTF frequency 125.625MHz (LL SVFR) is transmitted/received at sites near Reigate and Greenford.

ATSI conducted a basic RTF test at ground level on the helipad at North Greenwich using a hand-held scanner. It was found that, on 119.725MHz, only ac transmission could be heard. Transmissions made by ATC were detected only as a high pitched pulse and were indistinguishable. Both ATC and ac transmissions were heard on 125.625MHz.

The 3 indicative ground elevation profiles would appear to indicate that only Warlingham Site might have line of sight with the helipad; although the basic RTF test, which received ATC transmissions clearly on 125.625 would appear to indicate that the scanner detected at least one of the Reigate and/or Greenford transmitters.

CAA and ANSP Communications experts were asked for their opinion on the RTF coverage at the helipad and reported that a helicopter, even in a low hover at 300ft, would almost certainly be in an area of low signal strength from all three transmitters. The RTF conditions also indicated a possibility of an ac succumbing to multicarrier effect if the ac's equipment was susceptible, i.e. the ac's equipment would mute the presence of a good signal whenever the RTF was interpreted as high level noise below a certain aerial signal strength.

The EC155 pilot cited problems in contacting Heathrow Director on previous nights; therefore, ATSI analysed the RTF and surveillance recordings for 18, 19 and 20 May with the following results: (Note: On each night the subject flight was flown by the same airframe. On 18 and 19 May the EC155 flight was flown by a different numerical designator of the same operator. The flight on the 20 May was flown by the same numerical designator as the 21 May.) The first 36sec of each night's recorded surveillance is plotted in Figure 3 below.

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On 18 May 2012 a first call was made to Heathrow Director at 2221:24 without successfully establishing two-way communication. Two-way communication was established on 119.725MHz at 2223:09 and the first position indication symbol of the EC155 was seen at 2223:53: bearing 202° at 0.24nm from the helipad, at 500ft. The EC155 pilot then flew along the river towards the Isle of Dogs Reporting Point climbing to 1500ft. [EGLC met: SCT014/// BKN020/// BKN026///].

On 19 May 2012, two-way communication was established with Heathrow Director on first call at 2221:33. The EC155 appeared as a primary position indication symbol at 2221:41: bearing 100° at 0.38nm from the helipad. The ac was in the vicinity of the cable car crossing at North Greenwich (elev. 300ft approx). The EC155 pilot continued SW and at 2222:01 Mode C level reporting was detected at altitude 900ft (bearing 147° from the helipad at 0.51nm). The EC155 pilot continued towards the river, climbing to 1600ft, again towards RP Isle of Dogs. [EGLC met: BKN012/// BKN028///]. RTF indicates that the ac's destination on 18 and 19 May was a site near Denham.

On 20 May 2012, the EC155's position indication symbol appeared at 700ft, bearing 144° at 0.92nm from the helipad at 2201:29. The ac climbed slowly on a S'ly track to 900ft. Two-way communication was established with Heathrow director at 2202:10, in excess of 2nm S of the helipad. The EC155 pilot had attempted to call on 125.625MHz at 2159:26 and 2200:24. [EGLC met: OVC012///].

On 21 May 2012, the EC155 appeared as a primary position indication symbol at 2208:57 bearing 144° at 1.06nm from the helipad. The ac continued on a S'ly track and no Mode C was detected until 2211:25. Two-way communication was established with Heathrow Director at 2210:00 and the EC155 pilot left the confines of the London City CTR at 2210:15. [EGLC met: BKN012///].

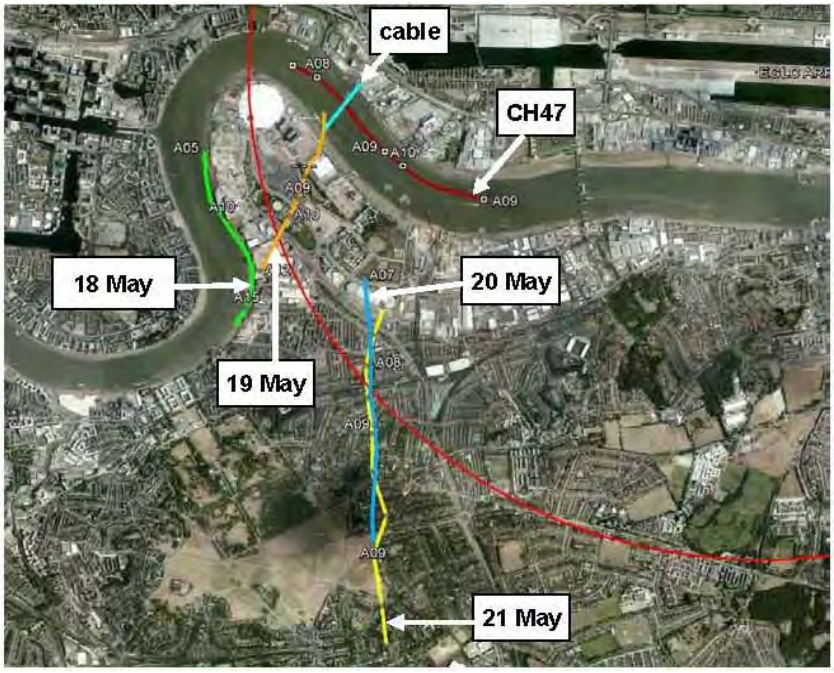


Figure 3: EC155 flight paths on 18, 19, 20 and 21 May together with plot of CH47 flight path

No MORs were submitted by the EC155 operator concerning the reported problems on previous nights' operations.

The theoretical base of primary and secondary surveillance coverage in the vicinity of the O2 Arena is approximately 200ft.

Based on the above information: two-way communication should be able to be established between a helicopter departing the O2 Arena and Heathrow Director when the ac departs immediately SW. On 18 May, communication was established beneath 500ft. On the other 3 nights it is likely that the ac departed initially to the N, around and above the O2 Arena and cable car, and then set course to the Isle of Dogs/S'bound accordingly. In the area to the

SE of the O2 Arena it appears that surveillance coverage is compromised at low level but as per the flight on 19 May, RTF communications can be established somewhere below 900ft altitude.

Figure 3 above shows that the CH47 pilot passed O/H the cable car at altitude 900ft. The cable itself and O2 Arena are notified as approximately 300ft elevation; therefore vertical distance between the EC155 and the CH47 was almost certainly less than 600ft. Lateral distance could not be established accurately.

Conclusion

The Airprox occurred when the EC155 flew into proximity with the CH47. Neither pilot was aware of the immediate presence of the other prior to the encounter.

The EC155 pilot commenced his flight without appropriate clearance from Heathrow Director. The Heathrow Director was unable to provide any form of separation between the flights or warning as no RTF communication had been established with the EC155 pilot and the EC155 was not depicted on the controller's situation display.

HQ JHC comments that the Chinook crew were operating in accordance with Air Navigation Order 49 (Flying machines at night), with the single exception of flashing navigation lights which is the SOP for Chinook helicopters. This is done to increase the conspicuity of the ac at night. Red HISLs are used when using NVD as white HISLs can provide significant distraction, (the rear crew were on NVD). They were flying in accordance with the requirements for flight in CAS at night at a cleared height as directed by Heathrow radar (2000ft was not possible due to weather) and had obtained clearance to operate in CAS. The crew were properly authorised for the flight in accordance with military aviation regulations. The London Helicopter Routes are used by military helicopters to enable expeditious transit across London, to save valuable flight time and to carry out essential pilot training for non-handling pilot duties in a high workload environment.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members agreed that the Chinook sortie was correctly authorised, that the crew were operating iaw the regulations for night flying in CAS, under an appropriate service from the correct ATS provider and with a clearance to do so and that they were properly conducting crew training. Members agreed that the Chinook crew were carrying out their duties in compliance with the regulations pertaining to helicopter flight in the London and London City CTRs. The Chinook is not fitted with an ACAS but the crew would expect to be alerted to, and separated from, other traffic by ATC. Although the crew had a responsibility to look out, the Board recognised their difficulty, in the absence of any traffic alert, of seeing the EC155 beneath them, against the background of cultural lighting, until it was passing down their LHS.

The Board then considered the actions of the EC155 crew in the context of the regulations pertaining to their flight. CAT helicopter pilot Members commented that it was common practice to lift to the hover in CAS in order to establish 2-way RT contact and that, whilst this practice was not within the letter of the law, it did not automatically compromise safety and was sometimes necessary in order for the flight to be accomplished. They added that safety of a flight that had not been previously coordinated could only be maintained by establishing contact before departing from the low hover. It was noted that there is no strict definition for 'low hover' but Members agreed that in this case the EC155 crew had departed early, without an ATC clearance, and was en-route before they established RT contact with ATC. If RT contact could not be achieved the EC155 crew was required to telephone the appropriate ATC agency to obtain a clearance before departure. The CAA Advisor confirmed that, in general, the requirement for an abbreviated flight plan could be fulfilled through RT in the low hover or by phone before lifting. ATC Members commented that the telephone contact number listed in the London Heathrow AIP entry, was routinely manned by a senior ATS assistant and was a fast and efficient way of facilitating a clearance with the Heathrow Controller.

Members noted that the AIP entry for London City Airport did not cover 'after hours' helicopter operations explicitly. The London City Class D airspace allowed day VFR operations which did not require ATC separation from IFR traffic. However, the EC155 flight was conducted at night and therefore, under the extant regulations, was required

to operate either under IFR or SVFR, both of which required ATC separation from other IFR or SVFR traffic. Consequently, whilst the EC155 crew was not best served by the AIP entry, Members unanimously agreed that they were operating inside Class D airspace at night and were therefore required, at the time of the Airprox, to obtain clearance before entering CAS. Members were unable to reach a conclusion as to why the EC155 crew did not receive a TCAS alert from the Chinook. It was suggested that this may have been due to the geometry of the incident but this issue could not be resolved. In the absence of cueing from TCAS or ATC, the Board recognised the difficulty the EC155 crew would have had in seeing the Chinook, concentrating as they were on their departure from the helipad and ensuring safe separation from the cable car. Taking all of these factors into account, the Board agreed unanimously that the cause of this Airprox was that the EC155 crew departed within the London City CTR without clearance and flew into conflict with the Chinook, which they did not see.

The Board noted that the helicopter operating company had conducted a formal risk assessment of the site and the operation as a whole. However, it did not appear to have included actions in the event of a lack of 2-way RT contact. Given that other company pilots were likely to have operated in a similar manner, the Board agreed to make a Safety Recommendation to the operator to review its procedures.

On the question of Risk, Board Members noted that the EC155 crew did not see the Chinook at all and the Chinook crew saw the EC155 passing down their LHS. Based on the Chinook crew's estimate of the separation Members were of the opinion that safety margins were much reduced below normal but that the EC155 pilot's choice of routeing above the S bank mast of the Olympic cable car provided a degree of lateral separation. On balance, the Board agreed that the safety of the ac involved had been compromised in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

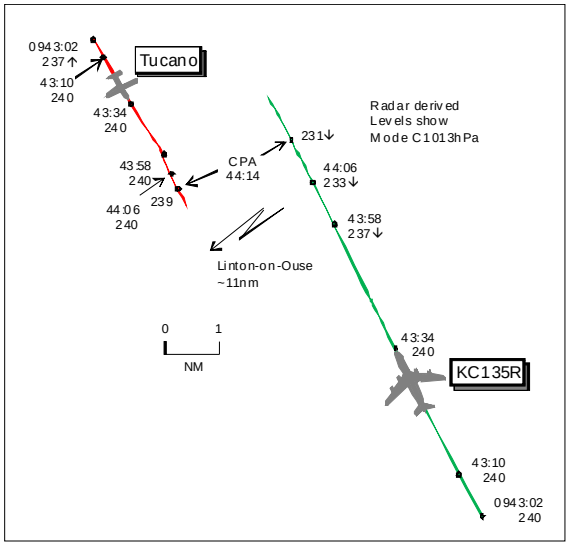
Cause: The EC155 crew departed within the London City CTR without clearance and flew into conflict with the Chinook, which they did not see.

Degree of Risk: B.

Recommendation: The EC155 operating company is recommended to review its procedures.

AIRPROX REPORT NO 2012068

Date/Time:	23 May 2012 0944Z	
Position:	5411N 00102W (11nm NE Linton-on-Ouse)	
Airspace:	TRA006	(Class: C)
	Reporting Ac	*Reported Ac*
Type:	KC135R	Tucano
Operator:	Foreign Mil	HQ Air (Trg)
Alt/FL:	FL240	FL240
Weather:	VMC HZBL	VMC CLNC
Visibility:	>10km	50km
Reported Separation:	NR	Nil V/3nm H
Recorded Separation:	800ft V/2·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KC135R PILOT reports heading 340° at 390kt in the cruise at FL240 under a TS, having just switched to ScATCC Mil from LATCC Mil on 370·62MHz, squawking with Modes S and C. The visibility was >10km flying in haze between layers in VMC and the ac was coloured grey with upper and lower HISLs switched on. ScACC Mil made a traffic advisory call about traffic at the same level on a reciprocal heading so the crew looked out but could not see the ac and then looked at the TCAS display to locate it. Once located they asked for climb to FL250 to avoid it but before the controller could respond TCAS generated an RA 'descend' which was followed. They informed the controller that they were following an RA and were descending to FL230; the controller cleared them to FL230. Flying out of sun they did not see the other ac until passing abeam it. The other ac appeared to be slightly above and slightly turning away and was dark in colour and either a small business jet or small military type. It was hard to determine owing to the undetermined distance away and aspect at the time of sighting. The other flight was not heard on frequency or talking to the same controller. ScATCC Mil asked if they intended to report the incident which they confirmed. They resumed FL240 once cleared with nothing further to note during the sortie. He assessed the risk as low.

THE TUCANO PILOT reports flying an air-test sortie from Linton-on-Ouse and listening out on a discreet frequency, squawking 7006 (TRA conspicuity code) with Mode C; TCAS 1 was fitted. The visibility was 50km in VMC and the ac was coloured black/yellow with HISLs, nav and landing lights all switched on. Having climbed to FL240, heading 160° at 120kt he saw a large ac approximately 15nm away to the SE. He continued with the air-test and identified the other ac as a KC135 before it passed 3nm down his LHS co-alt. There was no risk of collision as he had maintained visual contact with it for the previous 15nm until it passed.

UKAB Note (1): TRA006 is active Mon-Fri 0730-1700UTC Summer excluding English Public Holidays but may be activated at other times by NOTAM; vertical limits FL195 to FL245. Class C requirements for the provision of ATS do not apply within an activated TRA. ATS is provided in accordance with ATSOCAS by the appropriate military or civil ATS provider. Military autonomous operations are permitted and are to be conducted under VFR. Pilots of ac are responsible for avoidance of collision in accordance with the RoA. SSR Code 7006 with Mode C should be selected and retained when vertical profiles result in operations above and below FL195 until such time as flight within a TRA is complete. Military ac do not require a clearance to operate autonomously within an active TRA.

BM SAFETY MANAGEMENT reports that this Airprox occurred above the Vale of York AIAA, between a KC135R en-route to AARA 5 operating IFR in receipt of a TS from ScATCC (Mil) Controller 2 and a Tucano operating VFR in TRA 6.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

AIRPROX REPORT No 2012068

The KC135R crew report in excess of 10km visibility in haze, between cloud layers and were under their own navigation to AARA 5. Controller 2 was under training and reported low task complexity and moderate to low workload at the time of the occurrence.

The incident sequence commenced at 0943:05 as STCA white activated between the KC135R and Tucano. The Tucano was 11·2nm NW of the KC135R, tracking SE'ly, climbing through FL237. At 0943:08, Controller 2 passed TI to the KC135R flight on the Tucano stating, "…*traffic twelve o'clock, one-five miles, opposite direction, indicating same level*." The KC135R crew did not immediately respond to the TI and, at 0943:17, Controller 2 exchanged RT with an unrelated fast-jet formation. At 0943:35, the KC135R crew requested a climb which Controller 2 authorised, instructing the KC135R to "...*climb Flight Level two-five zero*" in order that separation could be deemed between the 2 ac. During this transmission, STCA activated red; the Tucano was 6·9nm NW of the KC135R, tracking SE'ly, indicating FL240. The KC135R crew did not acknowledge the climb instruction, replying that, *"(KC-135R c/s) is* (unintelligible) *following R-A*" which was acknowledged by Controller 2.

The KC-135R crew's response to the TCAS-RA descent instruction was visible at 0943:58 and shortly afterwards, at 0944:03, the crew reported visual with the Tucano. At this point, the Tucano was 3nm WNW of the KC135R, tracking SE'ly, indicating FL240; the KC135R was descending through FL235.

The CPA occurred at 0944.14 as the Tucano passed 2·1nm W of the KC135R, indicating FL239; the KC135R was descending through FL231. The Tucano pilot reported first visually acquiring the KC135R when 15nm lateral separation existed and remained visual throughout the incident sequence. It is noteworthy that the KC-135R crew reported that the Tucano 'was not heard on the frequency that (KC135R c/s) was on and (KC135R c/s) felt like the ac was not talking to the same controller as (KC135R c/s).'

In terms of this event as an air incident, the Tucano operating VFR visually acquired the KC-135R in good time and assessed that there was no confliction. Controller 2's instructor has stated that the trainee passed TI prior to the activation of STCA-white, which might indicate a discrepancy between the RT and radar times; however, NATS engineers have stated that both systems are GPS corrected and should be synchronous. It has not been possible to conclusively prove or dis-prove the existence of a time difference between the RT and radar. That said, regardless of the activation of STCA-white, Controller 2 passed timely TI to the KC135R crew and reacted appropriately to the crew's subsequent request to climb. Given the range scale that Controller 2 would have been operating on, the disparity between the range given in the TI and that on radar is understandable. Once the crew reported that they were manoeuvring in accordance with a TCAS RA, Controller 2's ability to affect the incident sequence was removed. There are no ATM issues that require further investigation; this event effectively represents a TCAS sighting report by the KC135R crew.

HQ AIR (TRG) comments that this was a very low risk event. The Tucano pilot was visual from 15nm, assisted by TCAS 1, and the KC135 was also equipped with TCAS and in receipt of a radar service, and had planned to take vertical separation in advance of the TCAS RA. Two points are worthy of note: first, the Tucano crew might have been able to give the obviously TCAS-equipped ac a wider berth, although their own on-board TCAS 1 did not trigger a TA; second, the KC135 was on a profile where a DS would have been available and might have resulted in deconfliction advice that pre-empted the eventual RA. Information from the Tucano manual states:-

"With the undercarriage retracted the TCAS operates in Sensitivity Level B (SLB). A TA is generated when an intruder comes within 0·55nm laterally or 800ft vertically or is on a course which will intercept the host aircraft within 30 seconds. This time is reduced to 20 seconds for non-altitude reporting intruders."

After carrying out some calculations, it has been determined that the TCAS would have been very close to generating a TA in accordance with these parameters so it is reasonable that it did not. Clearly the KC135 and other TCAS users have their units set to SLA to generate warnings much earlier. Clearly, given its normal operating environment and manoeuvrability, SLA would not be appropriate for the Tucano, and would also explain the apparent lack of consideration of the TCAS RA parameters.

HQ USAFE UK comments that this was a straightforward TCAS event. It serves as a reminder to military crews that, when possible, big jets should be avoided by generous parameters.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

This was an unfortunate incident where, although all parties were discharging their responsibilities to maintain their own separation from other traffic through see and avoid within the TRA, the acs' flightpaths triggered a TCAS RA in the KC135 causing the Airprox. The KC135 crew were given the heads-up on the approaching Tucano at the same level and, after locating it on TCAS, they attempted to avoid it by requesting a climb from ScACC Mil. However, owing to the acs' closure rate, before the controller could approve the climb a TCAS RA was generated which commanded a descent. The RA guidance was followed and the KC135 crew visually acquired the Tucano as it passed down their LHS. Meanwhile the Tucano pilot had seen the KC135 at 15nm range and was taking visual separation against it, content that it would pass well clear on his L. However, it appears that the Tucano pilot was unaware that his flightpath would breach the TCAS 'safety bubble' around the KC135 causing its crew to comply with an RA descent. A Member opined that had TCAS not been an element of the incident, the Airprox would probably not have been filed. Another Member commented that the KC135 crew could have asked for a DS whilst transiting the TRA which almost certainly would have resulted in an earlier resolution, instigated by the controller, which should have negated any TCAS alerts/warnings.

Looking at the risk, some Members thought that this had been a benign event where normal procedures, safety standards and parameters pertained – a risk E. This view was not shared by the majority of the Board who concluded that although the Tucano pilot's visual separation and the KC135 crew's actions ensured the ac were never going to collide, with the KC135 crew complying with a TCAS RA manoeuvre, a non-standard event, a risk C classification was more pertinent in the circumstances.

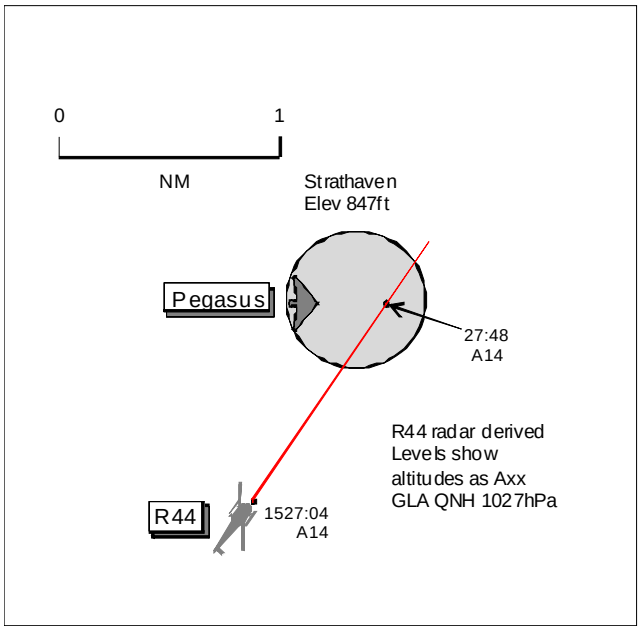
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The acs' flightpaths triggered a TCAS RA in the KC135.

Degree of Risk: C.

AIRPROX REPORT NO 2012069

Date/Time:	25 May 2012 1528Z	
Position:	5541N 00407W (O/H Strathaven M/Light Site - elev 847ft)	
Airspace:	SFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Pegasus Quantum M/Light	R44
Operator:	Civ Trg	Civ Pte
Alt/FL:	10ft↑ QFE (998hPa)	1400ft QNH
Weather:	VMC CAVOK	VMC CLOC
Visibility:	30nm	20nm
Reported Separation:	500ft V/350m H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PEGASUS QUANTUM M/LIGHT PILOT reports flying a local dual training sortie from Strathaven VFR and utilising Safety Common frequency 135·475Mhz. The visibility was 30nm in CAVOK VMC and the ac was coloured blue with a blue/white wing; no lighting was carried. On departure RW09, flying out of sun heading 090° at 50kt when just airborne climbing through 10ft QFE 998hPa he made a quick scan to his R and L to take advantage of the increased visibility and spotted a white coloured R44 helicopter 400m to his R and about 500ft above transiting from the SSW to the NNE. He assessed there was a risk of collision or that his ac would fly through the helicopter's rotor-wash if his departure was continued so he cut power and landed straight ahead back onto RW09. The helicopter passed 350m ahead and 500ft above and he assessed the risk as medium. He called Scottish Information from his mobile phone immediately afterwards to obtain further information. The R44 flight did not call on the Safety Common frequency. He went on to say that Strathaven had been the location of 3 Airprox last year which involved helicopters and this incident occurred just weeks after new charts had been issued denoting Strathaven with 'Intense Microlight Activity'; also Glasgow Airport had released part of the Class D CTR to the W back to Class G. He presumed the R44 pilot was therefore not using a current chart.

THE R44 PILOT reports en-route from N Ireland to Perth, VFR and in communication with Prestwick Approach and then Scottish Information, squawking with Modes S and C. The visibility was 20nm in VMC and the helicopter was coloured white with nav and strobe lights switched on. His route was through the E side of the Prestwick CTR to Darvel [7nm SW Strathaven] to Falkirk [22nm NE Strathaven] and then direct to Perth via the high ground. After hand-off from Prestwick back to Scottish Information, which he had worked prior to transfer to Prestwick, Scottish confirmed that they would look after his flight as he would be on the E CTR boundary of Glasgow and that Glasgow were busy. Heading 045° at 1400ft QNH and 110kt he was asked to report abeam Cumbernauld which he did by 8nm and he carried on to Perth. At no time was he aware that an Airprox had happened. Post flight he checked his GPS and it showed his ac passing waypoint STR2 [Strathaven M/Light Site] on his RHS by 1km.

UKAB Note (1): The Strathaven Website shows the ARP coordinates as 5540·8N 00406·33W. This position converts to deg/min/sec: 554048N 0040620W, which were the coordinates used in the UK AIP up until AIRAC 01/2012 12th JAN. However, the AIRAC 02/2012 9th FEB, which incorporated an amendment to the Strathaven entry, shows the coordinates as 554049N 0040654W; this is the actual position of the site, 625metres W of the position published on the Strathaven website. The R44 pilot confirmed that the STR2 waypoint coordinates in the GPS database are 554048·3N 0040617·8W, which is slightly further E than the position shown on the Strathaven website. The Strathaven site operator was contacted by the UKAB Secretariat and informed of the discrepancy between the coordinates shown on the website and repeated in a VFR Flight Guide as opposed to those

promulgated in the AIP. The Operator agreed to amend coordinates on the website and inform the appropriate Flight Guide publishers of the change.

ATSI reports that the Airprox was reported by the pilot of a Pegasus Quantum 912 M/Light when the pilot observed an R44 in the vicinity of the Strathaven M/Light site.

The M/Light was about to depart Strathaven for a local VFR flight and was monitoring SafetyCom on 135·475MHz. Since 9 February 2012 the Strathaven entry in the UK AIP (ENR 5-5-4-3) is fully promulgated, including the SafetyCom frequency. In addition VFR charts now show the area as one with Intense Microlight Activity.

The R44 was on a private VFR flight from N Ireland to Perth and was in receipt of a BS from Scottish Information on 119·875MHz.

Scottish Information is a non-surveillance based service and only offers Basic or Alerting Services. Scottish Information may request an ac squawk 7401 to assist in the prevention of airspace infringements.

ATSI had access to both pilots' reports, recorded area surveillance and recording of the Scottish Information frequency 119·875MHz. Additional information was also provided by the ANSPs at Glasgow and Prestwick Airports.

Both pilots reported visibility at 20nm or greater; however neither pilot cited cloud cover in their report. The meteorological information for Glasgow Airport, 15nm to the NW, was:-

METAR EGPF 251520Z 06015KT CAVOK 24/14 Q1027=

The R44 flight called Prestwick ATC on 129·450MHz at 1504Z and remained with Prestwick until 1521. The R44 transited Prestwick's CAS and left CAS 2nm E of Mauchline. The R44 pilot had informed Prestwick that his intentions were to route "up the eastern side of Glasgow, up towards Cumbernauld".

At 1512 Prestwick ATC telephoned Glasgow ATC advising of the R44. Glasgow informed Prestwick that they had no traffic to affect the R44 and, being busy with IFR traffic, declined to work the ac.

Prestwick ATC then passed the R44's details to Scottish Information and, at 1521, the R44 was transferred to Scottish Information. At this time Prestwick Multi-Radar Tracking showed the R44 approximately 10nm SW of the Strathaven ARP (554049N 0040654W) at altitude 1600ft (calculated using Glasgow QNH 1027hPa). The R44 was continuing on a NE'ly track.

The R44 flight called Scottish Information at 1521:30. The FISO had already received basic details from Prestwick ATC and requested the R44's present level and position. This was given as 1400ft, 2nm S of Darvel. The FISO informed the R44 flight it was a BS and requested the ac squawk 7401. The pilot read back the SSR code but did not acknowledge the service being provided. Next, a confirmation of the R44's routeing was requested. This was given as, "*if possible to skirt Glasgow's eastern boundary Cumbernauld onwards to Stirling…".* The FISO then requested a position report at Cumbernauld and informed the R44 pilot that Glasgow did not need to work the flight.

At 1522 the R44's SSR code changed from 7000 to 7401. ATSI observed the activation of the ac's SPI feature on the surveillance replay.

At 1526:27 the R44 was 2nm SSW of the Strathaven ARP at altitude 1400ft and tracking 050°.

By 1527:36 the R44 was immediately S of the Strathaven ARP by approximately 0·25nm at altitude 1400ft having adjusted its course L onto 040°.

Between 1527:44 and 1527:52 the surveillance replay shows the R44 fly over the Strathaven grass strip at an altitude of 1400ft. The Strathaven ARP has an elevation of 847ft. (See image below)

AIRPROX REPORT No 2012069

The M/Light pilot reported to UKAB that he observed the R44 on his RHS as he lifted [from a RW09 departure, prevailing NE'ly winds]. The pilot cut power to the M/Light and landed to avoid flight through rotor wash.

The R44 then continued away from Strathaven in a NE'ly direction.

Within the previous 12 months from the date of this Airprox there have been 3 other reported Airprox in the vicinity of the Strathaven M/Light site. Further to these previous incidents work has been completed on updating the Strathaven M/Light site AIP entry and changing the VFR chart entry to indicate Intense Microlight Activity.

Additionally, since 5 April 2012, airspace changes in the vicinity of Glasgow have resulted in airspace to the SE of Glasgow changing to Class G uncontrolled airspace below altitude 3500ft thus allowing VFR traffic transiting the area to do so without the requirement to call Glasgow ATC. [UK AIP AD 2-EGPF-4-1 refers].

The Airprox occurred in the vicinity of the Strathaven M/Light site when a M/Light pilot airborne from RW09 observed a R44 cross approximately 550ft R to L above the grass strip. The M/Light pilot aborted his departure and landed.

UKAB Note (2): The RoA Regulations Rule 12, Flights in the vicinity of an aerodrome states:

'(1) Subject to paragraph (2), a flying machine, glider or airship flying in the vicinity of what the commander of the aircraft knows, or ought reasonably to know, to be an aerodrome shall:

a) conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed; and

b) make all turns to the left unless ground signals otherwise indicate.

(2) Paragraph (1) shall not apply if the air traffic control unit at that aerodrome otherwise authorises.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings and reports from the appropriate ATC and operating authorities.

From the radar recording it was clear the R44 had flown O/H Strathaven M/Light site and through the cct pattern at an altitude below cct height, contrary to Rule 12, placing the helicopter into conflict with the departing Pegasus Quantum, which went unseen by the R44 pilot, causing the Airprox. Members agreed that thorough pre-flight planning should have revealed Strathaven M/Light site, which is clearly depicted on the 1:500000 and 1:250000 topographical charts, and due regard should have been taken by either giving it a wider berth, transiting well above the cct pattern or calling on the appropriate frequency for information on activity. It was fortunate that the Pegasus Quantum pilot saw the R44 immediately after take-off, 400m to his R and 500ft above, and was in a position to be able to abort the departure, landing back safely on the remaining RW as the R44 passed 350m ahead and 500ft above. The prompt action taken by the Pegasus Quantum pilot was enough to persuade the Board that any risk of collision had been quickly and effectively removed.

Members noted the action being taken by the Strathaven Operator to ensure the correct coordinates for the Microlight site are promulgated.

PART C: ASSESSMENT OF CAUSE AND RISK

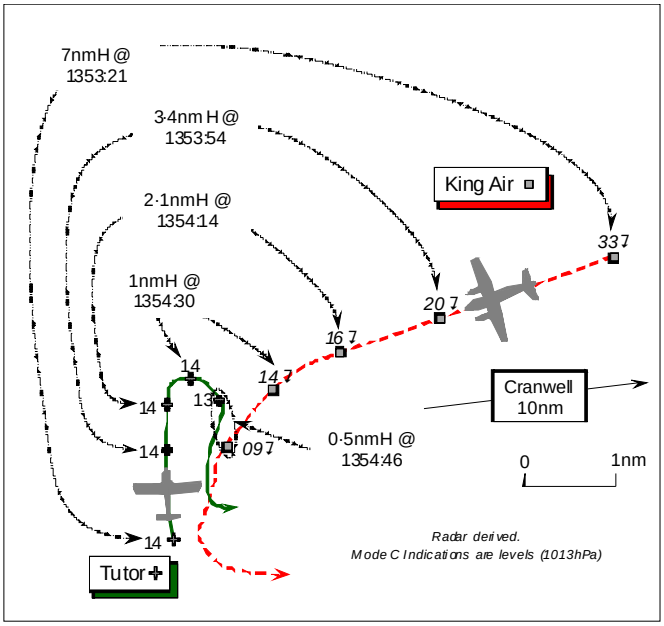
Cause: The R44 pilot did not comply with RoA Rule 12 and flew O/H a promulgated and active M/Light site, into conflict with the Pegasus Quantum, which he did not see.

Degree of Risk: C.

AIRPROX REPORT No 2012070

AIRPROX REPORT NO 2012070

Date/Time:	25 May 2012 1354Z	
Position:	5301N 00045W (10nm W of Cranwell A/D - elev 218ft)	
Airspace:	Lincolnshire AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Tutor TMk1	BE200 King Air
Operator:	HQ Air (Trg)	HQ Air (Trg)
Alt/FL:	1500ft QFE (1018hPa)	1000ft QFE (1018hPa)
Weather:	VMC In Haze	VMC CAVOK
Visibility:	30km	30km
Reported Separation:	½nm H	300-400ftV
Recorded Separation:	Nil V @ 1nm H 0·5nm Min H/400ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB TUTOR T Mk1 PILOT, a QFI, reports that whilst conducting a student pilot's Final Handling Test (FHT) they were being vectored under a TS from Cranwell DIRECTOR (DIR) at 1500ft QFE in VMC for a PAR to RW08RHC. The assigned squawk was selected with Mode C; elementary Mode S and TAS are fitted.

DIR passed TI about a contact at a range of 2nm, closing at the same height. Seconds later, in a position about 8nm W of the A/D, turning through 080° at 100kt, TAS indicated a contact less than 1nm away at the same height. As PIC, he took control to initiate appropriate action when a 'wing flash' indicated the contact's position. He spotted the other ac - King Air (A) - as it was about to pass down the starboard side of his Tutor less than 1nm away in an apparent decent to low-level but he took no avoiding action because it was then seen to manoeuvre. King Air (A) turned L and crossed ahead of his Tutor – he was unsure of the range - crossing through the extended centre-line of RW08RHC to join on the deadside. Minimum horizontal separation was ½nm and he assessed the Risk as 'medium'. The student then continued under vectors for the PAR, which was completed with no further incident.

He reported the Airprox to ATC after landing. The Tutor has a white livery; the HISLs, nav and landing lights were all on.

THE PILOT OF BEECH BE200 KING AIR (A), a QFI, reports he was conducting a dual local training flight from Cranwell and was in receipt of a BS from Cranwell TOWER on 268·625MHz. The assigned squawk of A2601 was selected with Mode C; TCAS and Mode S are fitted.

The student was the PF, on a visual simulated asymmetric recovery whilst positioning for Initials to RW08RHC. Heading 270° at 200kt, their ac had extended W of the A/D by about 8nm - some 3nm outside the MATZ - when a TCAS RA was enunciated demanding a descent. The RA was followed and he advised ATC. Whilst descending they saw the subject Tutor about 300ft away, which they later learned was radar traffic inbound to Cranwell. He estimated minimum separation was 300-400ft and when below the Tutor, commenced a L turn to join RW08RHC via Initials on the deadside. He perceived no threat of collision and assessed the Risk as 'low'; the sortie was then continued as briefed. He stated that the student had extended further than usual outside the MATZ while dealing with the simulated asymmetric recovery.

His ac has a white livery; the HISLs, nav and landing lights were all on.

CRANWELL DIRECTOR (DIR) reports the Tutor crew called airborne on 284·325MHz from Barkston Heath for a PD to Cranwell. The ac was vectored downwind for RW08RHC under a TS, descended to 1500ft QFE and the

crew instructed to report cockpit checks complete. The Tutor crew was given a slightly extended feed through the extended centreline because of 2 other ac ahead in the combined pattern with only 1 PAR controller available. As the Tutor crossed the extended centreline, a possible confliction was spotted 5nm NW of Cranwell heading towards the radar traffic about 1500ft above it and descending rapidly, so TI was requested from APP. The conflicting traffic was identified as a Radar to Visual join positioning for Initials working TOWER – King Air (A). At a range of 7nm the conflicting King Air (A) was called to the Tutor crew; when the range had decreased to 3nm he was instructed by the SUP to turn his ac away to try and avoid the conflicting King Air (A). As he turned the Tutor onto S, the conflicting King Air (A) also turned resulting in a situation where the 2 ac were within ½nm of each other at the same height. The conflicting King Air (A) subsequently turned about onto a NW'ly heading and positioned for Initials ahead of the Tutor. He assessed the Risk as 'high'.

THE CRANWELL AERODROME CONTROLLER (ADC) reports that one Tutor ac was in the visual circuit with another King Air (B) joining Tower-to-Tower from Waddington when the crew of King Air (A) called and requested to join; this was approved and the relevant RW, QFE and circuit information provided. As there were two King Air aircraft conducting standard joins through Initials at a similar time he elected to use the Hi-Brite ATM to update King Air (A) crew on the position of King Air (B). Whilst using the Hi-Brite to provide this information he noticed a contact that he believed was a potential confliction for the subject King Air – but not the subject Tutor. He passed TI in the standard format used for un-identified traffic and the crew of King Air (A) reported visual. Turning his attention to the visual circuit, King Air (B) was approaching Initials, he was now unaware of the position of the King Air (A) as the aircraft had transited away from the visual circuit to the W of Cranwell. It was at this point that the crew of King Air (A) reported a TCAS RA, which he acknowledged. Asking the crew of King Air (A) to confirm their position, there was no response so he elected to stop transmitting due to the perceived high workload in the cockpit - he even suspected that they might have decided to change frequency back to APP. After a short period of time he asked the crew of King Air (A) to confirm their position by squawking ident; once he was aware of their position he offered a straight-in-approach, which was declined, the crew continuing with the join through Initials. He was unaware of the location of King Air (A) when the TCAS RA occurred; his priority as the ADC was the control of aircraft in the visual circuit area.

THE CRANWELL ATC SUPERVISOR (SUP) reports that he witnessed the event as it occurred. He called the ADC to enquire on the position of King Air (A), as he believed it might be fast approaching the Tutor that was turning inbound for a PAR to RW08RHC. At the same time he instructed the DIR to turn the Tutor onto a heading of 180° in an attempt to position it away from King Air (A) that was indicating 2000ft. Whilst the Tutor was in the R turn onto 180°, King Air (A) also turned L onto S and descended close to the Tutor; minimum horizontal separation was about ½nm. The DIR's workload was assessed as 'low' with the overall workload on the unit 'medium to low'.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a Tutor being vectored for a PAR, in receipt of a TS from DIR, and King Air (A) positioning to join through Initials in communication with TOWER.

DIR reported that his workload and task complexity were low, with only the Tutor on frequency; the ADC reported his workload as medium to low (3 ac on freq), with low task complexity.

The incident sequence commenced at 1351:41 as the crew of King Air (A) requested to join the visual circuit and were passed the A/D details and circuit state. At this point, King Air (A) was 2.7nm N of Cranwell, tracking 260°, descending through 6500ft Mode C (1013hPa). In reply, at 1352:13, the crew of King Air (A) stated that they were, "*simulated asymmetric currently descending heading out to the west before joining through Initial",* which was acknowledged by the ADC. At 1352:23, the ADC passed the crew of King Air (A) TI derived from the Hi-Brite display (ATM) on King Air (B) conducting a Tower-to-Tower transfer from Waddington. [This was followed at 1352:58, by TI on an unrelated ac – not the subject Tutor.]

At 1353:21, DIR provided TI to the Tutor crew on King Air (A), "…*traffic right 2 o'clock 7 miles crossing right-left 1 thousand 5 hundred feet above descending*", which was not acknowledged. King Air (A) was 6nm ENE of the Tutor, tracking 260°, descending through 3300ft; the Tutor was indicating 1400ft Mode C (1013hPa), tracking N'ly. After passing TI, DIR immediately asked APP "*what's the 2-6-0-1* [King Air (A)] *doing north-west of us by 6 miles - descending for visual*?" APP replied that King Air (A) was in the visual circuit, causing DIR to enquire, "*whose visual circuit*?"

Immediately after this liaison between DIR and APP, at 1353:52, DIR instructed the Tutor to, "*turn right heading 1-8-0 degrees*", which was acknowledged. Both DIR and the SUP report that the SUP instructed DIR to turn the Tutor 'on heading 180° to attempt to position away from King Air (A) that was presenting at 2000ft at that time.' DIR did not tell the Tutor crew that the turn onto S was to deconflict them from King Air (A). [At 1353:54, King Air (A) was 3.4nm ENE of the Tutor, tracking 260°, descending through 2000ft Mode C; the Tutor was marginally left of King Air (A)'s 12 o'clock.]

At 1353:56, the crew of King Air (B) requested to convert from a cct join through Initial, to a straight-in approach. The ADC was then involved in liaison with the crew of King Air (B) until approximately 1354:11. The ADC reported that integrating King Air (B) with an un-related Tutor operating in the Cranwell visual circuit was the focus of his attention.

At 1354:01, DIR accurately updated the TI on King Air (A) to the Tutor crew stating, "…*previously called traffic north-east 4 miles tracking west 5 hundred feet above descending rapidly*", which was acknowledged by the crew.

At 1354:11 the ADC answered an incoming landline call from the SUP, seeking information on King Air (A) crew's intentions. The ADC replied, "*I called the traffic to him that came right-to-left across his nose, the 0-1* [not the Tutor but unrelated traffic referred to in the ADC's TI at 1352:58]." The SUP acknowledged this and stated in reply that, "*we've got a Tutor the 2-6-0-7 as well*." This was acknowledged by the ADC and the landline call terminated at approximately 1354:28.

During this liaison, at 1354:14, DIR provided further updated TI to the Tutor on King Air (A) stating, "*previously called traffic east 2 miles tracking west slightly above descending*"; this was acknowledged by the Tutor crew as *"..looking.."* who then reported at 1354:22, "..*visual with the King Air* [King Air (A)]". Based upon the Tutor pilot's report, this TI was co-incident with their TAS providing a warning of King Air (A). At 1354:14 King Air (A) was 2.1nm ENE of the Tutor, tracking 260°, descending through 1600ft; the Tutor had also just commenced the turn instructed at 1353:52 and was marginally right of King Air (A)'s 12 o'clock. At the point that the Tutor crew reported visual (1354:20), 1.8nm lateral separation existed.

At 1354:35, the crew of King Air (A) reported, "..*TCAS R-A*", which was acknowledged by the ADC. King Air (A) was 0.8nm ESE of the Tutor, tracking 260°, indicating 1400ft; the Tutor was also indicating 1400ft, maintaining a right turn passing through 070°. At 1354:38, it is evident on the radar replay that King Air (A) had entered a L turn and had reacted to the RA; the crew reported that they became visual with the Tutor during the RA descent.

The CPA occurred at 1354:46, at a position 10nm W of Cranwell some 1.7nm N of the extended RW centre-line (CL) for RW08, as King Air (A) passed 0.5nm S of the Tutor and 400ft below it.

Before considering the ATM aspects of this Airprox, it is worthy of note that the crew of King Air (A) was operating outside the visual circuit for an extended period in what is considered busy airspace; yet throughout the incident sequence, the crew maintained a closing heading toward the extended CL. Whilst the decision to head W to lose height and facilitate the handling of the Simulated Asymmetric emergency was understandable in isolation, the duration of that extension W whilst on the TOWER frequency, coupled with the closing heading to the CL conspired to place King Air (A) in confliction with the instrument pattern. Although there is little detail in the written account from the PIC of King Air (A), it is worthy of consideration that their lookout may have been affected by their requirement to deal with the simulated emergency.

In terms of the ATM aspects of this Airprox the ADC clearly understood the requirements of his Duty of Care, having perceived that there might have been a conflict between the 2 King Airs by passing TI at 1352:58. Subsequently, the controller's focus of attention sequencing the unrelated King Air (B) and Tutor was understandable, more so when it is considered that King Air (A) was operating VFR and the crew had stated an intention to head W prior to joining through Initials. Finally, the ADC had little time to act on the SUP's landline warning at 1354:23. Consequently, the ADC was unable to affect the outcome of this Airprox.

In the ACR, DIR provided timely and accurate TI with multiple updates to that TI, which assisted the Tutor crew in visually acquiring King Air (A). On that basis alone, it enabled the Tutor crew to discharge

their responsibility to 'see and avoid' in a timely fashion. However, whilst issued in good faith, as a result of the 22-sec gap between the turn instruction onto 180° being issued by DIR and the turn being followed by the Tutor, this resulted in separation that was less than it would have been without the turn. That said, the Tutor crew reported visual with King Air (A) at the point that they commenced the turn and continued into that turn; therefore, whilst the turn can be viewed as contributory to the Airprox, it was not causal.

The decision to step beyond the bounds of a TS and provide de-confliction advice in order to attempt to prevent a perceived mid-air collision is difficult and post-incident assessments of such a decision are fraught with difficulty, given the potential for hindsight bias. It should be taken in the light of specific factors, for example the weather and whether the pilot has stated that he is, or is not, 'visual' or 'IMC'. In this instance, given the good weather conditions and that 3.8nm separation existed, a better course of action might have been to provide updated TI and then to assess the Tutor pilot's response. A final point worthy of consideration is the potential for the seniority/ experience gradient to have affected the outcome of the SUP and DIR's liaison, which resulted in the turn onto S being issued; DIR was a relatively inexperienced first tourist, whilst the SUP was a multi-tourist, highly experienced controller. In that situation and cognisant that the risk of mid-air collision is a topic at the forefront of Defence aviation currently, it is unlikely that DIR would have questioned the SUP's direction. It is important to stress that this is not intended to criticise the personnel involved in what was a rapidly evolving situation, but to highlight areas that warrant further consideration in the broader ATM sphere.

Following a heading that was closing the extended CL, the King Air flew into conflict with a Tutor in the instrument pattern, causing ATC concern. The combination of an ATC issued instruction and a delay in following that instruction contributed to further reduced separation.

Recommendations:

RAF ATM Force Cmd is requested to:

Consider whether current Human Factors training for ATM personnel addresses Team Resource Management (TRM) awareness: specifically, seniority/experience gradient.

Consider, in consultation with the MAA and CAA SRG, providing guidance to RAF ATM personnel on discharging their responsibilities under MAA RA 3001 to prevent Mid-Air Collisions.

HQ AIR (TRG) comments that both ac received more information and assistance from ATC than was warranted by their choice of ATS and both also received in-cockpit indications permitting an early visual sighting and avoidance. BM SM's comments regarding King Air (A) crew's decision to extend so far to the W are valid; a switch to APP, or at least a request for information on instrument traffic, might have allowed for more coordination. Relying on ATC to go beyond the service selected by the pilot is not robust, particularly where the cockpit environment is busier than normal during simulated emergency handling. The routine use of a DS for any ATC vectored approach should also be considered. The main limitations of a DS are the requirement to obtain clearance for all heading and height changes and the perception that progress will be hampered by incessant avoidance turns. The former is not an issue as the aircraft is already under ATC vectors, and the latter is ameliorated by the 'if not sighted' caveat on avoiding action call and the extant ability for pilots to reject avoiding action against traffic where they are content that no conflict exists. Regardless of the ATSOCAS selected, pilots remain responsible for collision avoidance outside CAS.

HQ Air supports the recommendation for a review of the guidance to RAF ATM personnel.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was plainly unusual for visual cct traffic to fly as far as this away from an A/D, but it was evident from the QFI's account that the student flying King Air (A) had extended downwind well outside the MATZ because he was dealing with a simulated asymmetric recovery. The HQ Air (Trg) Member explained that the majority of sorties at this busy

training aerodrome could potentially end with a practice emergency; he emphasised the high student/instructor workload, the difficulties of mixing different ac types operating at significantly different speeds - here King Air (A) was flying at twice the Tutor's speed - that results in a complex traffic scenario at Cranwell.

Outside visual range from the A/D it was evident the ADC could provide only limited assistance to the crew of King Air (A). The ADC was understandably focused on traffic in the cct and in the immediate vicinity of the A/D but had conscientiously used the ATM to issue TI to the crew of King Air (A) about other traffic; nonetheless, he could not follow the ac continuously and was thus not aware of the conflict developing with the Tutor 10nm W of the A/D. In the Board's view, it would have been preferable if the crew of King Air (A) had been with APP or DIR at this range from the A/D, perhaps with the benefit of a radar service to assist them with their lookout responsibilities whilst mingling with the instrument pattern. Nevertheless, the ADC had been advised when King Air (A) was N of the A/D that the crew were extending downwind before joining through initial, but he had kept that information to himself and had not liaised with the ACR. Both APP and DIR needed to know that King Air (A) was extending out of the cct area to the W and it would have been wiser if the ADC had prewarned the radar controllers - as might normally be expected a controller Member previously validated at Cranwell suggested - which controller Members recognised as good practice and better teamwork.

When DIR spotted King Air (A) and issued TI to the Tutor crew he was still not aware what it was doing and the information gleaned from APP that King Air (A) was in the visual cct was not an accurate statement. Crucially, it was at this point that DIR, at the SUP's direction, instructed the Tutor crew to turn R onto S. Whilst the crew did not react promptly to this R turn - the Tutor was in King Air (A)'s 11:30 position some 3.4nm away when this instruction was issued - controller Members recognised that this R turn southerly was a poor choice and had the opposite effect to that of positioning the Tutor away from King Air (A). DIR was a relatively inexperienced controller and unlikely to question the SUP's intervention and Members noted BM SM's recommendation on this TRM issue. Whilst not wishing to stifle any controller's initiative for taking positive action to forestall a conflict, and recognising the Tutor crew was in receipt of TS where separation is not applied against other traffic, nevertheless, Members noted that the Tutor was being vectored in the radar pattern and the crew could reasonably expect not to be steered into close quarters with another ac. Many other options were available to DIR: it was suggested that a wiser choice might have been a L turn away from King Air (A) or, in the prevailing good weather conditions, as suggested by BM SM issuing further TI to the Tutor crew; however, it was the turn instruction that perpetuated the conflict with King Air (A) as it descended through the Tutor's level. The Board concluded, therefore, that this Airprox resulted because ATC vectored the Tutor into conflict with King Air (A).

After the third transmission of TI and as the Tutor's turn becomes apparent on the radar recording, the Tutor crew reported visual contact with King Air (A) over 1nm away. Although primed by the TCAS TA, the crew of King Air (A) saw the Tutor somewhat later, but the subsequent RA ensured that the crew descended clear of the Tutor before it was acquired visually. Taking all these factors into account, the Members agreed unanimously that there was no Risk of a collision in the circumstances conscientiously reported here.

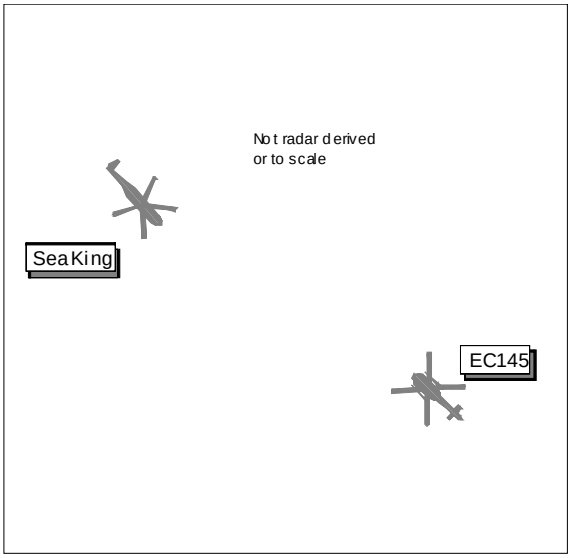
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: ATC vectored the Tutor into conflict with King Air (A).

Degree of Risk: C.

AIRPROX REPORT NO 2012071

Date/Time:	28 May 2012 0848Z	
Position:	5031N 00408W (2nm S Tavistock)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Sea King Mk4	EC145
Operator:	HQ Navy	Civ Comm
Alt/FL:	1200ft	500-800ft
	RPS (1014hPa)	(agl)
Weather:	VMC CLBC	VMC DRIZ
Visibility:	15km	5nm
Reported Separation:		
	100ft V/2-300m H	100ft V/1nm H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SEA KING PILOT reports en-route from Okehampton to Bullpoint (Plymouth Naval Base), VFR and in receipt of a BS from London Information on 124·75MHz, squawking 1177 (Lon Info conspicuity code) with Modes S and C. The visibility 15km flying 200ft below cloud in VMC and the ac was coloured green with nav and HISLs switched on. About 3nm NW of Yelverton, cruising at 1200ft RPS 1014hPa heading 160° at 60kt, the aircrewman advised him of an ac, a blue and yellow coloured helicopter, in their 9 o'clock range 200-300m away flying in the opposite direction and 100ft below. Neither pilot had seen the helicopter until it had passed abeam so no avoiding action was taken and they had not heard its crew transmit on the frequency. They reported the Airprox to London Information later after deplaning troops and completed the CA1094 on return to Sqn.

THE EC145 PILOT reports flying a local sortie from a private site near Exeter, VFR and in communication with Plymouth Mil on 121·25MHz, squawking 0032 with Modes S and C; TAS was fitted. The visibility was 5nm flying in haze/drizzle VMC about 300ft below cloud and the helicopter was coloured blue/yellow with HISL and nav lights switched on. One observer was seated in the front LH seat while the other was seated behind him on the starboard side. Whilst in transit to St Ives over Dartmoor the Wx deteriorated, as expected, with a lowering cloudbase and reducing visibility, which necessitated flying between 500-800ft agl to maintain VMC. Heading 270° at 120kt, ATC reported helicopter traffic in the area so he included his TAS in his scan and noted an ac ahead and he warned his 2 observers. As they descended over the W edge of Dartmoor he saw the Wx was significantly worse over the rising ground ahead but it was clearer to the N so he started a R turn towards Launceston. As he did so he saw a Sea King flying low-level and slightly lower than him in his 11 o'clock about 1·5nm ahead and travelling from R to L in a RH turn onto a SE'ly heading towards Plymouth. There was no risk of collision and although they were obviously turning away from each other and had vertical separation, he continued his RH turn through a further 30° to open the range and continue en-route to Launceston on a heading to 300°. He estimated the ac passed about 1nm port to port on a diverging track with his helicopter 100-200ft above. From first sighting until they passed he was confident there was no risk of collision and he kept the Sea King visual throughout. It was seen to continue its R turn briefly and then roll out heading towards Plymouth. They were not close enough to see the ac registration or other markings but he recognised it as a RN Sea King Mk4. His TAS displayed a contact throughout but he did not recall a traffic warning which would have indicated it was closer than 1nm. He did not consider the encounter as an Airprox so he did not report it but he told ATC that he was visual with, and clear of, the Sea King. Although situationally aware, thanks to ATC and TAS, he considered his relatively late sighting of the Sea King was a function of these factors: - a) both flights were operating in VMC at relatively low-level in quite poor Wx conditions and, b) as he descended his helicopter would have been sky-lined but he was looking down into a valley at a green camouflaged helicopter against a green backdrop of trees and rising ground. This incident has reinforced his view that a TAS is of enormous flight-safety value and should be fitted to military helicopters.

AIRPROX REPORT No 2012071

THE LONDON INFORMATION FISO reports moderate to busy traffic levels when he had to delay accepting the Airprox information by 40min. The Sea King crew reported a blue and yellow helicopter pass on their LHS at a distance of approximately 200m.

ATSI reports that the Airprox was reported by the pilot of a Sea King helicopter when it came into proximity with an EC145 in the vicinity of Yelverton at approximately 1200ft altitude.

The Sea King was operating VFR and was in receipt of a BS from London Information on 124·750MHz. The EC145 was operating VFR and may have been in contact with Plymouth Mil.

London Information is a non-surveillance based service and in accordance with notified procedures, ac in receipt of a BS from London Information may be requested to squawk SSR code 1177.

ATSI had access to both pilots' reports, London Information FISO report, recorded area surveillance and recording of frequency 124·750MHz.

Meteorological reports for Exeter between 0820Z and 0920Z included: '9999 FEW030'. Whereas, the meteorological report for Newquay over the same period included: '9999 BKN006' increasing to 'BKN007'. The Wessex RPS was 1014hPa.

The Sea King departed Okehampton at 0835UTC, climbed to altitude 1500ft and flew S towards Plymouth. The Sea King was squawking Mode A code 1177. The SSR code had been assigned by London Information when the Sea King last called London Information (at time 0809Z). The next call to London Information made by the Sea King was at 0848:53. As the Sea King departed Okehampton the EC145 was flying W'bound, away from Exeter, and was squawking a Mode A code appropriate to its task. Both flights were operating in Class G uncontrolled airspace.

The surveillance replay shows that the Sea King descended to 1300ft as it continued towards Plymouth and the EC145, continuing W'bound, maintained 1500ft until, at 0842:30, it descended out of surveillance coverage. The EC145 pilot reported that meteorological conditions deteriorated as the ac approached Plymouth.

At 0848:05 the Sea King was N of Plymouth, on a SE'ly track, W of Yelverton at altitude 1100ft. The EC145's position indication symbol then appeared behind the Sea King at altitude 900ft and tracked NW'ly.

At 0848:53 the Sea King crew called London Information reporting 5nm from Plymouth and changing frequency to Plymouth Mil. The Sea King flight was instructed to squawk 7000.

ATSI reviewed the London Information frequency between 0800Z and 0848Z. There was no call to London Information by the EC145 during this period. The Sea King flight recalled London Information at 0909:28 and, once the pilot had passed his intentions, he reported that he would like to file an Airprox.

The Airprox occurred in Class G uncontrolled airspace where responsibility for collision avoidance rests solely with the pilots of the ac involved. Meteorological conditions necessitated both flights to be operating at reasonably low levels. The Sea King flight was in receipt of a BS (non-surveillance) from London Information and London Information was unaware of the presence of the EC145 in the vicinity of Plymouth.

KAB Note (1): The Plymouth Mil transcript at 0847Z shows the Plymouth Mil controller transmitting, *"(EC145 c/s) traffic believed to be you has traffic north-west one and half miles tracking south-east indicating similar altitude".* The EC145 pilot replied, *"(EC145 c/s) pretty sure it's a Sea King I think a Navy one and I'll be passing to his stern".*

HQ NAVY comments that although the EC145 was only receiving a BS from Plymouth Mil, the controller passed a timely and accurate traffic warning on the conflicting traffic thereby assisting the EC145 to attain visual contact on the Sea King. An ATS was available to both flights from Plymouth Mil LARS; indeed the Sea King flight called them for a BS approximately 1min after the Airprox, for its transit to Bull Point.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, and reports from the appropriate ATC and operating authorities.

Members could not resolve the disparate separate distances reported by both crews. The EC145 pilot was given a traffic warning by Plymouth Mil and noted the Sea King on TAS before visually acquiring it as it was turning R towards the SE about 1·5nm away in his 11 o'clock as he turned R towards better Wx to the N. He turned further R to increase separation, estimating it passed 1nm to his L and 100-200ft below. Given the reported Wx in the area and the geometry described, Members thought the EC145 pilot had seen the Sea King as soon as reasonably possible and taken positive action to ensure that the ac were not going to collide. The Sea King crew, without the benefit of enhanced SA from surveillance based information (ATC or TCAS) only saw the EC145 as it passed down their LHS, they thought by 200-300m and 100ft below. It was unfortunate that as the ac passed both flights were on different frequencies, for had the Sea King crew called Plymouth Mil earlier they would have been aware of the EC145's presence from the RT exchanges that took place immediately prior to the Airprox. Military Members opined that military aircrew were usually comfortable with closer separation distances but it appeared the Sea King crew were surprised by the EC145's passage. In determining the Cause, the Board were left to consider 2 alternatives. If the Sea King crew's estimate of the separation distance was accurate then they should have seen the EC145 before it passed down their port side: effectively a non-sighting by the Sea King crew. Conversely if the EC145 pilot's estimate of the separation rage was accurate, it was not unreasonable, given the geometry and wx conditions, that the Sea King crew did not see the EC145 until it was passing 1nm away. On balance, the Board elected to classify the incident as a conflict in Class G airspace where the actions taken by the EC145 pilot had removed any risk of collision.

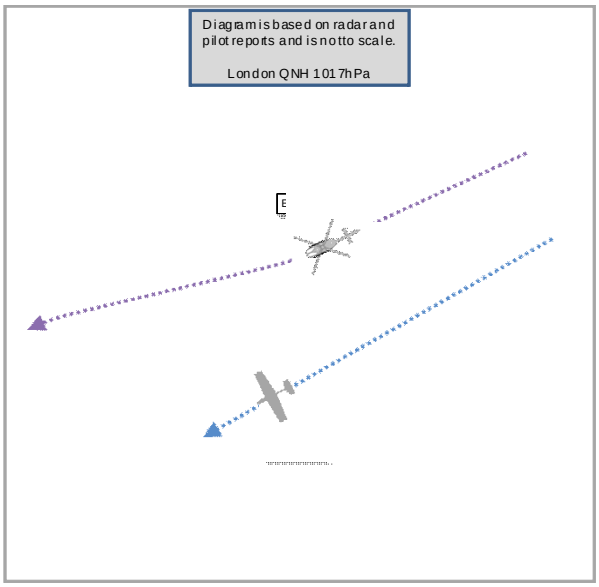
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the EC145 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012072

Date/Time:	27 May 2012 1443Z (Sunday)	
Position:	5012N 00515W	(Near Redruth)
Airspace:	Culdrose AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	CFM Shadow D	EC145
Operator:	Civ Pte	Civ Pol
Alt/FL:	1900ft	2000ft
	NK	NK
Weather:	VMC CLBC	VMC CLBC
Visibility:	>20nm	8nm in Haze
Reported Separation:		
	50ft V/100ft H	500ft V/0.5nm H
Recorded Separation:		
	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SHADOW D MICROLIGHT PILOT reports flying a VFR private local flight in a red microlight, with top and bottom strobes 'on'. A SSR transponder was not fitted but he was in receipt of a BS from Newquay LARS [133.400MHz]. While heading 240°, level at 1900ft [Newquay QNH 1019hPa] at 75kt a police helicopter passed him on the R side with a separation assessed as 100ft H and 50ft V. Although the police helicopter passed on the correct side, the close proximity gave the M/light pilot concern. He informed Newquay LARS that he was visual with the police helicopter that had just passed very close. Newquay informed him that the police helicopter had not called them despite crossing the extended centre line for RW30 [UKAB Note (1): Radar replay shows the police helicopter crossed the RW30 extended C/L at a range of 8nm]. Newquay LARS attempted to establish R/T communication with the helicopter on 2 occasions, but received no response to their calls. The Newquay Controller invited him to call on the land line on return to his home A/D if he wished, which he did.

He assessed the risk as High.

[UKAB Note(2): The CFM Shadow D is a microlight in the single engine 'pusher' configuration with a MTOW of 386kg, as shown below:

THE EC145 PILOT reports transiting to an urgent police task with a crew of 2 police observers, one in the front L seat and one in the seat behind the pilot on the R side. HISL and navigation lights were selected 'on' as was the SSR transponder, in modes 3A/C and S. He was receiving a BS from Newquay or he may have changed to London Info but no traffic had been reported in the area. While heading approximately 245°, level at '... 2000ft on the RPS in VMC but hazy conditions made more difficult looking in to sun ...' at 120kt, the police observer in the R rear seat

called visual with a small ac at close range in the 10 o'clock position and slightly below. The pilot concentrated his scan in that area and almost immediately saw a very small high wing microlight ac about 30° L of the nose, tail on with a similar heading, approximately 1.5nm ahead and 200ft below. He made a small alteration of course to the R and climbed slightly, maintaining visual contact to ensure safe separation as they overtook at about 40kts on the R side. He estimated they passed 0.5nm [laterally] and about 500ft above on a slightly diverging track and reported he didn't alter course again until well past.

He assessed there was no risk of collision and did not consider the incident an Airprox.

ATSI reports that an Airprox was reported to have occurred 17nm SSW of Newquay Airport in Class G Airspace between a microlight and helicopter. The times in the written reports of both pilots differed by one hr; the microlight pilot reported 1545 UTC and the helicopter pilot 1645 UTC. From the available RTF and radar replays, CAA ATSI determined that the Airprox occurred at 1443 UTC.

[UKAB Note(3): Discussion with the helicopter operations centre established that the helicopter took off at 1500L and landed at 1645L, thereby supporting the ATSI contention that the Airprox took place at 1443 UTC].

The CFM Shadow D was being operating VFR on a local flight from Roche airfield situated 7nm E of Newquay Airport and in receipt of a BS from Newquay Radar. The EC145 was operating VFR from a private site at Middlemoor near Exeter. It was established that the EC145 pilot was in receipt of a BS from London Information.

CAA ATSI had access to RTF recordings for Newquay Radar, London Information and NATS Area Radar, together with written reports from the two pilots and the ATSU. Due to the limited radar coverage in the area only the EC145 was showing on radar.

The weather for Newquay and Exeter was reported as follows:

METAR EGHQ 271420Z 22005KT 150V260 9999 FEW016 15/11 Q1019=

METAR EGTE 271420Z 31008KT 270V330 9999 FEW030 20/14 Q1018=

[UKAB Note(4): The weather for Culdrose was reported as follows:

METAR EGDR 271450Z 16007KT 9999 HZ FEW018 BKN220 17/13 Q1018 BLU]

At 1408:55, the M/light pilot reported departing from Roche airfield. He requested a BS at not above 1500ft, later changed to not above 2000ft. At 1411:33, the EC145 pilot contacted London Information and reported departing from Exeter westbound to operate in the Penzance area, routeing across Dartmoor at an altitude of 2500ft on 1018hPa, and requesting a BS with a squawk of 0032. London Information agreed a BS and passed the RPSs for Wessex [1013hPa] and Scillies [1009hPa], which were correctly acknowledged.

At 1436:28, the Newquay radar controller observed the EC145 showing on radar and noted that the pilot had not called Newquay as was his usual practice when in the area. At 1438:40, radar recording showed the EC145 positioned 11.3nm SSW of Newquay Airport indicating alt 2500ft [derived from radar QNH 1017hPa]. At 1442:27, the EC145 is shown 1.6nm from the reported Airprox position, tracking SW and still indicating alt 2500ft. The EC145's track and level remain constant and shortly afterwards the helicopter is shown passing 0.3nm north of the reported Airprox position. RTF replay showed that no call was made to or from the pilot regarding the Microlight.

At 1443:03 the Microlight pilot advised Newquay radar that he was visual with the EC145 helicopter passing on his R side. The Newquay radar controller replied that the helicopter looked as though it was routeing to Penzance or St Ives. At 1443:10, having established the callsign of the EC145, the Newquay radar controller made a blind transmission to the EC145, with no response.

At 1447:55, the EC145 pilot advised London Information that he was 'on task' at Penzance. At 1504:20, the Microlight pilot reported descending towards Roche and agreed to phone when on the ground regarding the EC145.

The EC145 was in receipt of a BS from London Information without the aid of surveillance equipment. The Microlight was not on the frequency and would have been unknown to the FISO and EC145 pilot. The Microlight was in receipt of a BS from Newquay Radar. The ATSU indicated that the Microlight was not visible on radar for 10mins prior to and after the reported Airprox. Therefore, although the EC145 was visible on the Newquay radar, it would not have been obvious to the controller that there was any confliction. The Newquay controller was surprised that the EC145 had not called as was his usual practice when operating in that area.

CAP774, UK Flight Information Services, Chapter 2, Page 1, Paragraphs 1, 3 and 5, state:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.'

'Basic Service is available under IFR or VFR and in any meteorological conditions.'

Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ), and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot's situational awareness. This will not normally be updated by the controller/FISO unless the situation has changed markedly, or the pilot requests an update. A controller with access to surveillance-derived information shall avoid the routine provision of traffic information on specific aircraft, and a pilot who considers that he requires such a regular flow of specific traffic information shall request a Traffic Service. However, if a controller/ FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

CAP774, UK Flight Information Services, Chapter 1, Page 1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

The Airprox occurred in Class G airspace when the Shadow Microlight pilot became concerned about the relative position and proximity of the EC145, which, having sighted the Microlight 1.5nm ahead, altered course to overtake it by passing to the R and above.

Under a BS, pilots are ultimately responsible for collision avoidance and it was not possible for either Newquay Radar or London Information to provide any warning to their respective aircraft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Members noted that the EC145 pilot did not communicate with the Newquay controller whilst transiting in proximity to the A/D and that more situational awareness would have been gained by the use of a LARS service from Newquay. This in turn could have aided the EC145 pilot by, for example, increasing his cruise altitude to pre-empt deconfliction based on knowledge of the microlight pilot's planned cruising altitude.

Members noted the Shadow and EC145 pilots' disparate estimates of the minimum separation between the ac. In the absence of recorded radar data, Members considered that the actual separation was probably somewhere between the 2 estimates. Since the EC145 crew saw the microlight in challenging conditions and EC145 pilot was visual with the Shadow and always in a position to turn away to increase the separation if necessary, the Board was satisfied that there was no risk of a collision. Nevertheless the Shadow pilot had been concerned and the Civ helo member opined that this Airprox reinforces the need for a wide berth between helicopters and microlights, not least due to the impact of helo rotor downwash on their relatively fragile structures.

PART C: ASSESSMENT OF CAUSE AND RISK

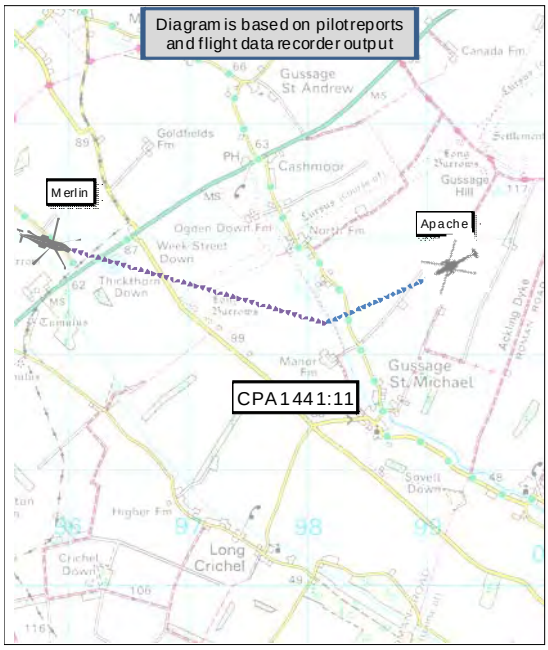
Cause: The Shadow microlight pilot was concerned by the proximity of the overtaking EC145.

Degree of Risk: C.

AIRPROX REPORT No 2012073

AIRPROX REPORT NO 2012073

Date/Time:	31 May 2012 1442Z	
Position:	5054N 00202W	(10nm SW Salisbury)
Airspace:	Lon FIR-LFA2	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Apache	Merlin
Operator:	HQ JHC	HQ JHC
Alt/FL:	75ft	100ft
	RPS (1014hPa)	RPS (1016hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	30km	10km
Reported Separation:		
	25m	0ft V/60ft H
Recorded Separation:		
	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE APACHE PILOT reports conducting a daytime route reconnaissance for a planned subsequent Night Vision System (NVS) sortie, operating under VFR and heading 280° at 50kts at a height of approximately 75ft agl. The dark green ac had landing lamp and white strobes selected on and was squawking with Modes 3A, C and S. The Co-pilot/Gunner (CPG) [sitting in the front seat] saw a camouflaged helicopter in his 1 to 2 o'clock position at a range of less than 200m on a collision course. He called 'Aircraft, Pull up' and at the same time pulled back on the cyclic. The other ac passed underneath and down the LH side. During the avoiding action the ac Flight Control System (FCS) degraded to a reversionary mode in roll, caused by the mismatched control inputs from the front and rear-seat pilots. During the return flight to base it was noticed that the engines had suffered a dual over-torque.

The pilot assessed the risk of collision as 'Very High'.

THE MERLIN PILOT reports conducting a low-level transit as part of a training sortie. He was operating under VFR in a green ac with navigation lights, two landing lights and white upper and lower strobes on. After departure from Blandford Forum HLS, heading 110° at 120kts and 100ft agl, the RHS pilot looked inside the cockpit in order to select the Middle Wallop APP frequency, to obtain a BS for the transit. The LHS pilot was the HP at the time and was looking out. The centre seat 'Nav' was also assisting in look out, but with a limited field of view due to the jump seat position. As part of the training the number one crewman (front) was conducting the navigation, biasing his lookout forward. The two remaining crewman were on opposite sides of the cabin, with the rear crewman biasing his lookout to the R due to the RHS pilot being 'heads-in'. When the LHS pilot looked L, as part of his lookout scan, he was confronted with an Apache helicopter, in an extremely high nose up attitude at the same level and at a range of approximately 60ft. The centre seat Nav saw the Apache at the same time, which appeared to have been masked by the windscreen coaming until the last moment. There was insufficient time for avoiding action to be taken.

The pilot assessed the risk of collision as 'Very High'.

THE APACHE SQN FSO stated that mission planning system data, tapes and maps had been quarantined for further investigation.

THE MERLIN SQN COMMANDER commented that it was extremely fortunate that the avoiding action of the Apache crew had prevented a much worse outcome and that maps, authorising sheets and data recordings had been quarantined to facilitate a hoped for HQ JHC investigation. He also opined that an ACAS would have been likely to have prevented this occurrence and that, frustratingly, this mark of Merlin was delivered to the RAF with TCAS fitted but that the system was removed due to its being unsupported. He concluded by strongly recommending that a TCAS system is procured as a matter of urgency, given that mid-air collision is one of Commander JHC's top risks.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, reports from the appropriate operating authorities and a computer-generated reconstruction of the ac flight paths, including cockpit voice recording. Radar video recordings were available but the ac contacts were below the base of recorded radar coverage.

The voice recordings accompanying the computer-generated reconstruction revealed that both crews were undertaking tasks that involved some 'heads-in' time. Therefore Board Members initially discussed the CRM in both ac, especially the amount and allocation of lookout, given the task each crew was undertaking. The AAC Member explained that the Apache crew's task was to reconnoitre by day a planned night-flying route in order to ensure that digital information stored by the ac's systems on potential vertical obstructions, such as pylons, aligned with real world information and to annotate positions where unmapped obstructions existed. The aim was to enable the night route to be flown at reduced risk. The JHC Member explained that the Merlin crew were attempting to contact Middle Wallop to obtain a BS but that the subject version of Merlin is fitted with a communication control system designed such that frequency changes can take up to 16 seconds. He reiterated that the RHS pilot was 'heads-in' completing that task, but he also opined that, given the number of crew in the Merlin, their lookout was not effective as a result of inefficient CRM. Overall, the Board considered that CRM was a factor on both cockpits.

The helicopter Member raised the issue of route coordination between the helicopters prior to their sorties. The AAC Member replied that there was no coordination; the Apache was within a Dedicated User Area (DUA) and the computerised deconfliction system (CADS) is not mandated for day sorties. He also opined that the issue of coordination would be examined by the JHC investigation, the results of which would be available shortly.

Recalling a previous Airprox between military helicopters and a formal Safety Recommendation to fit ACAS [Airprox 2011/006 dated 24th January 2011], Members considered that this incident could have been avoided if the ac had been fitted with ACAS. A civilian pilot Member informed the Board that FLARM (Flight Alarm), commonly fitted to gliders, is an inexpensive and relatively easy-to-fit option that has proved effective in helicopters in Europe. Members agreed that Director UKAB should write to HQ JHC to highlight this incident, lending weight to the requirement to fit ACAS.

The Board was unanimous in its determination of the cause. Assessment of the degree of risk was greatly assisted by the computer generated flight path reconstruction and cockpit voice recording. After playback of the reconstruction, it was readily apparent that the ac avoided collision by the narrowest of margins and that the actions of the Apache crew were instrumental in achieving separation. The Board commended the Apache crew on their life-saving manoeuvre.

[UKAB Post-meeting Note: A JHC Investigation concluded that the minimum ac separation was likely to have been 48ft.]

PART C: ASSESSMENT OF CAUSE AND RISK

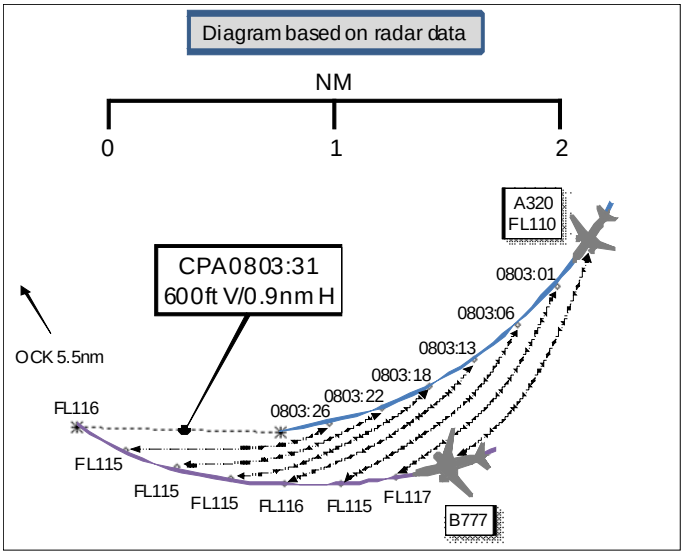
Cause: A late sighting by the Apache crew and effectively a non-sighting by the Merlin crew.

Degree of Risk: A.

AIRPROX REPORT No 2012075

AIRPROX REPORT NO 2012075

Date/Time:	2 June 2012 0804Z	(Saturday)
Position:	5114N 00021W	(OCK HOLD)
Airspace:	Lon TMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B777	A320
Operator:	CAT	CAT
Alt/FL:	FL120↓	NR
	(SPS 1013 hPa)	(SPS 1013 hPa)
Weather:	VMC NR	VMC NR
Visibility:	NR	>20km
Reported Separation:		
	500ft V/0.5nm H	>700ft V/ 1nm-1.5nm H
Recorded Separation:		
	600ft V/0.9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B777 PILOT reports turning R in the Ockham (OCK) hold at FL120, operating under IFR and in contact with London Heathrow (LHR) APP. The SSR transponder was selected on with Modes 3/A, C and S. The B777 pilot's C/S was [C/S A]; however, he (PNF) read back a descent clearance addressed to a B747 [C/S B], using that ac's C/S. The PF commenced descent. The ATC controller repeated the instruction for the B747 [C/S B] and the B777 pilot [C/S A] again read back the clearance using the B747's C/S. A TCAS TA occurred, whereupon he realised his mistake and the ac was climbed back to FL120.

He noted that he and the crew of the B747 [C/S B] had been on the same frequency since leaving the Moncton FIR. He had been aware of the possibility of callsign confusion for some time and had briefed his FO accordingly. He also noted that he had flown the B747's route, using [C/S B], on his previous flight.

He assessed that the risk of collision was 'Medium'.

THE A320 PILOT reports holding at OCK, operating under IFR with a RCS from LHR APP. [UKAB Note(1): This ac was not the ac with C/S B]. The navigation lights and HISLs were selected on, as was the SSR transponder, with Modes 3/A, C and S. Whilst in the hold he received a TCAS TA warning. He saw a B777 [the subject B777, C/S A] in his 12 o'clock position at approximately 1nm to 1.5nm range and 1000ft above. The TCAS display showed the ac slowly descend to approximately 700ft above him. No TCAS RA was displayed and Heathrow APP advised B777 [C/S A] to climb back up to a FL that he could not recall.

He assessed that there had been no risk of collision.

THE LTC RADAR CONTROLLER reports operating as Heathrow Intermediate (INT) Director South. He instructed B747 [C/S B] to descend to FL80 to which there was a garbled response. He first suspected that another ac, [C/S C], had also taken the call. He stated "*That call was for* [C/S B]. *Who else responded?*" There was no reply so he repeated "[C/S B] *descend FL80*".

The response was again garbled. He checked the Mode S of [C/S B] and [C/S C] whereupon his attention was drawn by STCA activation as the B777 [C/S A] commenced a descent from FL120. He realised that the crew of B777 [C/S A] had taken the descent call addressed to B747 [C/S B], instructed them to stop descent, to climb to FL120 and also issued TI. He then instructed the A320 to descend to FL100 and passed TI. The A320 pilot reported that he was visual [with the subject B777, C/S A] and that he did not have a TCAS RA. The controller confirmed his clearance again as FL100.

ATSI reports that an Airprox occurred at 0803:31 UTC, in the OCK hold, in the London TMA, between a Boeing 777 (B777 [C/S A]) and an Airbus A320 (A320). The B777 was operating IFR on a flight from N America to LHR. The A320 was operating IFR on a flight from Europe to LHR.

Concurrently, a Boeing B747 [C/S B] and another B777 [C/S C] were operating IFR on flights from N America to LHR.

All 4 ac were in receipt of a RCS from London TC, Heathrow INT South [134.975MHz]. B777 [C/S A], B777 [C/S C] and B747 [C/S B] all had similar trip numbers. Additionally, B777 [C/S A] and B747 [C/S B] had similar C/S.

CAA ATSI had access to recordings of RTF from LTC and area radar recordings together with written reports from the pilot of B777 [C/S A] and the radar controller.

At 0750:40 the B777 [C/S C] contacted Heathrow INT South, level at FL90, and was instructed to hold at Ockham with an expected delay of 10 minutes.

At 0751:00 the B747 [C/S B] contacted Heathrow INT South, level at FL100, and was instructed to hold at Ockham with an expected delay of 10 minutes.

At 0753:40 the A320 contacted Heathrow INT South, at FL110, and was instructed to hold at Ockham with an expected delay of 15 minutes.

At 0800:00 the B777 [C/S A] contacted Heathrow INT South, at FL120, and was instructed to hold at Ockham with an expected delay of 15 minutes.

At 0800:20 the B747 [C/S B] was instructed to return to Ockham and then leave Ockham heading 280°.

At 0802:20 B747 [C/S B] was instructed to descend to FL80. There was a garbled response. The controller's report stated that his initial reaction was that B777 [C/S C] had taken the call. The controller transmitted, "*that's two at once there that was for the* [C/S B] *who was the other station".* There was no response and the controller transmitted, "[C/S B] *just confirm flight level eight zero".* Again the response was blocked before one of the ac transmitted, "*sorry that's my fault start again".*

At 0802:40 the controller re-iterated the instruction to B747 [C/S B] to descend to FL80 which was read back correctly by the pilot of B747 [C/S B].

The controller's report stated that he checked the Mode S selected flight level of B777 [C/S C] and B747 [C/S B] to confirm that they were correct.

At 0802:55 STCA was activated due to B777 [C/S A] in the hold at Ockham descending from FL120 to FL80 while A320 was at FL110, 1.4nm behind B777 [C/S A].

The controller instructed B777 [C/S A] to climb to FL120 and acknowledge. The B777 [C/S A] pilot acknowledged the instruction to climb to FL120. The controller reiterated the instruction to climb to FL120 and gave traffic information on the A320, stating it was 2nm behind B777 [C/S A] before transmitting, "*break, break"* and instructing the A320 to descend to FL100 and giving traffic information on B777 [C/S A]. The A320 pilot informed the controller that he was visual with B777 [C/S A] and had it on TCAS but had no RA.

At 0803:31 (CPA) B777 [C/S A] was climbing through FL116 to FL120 and the A320 was at FL110; the lateral distance between the two ac was 0.9nm

At 0804:40 B777 [C/S A] contacted the Heathrow INT controller and advised, "*I am very sorry about that just to be clear we both heard what we wanted to hear so it's entirely our error but no TCAS RA from us but I will be filing".*

In summary, the controller instructed B747 [C/S B] to descend to FL80. The crew of B777 [C/S A] took the instruction to descend to FL80 at the same time as the crew of B747 [C/S B]. The controller was aware of the potential that another ac had taken the call due to the blocked transmission during the read-back from B747 [C/S B] but did not know which other ac until STCA activated. Once it became evident that B777 [C/S A] had taken the

call the controller took steps to resolve the situation. Although the term “avoiding action” was not used, the action taken was prompt, effective and resolved the situation quickly.

CAP493 the Manual of Air Traffic Services, Section 8, Chapter 2, Page 3, Paragraph 5.2 states:

‘Human Factors experts describe slips in the following terms: The intention is correct but is not carried out as planned, e.g. callsign confusion or a Freudian slip, like unintentionally clearing an aircraft to an occupied level because that level is on the controller's mind. These are hard to correct, but are likely to be one-off instances.’

It is likely that, despite the increased vigilance by the crew, the awareness of the possibility of callsign confusion led to the other callsign being on the crew’s mind.

The Airprox occurred in Class A airspace in the vicinity of the OCK hold when the crew of B777 [C/S A] took an instruction meant for a B747 [C/S B] with a similar callsign and flew into conflict with an A320.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The civilian pilot Board Members were of the opinion that this incident was probably due to a combination of well-understood human factors. An airline pilot Member advised the Board that a sequence of schedules involving overnight eastbound trans-Atlantic flights and morning arrivals into Heathrow could be very tiring and crews were required to guard against low arousal levels. Ironically, it may have been the Captain’s briefing on potential C/S confusion that highlighted the other ac’s C/S, leading the crew to ‘hear what they wanted to hear’ and react accordingly. Although the Board Members agreed on the insidious nature of this incident, they were also of the opinion that the descent clearance from C/S A’s level in the OCK holding stack directly to the bottom could reasonably have been expected to alert the crew of [C/S A] to their error.

The civilian ATC Board Members questioned whether the issue of similar C/Ss was addressed at a company level and that to do so would reduce risk, not least in the busy TMA environment. The SRG Advisor stated that work was underway within EASA to address this issue.

The Board Members were unanimous in their endorsement of the LTC Radar Controller’s handling of the incident.

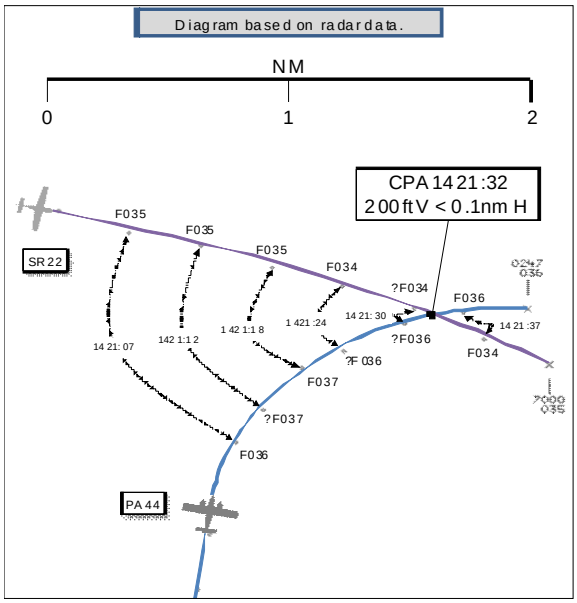
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The B777 crew actioned an ATC instruction intended for another aircraft and descended into conflict with the A320.

Degree of Risk: C.

AIRPROX REPORT NO 2012076

Date/Time:	9 Jun 2012 1422Z (Saturday)	
Position:	5211N 00033W	(CIT NDB(L) Hold)
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA44	SR22
Operator:	Civ Trg	Civ Pte
Alt/FL:	3500ft	3300ft
	QNH (1009hPa)	(NR)
Weather:	VMC CAVOK	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:		
	100ft V/0nm H	200ft V/0.5nm H
Recorded Separation:		
	200ft V/< 0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA44 PILOT reports instructing on an IF training sortie with the 'IFR screens' fitted. He was sitting in the RH seat, with the student in the LH seat, operating under IFR with a PS from Cranfield APP [122.850MHz]. The ac was white in colour with a prominent blue fuselage stripe and with strobes and landing light selected on. The SSR transponder was selected on with a local conspicuity squawk and Modes 3/A, C and S. TCAS was not fitted. When entering the RH base turn for the Cranfield CIT NDB(L) hold, heading 060° at 120kts and level at altitude 3500ft [QNH 1009hPa], he saw a low-wing single engine piston ac appear from below his R engine, which he identified as a Cirrus [the subject SR22]. He did not see the conflicting ac in time to take avoiding action and noted that the other ac did not appear to take avoiding action either. He observed that he could not imagine how the other ac did not see him.

He also expressed the view that far too many ac fly through the Cranfield IAP/holding area without talking to Cranfield. He felt that it was only a matter of time until there was a serious accident.

He assessed the risk of collision as 'High'.

THE SR22 PILOT reports transiting from Coventry Airport to Stapleford Airport, heading 120° at 155kts and altitude 3300ft [altimeter setting reported as London QNH (1011hPa) at 1423], in a white ac with yellow, grey and silver stripes. The wing tip strobes were selected on, as was the SSR transponder with Modes 3/A, C and S. The ac was fitted with TCAS. He was the PIC in the LHS and his 'co-owner and pilot' was in the RHS. In the rear seat was an RAF WW2 aircrew veteran. He was listening out on Sywell Information [122.700MHz] having passed to the S of Sywell. He was about to change to Farnborough Radar [132.800MHz] to obtain a BS for the transit to Stapleford when he noticed a TCAS indication of an ac in their 2 o'clock at about 5nm and at a similar altitude. Shortly thereafter, both he and the co-pilot became visual with a low wing twin-engine ac, wings level on a converging track and in what appeared to be a shallow climb. Although he did not consider the other ac to be on a conflicting course, he descended about 100ft to increase separation in case it changed altitude and/or course. As the twin approached his O/H it commenced a R turn passing above and behind him, levelling out 200-300ft above and in his 7o'clock on a parallel ESE course at a range of between 0.5nm and 1nm. He rocked the ac's wings to indicate he was visual with the twin but saw no reciprocal action. He thought that, given the other ac type and location, it may have been conducting IF training 'out of Cranfield'. He therefore assumed that the pilot might have been operating with IFR screens fitted, leaving only the instructor/examiner to conduct visual lookout.

He assessed that there was no risk of collision as he was in visual contact with horizontal and vertical separation.

AIRPROX REPORT No 2012076

THE CRANFIELD CONTROLLER reports that the subject PA44 was in the base turn of the CIT hold when the pilot reported an Airprox with a Cirrus. He had no Cirrus traffic on frequency and asked the PA44 pilot if the traffic was routing E or W. The pilot responded E. He called the Luton Radar Controller and asked if he had any Cirrus traffic 'that may have just flown through [the CIT] hold'. The Controller passed details of the subject SR22, at that time approximately 5nm E of the CIT beacon and on frequency with Farnborough LARS(N).

ATSI reports that the AIRPROX occurred at 1421:32 UTC, 7.6nm NNE of Cranfield Airport, within Class G airspace, between a Piper PA-44-180 (PA44) and a Cirrus SR-22 (SR22). The PA44 was operating on a local IFR training flight and was returning to Cranfield Airport on transfer from East Midlands, in receipt of a PS from Cranfield APP [122.850MHz]. The SR22 was operating VFR on a flight from Coventry Airport to Stapleford Airport and was not in receipt of an ATS. The SR22 pilot's written statement indicated that he had been listening out on Sywell Information (AFIS) and was changing to Farnborough LARS(N) [132.800MHz]. This frequency change occurred after the AIRPROX.

The Cranfield controller was providing a combined Aerodrome and Approach Control Service without the aid of surveillance equipment. Radar is not available at Cranfield.

CAA ATSI had access to RTF recordings of Cranfield APP and Farnborough LARS(N), area radar recordings, written reports from both pilots and a written report from the Cranfield APP controller.

The weather for Cranfield was reported as follows:

METAR EGTC 091350Z 27016KT 9999 SCT040 16/09 Q1009=

METAR EGTC 091450Z 27010KT 9999 SCT040 16/09 Q1009=

At 1400:51 the PA44 pilot was 14.7nm NE of the CIT and contacted Cranfield APP, reporting inbound to the CIT (NDB) at altitude 5000ft, with an estimated arrival time of 1408. The controller instructed him to descend to altitude 4500ft, and to squawk the Cranfield IFR conspicuity squawk of 0247. This was correctly acknowledged by the PA44 pilot. The PA44 pilot confirmed a training requirement for one hold and an ILS to circling approach to land. The controller reported RW21 in use and passed the 1350 Cranfield weather. The PA44 was to be number two in the traffic sequence following a PA28 already established in the hold at altitude 3500ft.

At 1419:18, the PA44 pilot reported beacon outbound and the controller responded, "[PA44 C/S] *once more round the hold report next time beacon outbound*." Radar recording showed the SR22, 8.1NM NW of the CIT, at an indicated altitude of 3400ft. The PA44 pilot was then instructed to descend to altitude 3500ft.

At 1420:18, the PA44 was shown outbound abeam the CIT(NDB), tracking NE and passing altitude 4000ft in the descent, with the SR22 in the PA44 pilot's 10 o'clock at a range of 3.9nm and tracking ESE.

At 1420:46, radar recording shows the PA44 at altitude 3500ft, approaching the end of the outbound leg in the holding pattern on a NE track. The SR22 was indicating altitude 3400ft, in the PA44 pilot's 10 o'clock position, at a range of 2.4nm and converging.

At 1421:01, the distance between the two ac was 1.4nm and at 1421:13 was 0.8nm with the PA44 at 3500ft and the SR22 at 3400ft. The PA44 pilot then commenced a right turn.

At 1421:24, the distance between the two ac was 0.3nm, with the SR22 indicating 3300ft and the PA44 3500ft. The two ac are shown to maintain their respective levels as they continue to converge, crossing tracks at 1421:32 (CPA). The SR22 pilot continued on a SE track and the PA44 pilot continued in the R turn, passing 0.5nm behind the SR22 as he completed the base turn of the procedure.

At 1422:24, the PA44 pilot reported, "*er* [PA44 C/S] *we're in the base turn to the hold er had a AIRPROX with a Cirrus ????? ?????*." The controller replied, "[PA44 C/S] r*oger I'm not talking to any Cirrus at the moment*." The PA44 pilot responded, "*Roger thanks I hope he's maintaining a listening watch at least*." At 1422:47, the controller made a blind transmission to any Cirrus aircraft on the frequency. The PA44 pilot reported that the Cirrus was eastbound at 3500ft.

At 1423:01, the SR22 contacted Farnborough LARS(N) reporting en-route from Coventry to Stapleford, overhead Sandy at altitude 3500ft on the London QNH 1011.

The PA44 was operating under IFR and in receipt of a PS. The SR22 was unknown traffic, which was not in receipt of an ATS. CAP774 UK Flight Information Services, Chapter 4, Page 5, states:

A Procedural Service is an ATS where, in addition to the provisions of a Basic Service, the controller provides restrictions, instructions, and approach clearances, which if complied with, shall achieve deconfliction minima against other aircraft participating in the Procedural Service. Neither traffic information nor deconfliction advice can be passed with respect to unknown traffic.

Both aircraft were operating within Class G airspace. CAP774, Chapter 1, Page 1, Paragraph 2, states:

Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment…

The AIRPROX occurred when the PA44 pilot became concerned about the close proximity and relative position of the SR22. The Cranfield controller was not aware of the SR22 and was therefore unable to provide traffic information or any deconfliction advice to the PA44 pilot.

In Class G airspace, the pilots are ultimately responsible for collision avoidance and should consider service provision to be constrained by the unpredictable nature of this environment.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, a report from the air traffic controller involved and reports from the appropriate regulatory and operating authorities.

The Board established that both pilots had an equal and shared responsibility to see and avoid and that the SR22 pilot was required to give way to the PA44 pilot under Rule 9 of the RoA [... the aircraft which has the other on its right shall give way]. Moreover, he was required to avoid passing under or ahead of the PA44 as required by Rule 8 of the RoA [...shall avoid passing over or under the other aircraft, or crossing ahead of it, unless passing well clear of it]. The Board opined that the SR22 pilot did give way, but would have been better advised to give greater vertical and more lateral separation in doing so.

The Board also questioned whether the fitment of IFR screens had impeded the PA44 Instructor's lookout. It was noted that the fitment of IFR screens was mandated by the CAA but not by other EASA member states. The CAA SRG Advisor highlighted the requirements of the RoA, specifically Rule 23 'Simulated Instrument Flight'.

'An aircraft shall not be flown in simulated instrument flight conditions unless ... if the safety pilot's field of vision is not adequate, both forwards and to each side of the aircraft, a third person, who is a competent observer, occupies a position in the aircraft from which his field of vision makes good the deficiencies in that of the safety pilot, and from which he can readily communicate with the safety pilot.'

He also stated that work was ongoing to investigate alternative means of safely achieving simulated instrument flight.

Finally, The Board noted that the fitment of TCAS in the SR22 and the use of an SSR transponder by the PA44 pilot enabled the SR22 crew to obtain a visual sighting in sufficient time to enable the SR22 pilot to take avoiding action. The SR22 pilot's early sighting of the PA44 ensured there was no risk of collision.

AIRPROX REPORT No 2012076

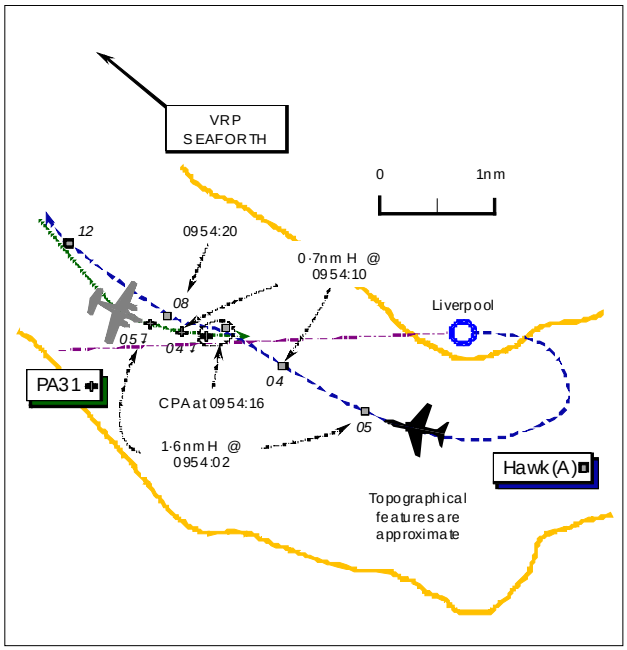
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict resolved by the SR22 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012077

Date/Time:	12 Jun 2012 0954Z	
Position:	5320N 00253W (1.5nm W of Liverpool Airport - elev 81ft)	
Airspace:	Liverpool CTR/ATZ (Class: D)	
	Reporting Ac	*Reporting Ac*
Type:	PA31-350	Hawk T Mk2
Operator:	Civ Comm	HQ Air (Trg)
Alt/FL:	300ft↓	400ft
	QNH (1011hPa)	QNH (1011hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	>10km	15km
Reported Separation:		
	100ft V/100m H	100-150ft range
Recorded Separation:		
	Nil V @ <0·3nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER NAVAJO CHIEFTAIN PA31-350 PILOT (PA31) reports flying in to Liverpool Airport on an Air Ambulance flight from the Isle of Man in VMC. Inbound VFR, he was advised by Liverpool RADAR of two Hawks making a low approach and go-around down the Mersey at 500ft QNH. He was then transferred to Liverpool TOWER on 126·35MHz and instructed to join final, No2 to the Hawks. Whilst on L base for RW09 he saw a Hawk in front of him perform a low approach and go-around, but he lost sight of the ac – Hawk (A) - as it entered the downwind leg after the go-around. Upon being cleared to land by TOWER, he turned onto final and at 300ft QNH (1011hPa), heading 090° 1.5nm from touchdown at 120kt, a Hawk crossed the FAT climbing from R to L in front of him about 100m away and 50-100ft above with a 'high' Risk of collision. He had advised TOWER that he was visual with the Hawk and heard the controller instruct the pilot of Hawk (A) to extend downwind. However, he was not told that it would be cutting across in front of his ac on final. He reported the Airprox to Liverpool TOWER on the RT. The ac has a white/mauve livery and the HISLs were on. A squawk of A0260 was selected with Mode C and S on; TCAS is not fitted.

THE PILOT OF THE HAWK TMk2 [HAWK (A)], a QFI, reports he was inbound to Liverpool Airport in VMC for a training ILS approach on RW09 with the student PF. They were following another Hawk – Hawk (B) - in the pattern and in receipt of a TS *(sic)* from Liverpool RADAR on 119·85MHz. A squawk of A0262 was selected with Modes C and S on; TCAS is fitted.

RADAR had advised of a civilian twin – the PA31 - in the vicinity of the mouth of the Mersey that was 'left base over land'. The PA31 pilot had been told by RADAR to hold off joining because of the two Hawks on App, he thought. A departure clearance was negotiated with RADAR that would initially take them down the River Mersey, SVFR, not above 1500ft QNH and the controller would advise them whether it would be either a L or R turnout after climbing out from the low-approach. The controller then asked both Hawks to be at 'low-level' due to the PA31 holding at the mouth of the Mersey; they advised RADAR they would be below 500ft, which was accepted. Having watched the preceding Hawk (B) depart in the same manner, he thought, [UKAB Note (1): the radar recording shows Hawk (B) turned wider outbound and closer to the opposite bank] they listened to the RADAR controller inform the crew of Hawk (B) that the PA31 was inbound at 1000ft. Continuing their approach, at short final for the low-approach they heard the PA31 pilot ask for joining instructions, which he was given together with the position of their Hawk (A). The twin pilot called that he was visual with both Hawks and changed to the TOWER frequency. After their go-around, upon rolling out pointing W down the River Mersey at about 500ft QNH, RADAR

informed them that the PA31 was 'one and a half mile final to RW09, extend downwind until you pass behind please'; however, this extension downwind would have taken his jet over a built up area at 500ft and at the same time TCAS enunciated a TA. It took some time to digest all this information and try to get SA on the exact position of the PA31. The TCAS contact initially showed up R of the nose (as he would have expected from his own SA and the overland, left base radio call) but then the contact proceeded to move to L of the nose and this inaccurancy became a distraction that compounded his loss of SA on the PA31. The RADAR controller transmitted the PA31's position to them again and they informed him that they were below 500ft in accordance with his departure instructions. He believed the twin was altitude-deconflicted, from their departure instructions, his own SA [having heard the crew of Hawk (B) being told that the PA31 was inbound at 1000ft] and the TCAS contact out to the L, he believed the safest course of action would be to continue down the course of the River Mersey and not turn L to head downwind, as this would have turned them towards the TCAS contact. About 10sec after RADAR's position call, descending through 370ft down to 250ft ALT in a slight RH turn through 295°, the front seat student PF obtained visual contact with the PA31 slightly below, in their front L quarter 300ft away and initiated a RH pull up. They passed above and slightly in front of the twin ac at an estimated slant range of about 100-150ft with a 'medium' Risk of collision. Departing down the River Mersey, they exited the CTR and, having discussed the event with the student, continued the sortie. TCAS did not enunciate any RA.

THE LIVERPOOL AERODROME CONTROLLER (TOWER) reports that he was pre-noted by RADAR about two light-twin ac joining VFR from the N and, at a similar time, also notified about 2 Hawk ac making individual instrument approaches to RW09. During the discussion with the RADAR controller, it was agreed that the light-twins would be instructed to follow the E bank of the River Mersey towards the A/D to de-conflict with the Hawk ac, that would be routeing up *(sic)* the Mersey low-level on departure; he was informed by RADAR that TI had been passed to all ac concerned whilst they were on the same frequency. The first light twin made its approach after the Hawk (B) had gone around, that was uneventful. However, when the second twin - the PA31 - reported final and had been cleared to land, the pilot advised 'I'm visual with the Hawk that's just missed us'. He was surprised at this as he believed TI had been given on Hawk (A), it had just gone through the approach and the weather was good. Querying the PA31 pilot, 'I thought you'd been given traffic information on that ac?', the pilot replied that he had but 'didn't expect it to get that close'. The PA31 made an uneventful approach and landing, but did not indicate at the time that he would be filing an Airprox.

THE LIVERPOOL APPROACH RADAR CONTROLLER (RADAR) reports that Hawk (A) was on an ILS approach to RW09 and then departed low-level via the River Mersey to leave the CTR, with a R turn out. The PA31 was joining L base RW09, VFR, behind the Hawk. Both ac had been given TI on each other whilst inbound.

When Hawk (A) turned outbound from the low-approach it was observed making a very tight cct to the S, so he updated the crew on the position of the PA31 and requested they extend downwind and to pass behind. Hawk (A) was observed passing close to the PA31, but he gave no estimate on the relative positions.

There was no mention of an Airprox by the Hawk on the RT.

ATSI reports that the Airprox occurred in the Class D Liverpool ATZ comprising a circle radius 2.5nm centred on RW09/27 up to 2000ft aal and situated within the Liverpool CTR.

The PA31 was operating VFR from the Isle of Man to Liverpool and was in receipt of an Aerodrome Control Service from Liverpool TOWER on frequency 126.350MHz. Hawk (A) was operating VFR on a local flight from Valley, conducting an ILS approach at Liverpool for training and was in receipt of a service from Liverpool Radar on 119.850MHz. Hawk (B) was also conducting ILS training with Liverpool Radar and was ahead of Hawk (A) in the approach sequence.

The Liverpool METARs were:

0950Z 07008KT 040V100 9999 FEW035 SCT045 13/06 Q1011=

1020Z 05009KT 9999 FEW035 BKN046 14/05 Q1011=

At 0942:00, the crew of Hawk (A) contacted Liverpool RADAR for a practice ILS approach and was instructed to squawk A0262. Hawk (A) was identified and given a clearance to enter CAS, heading 120° at 3000ft. At 0944:00, Liverpool RADAR issued a clearance to the PA31 pilot to enter the CTR via SEAFORTH, VFR, not above 2000ft

for RW09. At 0944:10, the crew of Hawk (A) was instructed to turn R heading 150°. At 0946:50, Hawk (A) was instructed to turn L onto a heading of 120° to close the LLZ from the L and descend to 2500ft.

At 0947:20, Hawk (B) was on final approach for RW09 and the crew was given clearance for a low approach and go-around with a RH turn out. At 0948:20, the crew of Hawk (A) reported LLZ established and was instructed to descend with the glidepath. The Liverpool RADAR controller informed the crew of Hawk (A) that there was a company Hawk (B) on short final that would be turning R up the Mersey. The crew of Hawk (A) replied, "*copied I'll be requesting the same departure clearance";* the crew of Hawk (A) was instructed that after the go-around the clearance would be VFR not above 1500ft up the Mersey, direction of turn to be advised but that it was likely to be a R turn.

At 0949:00, Hawk (A) was advised about the PA31, *"..joining down the river.. towards L base you happy to..be low level up the river initially 'til you've passed him".* The crew of Hawk (A) acknowledged the transmission and stated that they would be, *"..not above 500 feet".*

At 0950:00, the PA31 pilot advised that he was entering the zone at SEAFORTH routeing to Garston Docks with the A/D in sight and that he had copied, *"..the Hawk traffic coming down the Mersey".*

At 0950:00, Hawk (B) had turned R after the go-around and was over the S bank of the River Mersey. Hawk (B) then proceeded westbound and followed the western bank of the Mersey, crossing the extended centre-line 2.7nm W of the airfield, ahead of Hawk (A) who was at 1800ft on final approach.

At 0950:10, the crew of Hawk (B) was passed TI on Hawk (A) on final and informed that the PA31 was, "*..at..the mouth of the river inbound to the field VFR at a thousand feet".*

At 0951:10, the crew of Hawk (A) was given clearance for a low approach and go around with a R turn. The PA31 pilot was given updated TI on Hawk (A) and informed that Hawk (A) would be going around before making a R turn to route up the river at low-level. The pilot of the PA31 replied that he was visual with Hawk (A). The PA31 pilot was instructed to contact Liverpool TOWER on 126.350MHz. The PA31 pilot reported visual with Hawk (A) on contact with TOWER and was instructed to report final number 2.

At 0953:50 Hawk (A) reported, "[Hawk (A) C/S] *on the go-around low approach..below 5 hundred feet over the Mersey"* and was informed by the Liverpool RADAR controller, *"..roger the Piper twins* [the PA31] *on a 1 and a half mile final to runway 0-9 so if you just continue downwind until you pass behind it please".* There was no reply from the crew of Hawk (A) and the controller asked if he had copied the instruction. The crew of Hawk (A) replied, "*....copied but we're below..5 hundred feet up the Mersey".*

At 0954:05, Hawk (A) had turned further R and was converging with the FAT 0.8nm to the SW of the A/D, close to the eastern bank of the Mersey.

[UKAB Note: The Prestwick System radar recording shows that at 0954:02, the PA31 was on final approach, about midstream, indicating 500ft Mode C (1013hPa) while Hawk (A) was S of the FAT to RW09 NW bound at a range of 1.6nm from the PA31, that is also indicating 500ft Mode C (1013hPa). At 0954:10, the two ac close to a range of 0·7nm, with both ac indicating 400ft Mode C. Hawk (A) crosses ahead of the PA31 from R – L, just after 0954:16, indicating 400ft, with the PA31 also shown at 400ft 0·3nm to the WSW, however, the position of the Hawk may be inexact due to 'track jitter'. Hawk (A) is then shown at 0954:20, about 2nm W of the Airport, N of the CL, indicating 800ft Mode C before subsequently climbing to 1200ft Mode C as the ac transits downstream.]

The PA31 pilot reported to the Liverpool ADC that he was, "*visual with that Hawk* [(A)] *that's just about hit us".* The written report from the pilot of the PA31 stated that he had seen Hawk (A) as it conducted the go-around but lost sight of it as it turned downwind. When the PA31 was on final at 300ft, Hawk (A) crossed in front of the PA31 from R-L, about 100m away and 50-100ft above the PA31 climbing.

The written report from the pilot of Hawk (A) states that he had heard the TI passed to Hawk (B) on the PA31 and believed that the PA31 was at 1000ft. The report also states that the controller informed the pilot of Hawk (A) that the PA31 was on a 1½nm final and that he was instructed to continue downwind until he passed behind it. The report states that extending downwind would have taken the ac over a built up area at 500ft. It also states that TCAS gave a TA on the PA31, which initially showed the PA31 to be R of Hawk (A) and then changed to the L,

which caused the pilot to lose SA. The pilot was reluctant to turn to the L towards the contact and, in the belief that he was height deconflicted against the PA31, the pilot of Hawk (A) continued down the Mersey. The student PF became visual with the PA31 front left and slightly below and initiated a RH pull up. Hawk (A) passed slightly in front of the PA31 at an estimated slant range of approx 100-150ft.

The Liverpool RADAR controller stated that Hawk (A) conducted a much tighter cct following the go-around than he expected. Although nothing is laid down in unit instructions regarding the size of the cct pattern, the controller expected that Hawk (A) would follow a similar pattern to that flown by Hawk (B) previously. The controller stated that Hawks operate there about every 2 weeks and that standard procedure is to retain the ac on the APPROACH frequency and pass TI as required.

The Liverpool TOWER controller stated that he lost sight of Hawk (A) after it turned crosswind. The controller was looking out of the window at the time of the incident but did not see the confliction with the PA31. The TOWER controller had only recently obtained a unit endorsement and, despite being an experienced Military controller, had not seen that particular situation before.

Both aircraft were operating VFR in Class D CAS. CAP 493, The Manual of Air Traffic Services Part 1, Section 3, Chapter 4, Paragraph 3.1 states:

'Instructions issued to VFR flights in Class D airspace are mandatory. These may comprise routeing instructions, visual holding instructions, level restrictions, and information on collision hazards, in order to establish a safe, orderly and expeditious flow of traffic and to provide for the effective management of overall ATC workload.'

When Hawk (B) made the approach and go-around to RW09 the cct flown followed the S and then the W bank of the Mersey and the Liverpool RADAR controller expected that Hawk (A) would conduct the go-around and subsequent cct in a similar manner. This may have been reinforced by Hawk (A) requesting the "*same departure clearance*" as Hawk (B). If Hawk (A) had followed a similar cct pattern to Hawk (B) it is very unlikely that a confliction with the PA31 would have occurred so it is likely that the controller did not expect Hawk (A) and the PA31 to interact.

The Liverpool RADAR controller gave TI to Hawk (A) prior to the go-around stating that the PA31 was joining down the river and requested that Hawk (A) remain low-level until past the PA31. The TI was not updated until after Hawk (A) conducted the go-around when the PA31 was on a 1½nm final, nor were positive instructions given to Hawk (A) prior to the go-around to ensure that the cct pattern conducted did not bring it into conflict with the PA31.

When RADAR saw that the cct conducted by Hawk (A) was much tighter than anticipated, the position of the PA31 was passed (1½nm final) together with the instruction to continue downwind until Hawk (A) had passed the PA31. The pilot of Hawk (A) did not follow the controller's instruction due to the belief that the instruction would take the ac over a built up area at 500ft (although at the time the instruction was issued Hawk (A) was close to the eastern bank of the Mersey while the PA31 was above the centre of the river – continuing downwind as instructed would have taken Hawk (A) behind the PA31 before reaching the western bank of the Mersey). As Hawk (A) continued the R turn the geometry of the situation changed so that where the PA31 had been to the R of Hawk (A) it changed to the L – as indicated by the TCAS, which made the pilot reluctant to turn to the L downwind.

The pilot of Hawk (A) did not have the PA31 in sight and made an incorrect assumption that he was height deconflicted from the PA31 based on the TI passed to the other Hawk (B) stating that the PA31 was at 1000ft. The pilot of Hawk (A) was not passed altitude information on the PA31 but at 1½nm final, the PA31 could reasonably be expected to be approximately 450ft aal, descending to land.

The Rules of the Air Regulations 2007, Rule13 states:

'(1) An aircraft landing or on its final approach to land shall have the right-of-way over other aircraft in flight or on the ground or water.

(2) An aircraft shall not overtake or cut in front of another aircraft on its final approach to land.'

Hawk (A) crossed the FAT approximately 1nm W of the threshold RW09 at 300ft whilst the PA31 was on final approach 1nm W of the threshold at 300ft.

On his first call to TOWER, the PA31 pilot reported having Hawk (A) in sight; however, he did not inform TOWER when he lost sight of it, and therefore TOWER was not prompted to update the TI to assist the pilot of the PA31 to 'see and avoid'.

As Hawk (A) was on RADAR's frequency the pilot did not hear TOWER's instruction to the PA31 to position number 2 to Hawk (A), which may have alerted the pilot of Hawk (A) to the relative position of the PA31 and given an indication that the PA31 was descending on final approach.

Despite PDs from Valley being a regular occurrence at Liverpool Airport, the newly validated TOWER controller had not seen the scenario before. When Hawk (A) conducted the go-around the TOWER controller did not see the subsequent cct and was therefore unaware of the resulting confliction with the PA31. A discussion before validation may have prompted improved awareness by the TOWER controller to the potential issues encountered when integrating military training traffic with other traffic approaching to land and encouraged more vigilant monitoring of the situation and resultant updates in TI.

The Airprox occurred in the Liverpool Airport ATZ, when Hawk (A) flew into conflict with the PA31.

Contributing factors were considered to be:

RADAR expected the cct flown by the pilot of Hawk (A) to mimic that flown by Hawk (B) but did not provide positive instruction to ensure that this was the case.

The crew of Hawk (A) did not comply with RADAR's instruction to continue downwind until past the PA31.

The crew of Hawk (A) believed that following the Mersey instead of following the controller's instructions was a safer course of action due to the incorrect belief that Hawk (A) was height deconflicted from the PA31, and a loss of SA regarding the position of the PA31.

Hawk (A) and the PA31 were on two different frequencies whilst operating in the ATZ, which reduced the SA for the pilots of both ac.

The TOWER controller was not aware that the PA31 had lost sight of Hawk (A) or that the crew of Hawk (A) was conducting a tighter than expected cct and did not pass updated TI to the PA31 pilot.

Recommendations:

It is recommended that Liverpool ATC review their procedures for traffic conducting go-arounds for training purposes and give consideration to ensuring that all ac operating in the ATZ are transferred to the TOWER controller.

It is recommended that Liverpool ATC ensure that PDs by Hawk ac from Valley are discussed as part of unit training prior to validation.

The unit has accepted these recommendations and will progress them accordingly.

HQ AIR (TRG) comments that the crew of Hawk (A) were instructed to continue downwind until clear of the PA31 but did not read this back. Their initial lack of response suggests they were preoccupied with other tasks and their subsequent transmissions suggest that they believed their altitude would keep them clear of the traffic; they clearly did not assimilate the TI regarding the PA31's position and therefore its proximity. Indeed, given the proximity of Liverpool airport to the River Mersey, there was always going to be a potential conflict on the extended RW centreline as the PA31 turned in. The crew also seem to have been preoccupied with the TCAS display, possibly at the expense of their lookout. It is well known that TCAS azimuth information is unreliable and should not be used for taking lateral deconfliction, as this Airprox highlights all too well. Furthermore, the crew's concern about overflight of built-up areas was allowed to over-ride compliance with ATC instructions in CAS and deconfliction with the PA31. Extending to the W bank before turning would have removed the collision potential and should have been the instinctive response to their concerns, assuming that the TI had been fully assimilated. However, their apparent preoccupation with TCAS appears to have prevented such an option being completed.

AIRPROX REPORT No 2012077

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

This Airprox developed very quickly as Hawk (A) was departing after completing the go-around and the PA31 turned onto final for RW09. Members discussed the efficacy of ac completing approaches on different frequencies in close proximity, as it denied the TOWER controller positive RT contact with the crew if things went awry whilst they flying were through the visual cct area in contact with RADAR. Conversely, if the Hawks had been switched to TOWER, the high relative speed of the jet training ac meant they would be with TOWER for a very short period indeed and the added complexity of switching frequency twice, increasing the potential for error, weighed against the practice.

The PA31 pilot's report shows that whilst he was on L base he was aware of what Hawk (A) was doing from previous TI and saw the jet execute the low approach to RW09, but had subsequently lost sight of Hawk (A) during the go-around as it departed in the vicinity of the downwind leg. Consequently, the PA31 pilot did not see Hawk (A) until 1·5nm final when it crossed ahead of his ac climbing from R to L. Similarly, TOWER had also lost sight of Hawk (A) after it turned crosswind, but unaware that the PA31 pilot had also lost sight of the jet, the controller had focussed his attention elsewhere and had not observed the close quarters situation. Consequently, as TOWER had not tracked the progress of Hawk (A) the controller did not recognise that it had turned tight outbound onto a conflicting course with the PA31 on final. Therefore, he would have been unable to offer an immediate update of the Hawk's position if the PA31 pilot had asked for it. In the Board's view, neither the PA31 pilot nor TOWER had any effective influence over the outcome of this Airprox.

However, RADAR reports he had seen Hawk (A) making a very tight cct to the S, as reflected on the radar recording, so the controller had reiterated further TI on the position of the PA31, "*..on a 1 and a half mile final…"* and instructed Hawk (A)'s crew to, *"..just continue downwind until you pass behind it..".* With no immediate reply from the crew of Hawk (A), Members postulated whether the controller should have pressed for an accurate read back as the crew's eventual answer, "*..copied but we're below..5 hundred feet up the Mersey",* did not make it obvious that they had not spotted the PA31 or that they would pass astern of it. Members debated whether this lack of a read back was a factor and it was noted that if pilots are unable to comply with the clearance issued they must say so, but a CAT pilot Member did not perceive that there were grounds for the RADAR controller to question the Hawk crew's understanding at that stage. This all occurred less than 30sec before the CPA and the Hawk QFI's laudably frank account made it plain that he perceived that the PA31 was further away from the Airport at 1000ft amsl. This, coupled with the reply, suggested that he believed they would be vertically separated if he remained at low-level, but it was evident from his report that he had lost SA on the position and altitude of the PA31, which at 1½nm final to land would plainly be descending below 450ft. Members noted the QFI's overt concern at passing over built up areas at 500ft, which he reports is why had not extended downwind to the W bank of the Mersey. However, the Board recognised that this was a self-imposed limitation; RADAR's departure instructions to the crew of Hawk (A) out of the Class D CTR were *"..it should be a right turn..VFR not above 1 thousand 5 hundred feet up the Mersey",* so as long as Hawk (A) stayed out of the way by remaining S of the FAT until it they were visual with the PA31 and continued downwind as instructed, they could climb clear of the PA31 to a maximum of 1500ft QNH.

Here the PA31 on final had right-of-way and the crew of Hawk (A) had been given TI about it by RADAR twice, before and after the go-around. Although ATSI reports that positive instructions were not given to ensure that their cct pattern did not result in a conflict with the PA31, in the Board's view, RADAR's TI and instructions were sufficient to enable the crew of Hawk (A) to remain clear of the approaching PA31 on final, maintaining their own separation as appropriate astern. However, it was at this point that TCAS also came into the equation and unusually created more confusion in the cockpit of Hawk (A). Pilot Members agreed with the HQ Air (Trg) Member's view that the QFI had spent too much time on trying to reconcile his mental air picture with what he could see on TCAS, rather than scanning visually for the PA31. The Board was well aware of the inherent unreliability of TCAS in azimuth, but it seemed to pilot Members that the QFI had elected to manoeuvre on the basis of the displayed relative position of the PA31 and his belief that there was altitude deconfliction, which was most unwise. If the crew of Hawk (A) had continued downwind as instructed and not attempted to cut through the FAT until they had sighted the PA31 visually the conflict would not have occurred. The Board concluded therefore,

that the Cause of this Airprox was that the crew of Hawk (A) did not comply with ATC instructions and flew into conflict with the PA31.

Turning to the inherent Risk, the radar recording shows that the Hawk turned mid channel to pass through the FAT and both ac indicated the same level just before they passed. Without the benefit of TCAS, the PA31 pilot had seen the Hawk only as it was crossing ahead and 50-100ft above his ac and too late to take any avoiding action. Confused by their own TCAS display, which nonetheless seemed to have shown the crew where to look for the PA31, the PF finally saw the descending PA31 slightly below, in their front L quarter a mere 300ft away whilst they were descending towards it. To avoid the PA31, the student pilot in the Hawk front seat pulled up to the R and they passed slightly in front of, and above, the twin. Both pilots' written reports broadly concurred that the minimum horizontal separation was between 50-100m and the radar recording confirmed that horizontal separation was less than 0·3nm; however, the Board was briefed that given the associated track jitter of the Hawk contact, the separation was probably closer to that of the pilots' accounts.

This was plainly a Risk-bearing Airprox, but as to the degree of Risk some Members opined that the avoiding action taken by the Hawk crew was just in time to be effective in forestalling a collision, albeit that safety had not been assured. However a civilian GA pilot Member was concerned at the high speed of the Hawk within the pattern compared to the twin which resulted in a high closure rate. Members postulated that the time between the Hawk student's sighting of the PA31 about 100m away and pulling up out of the way was so short, coupled with the miss distance being so slim, that chance had played a significant part here in preventing a collision. The Membership was fairly evenly divided in their views and so a vote was necessary. By a majority verdict, the Board concluded that an actual Risk of collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

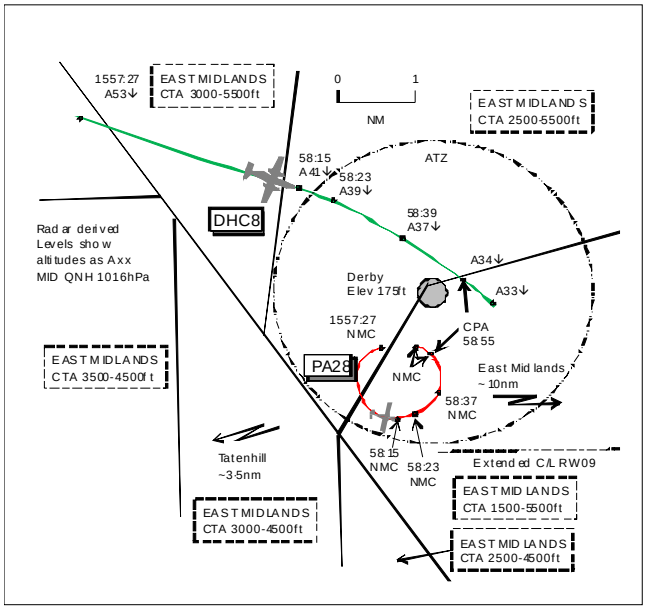
Cause: The crew of Hawk (A) did not comply with ATC instructions and flew into conflict with the PA31.

Degree of Risk: A.

AIRPROX REPORT No 2012078

AIRPROX REPORT NO 2012078

Date/Time:	13 Jun 2012 1559Z	
Position:	5251N 00137W (10nm WNW East Midlands - elev 306ft)	
Airspace:	EMA CTA	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	DHC8	PA28
Operator:	CAT	Civ Trg
Alt/FL:	↓2000ft QNH (1015hPa)	↓1700ft QNH
Weather:	VMC CLBC	VMC HZBC
Visibility:	10km	3000m
Reported Separation:	NR	Not seen
Recorded Separation:	NR V/1·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports inbound to East Midlands, IFR and in receipt of a RCS from East Midlands on 134·175MHz, squawking 7414 with Modes S and C. While on vectors descending to 2000ft QNH at 180kt ATC informed them of a light ac in close proximity and a TCAS TA was then generated; no height information was displayed with the TA. Flying 100ft below cloud but between layers with 10km visibility the FO then became visual with a Cessna ac, he thought, about 2nm away to their R. After further vectoring to the ILS an uneventful approach and landing was carried out. Whilst on the stand they were asked to contact ATC and the Supervisor informed them that minimum separation was lost owing the other ac infringing CAS.

THE PA28 PILOT reports on a local training flight (P1S) [See UKAB Note 1 below] with an instructor from Wellesbourne Mountford via Gamston, she thought, VFR and in receipt of a radar service from Birmingham on 118·05MHz, squawking with Mode C, she thought. The visibility was 3000m in haze flying 1000ft below cloud and the ac's strobe and beacon lights were switched on. She was tracking the NDB/ADF to Tatenhill [16nm W East Midlands] whilst in contact with East Midlands on 134·175Mhz, she thought. She then tracked towards LIC NDB, she thought, [NDB removed May 2010 from a position 4·5nm SSE Tatenhill] but turned further L not realising that the ac entered the East Midlands CTA about 8nm W of East Midlands airport. As soon as she realised this she headed W and contacted Birmingham Radar on 118·05MHz. Near Tatenhill she was flying at 2500ft and descended to 1700ft but forgot to inform ATC of the descent. She did not see the reporting ac.

UKAB Note (1): Although the PA28 pilot was accompanied by a qualified instructor and believed she was being instructed, it was not an instructional flight. The PA28 pilot signed for the aircraft in the Tech Log and the instructor did not enter the flight or claim the hours in his logbook.

UKAB Note (2): The PA28 operator advised that the PA28 transponder was placarded as Mode C inoperative since the ac's annual inspection was completed 10/02/2012.

THE PA28 OPERATOR'S MANAGING DIRECTOR comments that the CFI reviewed the details of the incident. The LIC NDB was decommissioned on the 6th May 2010 and hasn't appeared on either the 2011 and 2012 charts. The pilot reported operating as P1S and was therefore under supervision, he thought. The pilot holds an IMC rating so may have been getting additional instruction; however, the standard of airmanship was very poor. It appears that this was a very badly planned flight probably as a result of an outdated chart. Later a meeting was held with the pilot and instructor and appropriate action has been taken. The company are very focussed in providing the highest level of training to students and ongoing support to club members, who hold PPLs and safety is an absolute priority.

THE EAST MIDLANDS RADAR 1 CONTROLLER reports operating as a mentor to a trainee as the DHC8 was being vectored for a straight-in approach for RW09 from the NW. A 7000 squawk with NMC was observed manoeuvring to the W of East Midlands and it was believed to be below the CTA, the base level of which is 1500ft. No RT call was received from this flight and no ac were thought to be lost in the vicinity. The DHC8 was descended to 2000ft and was placed on a heading to intercept the ILS. The 7000 squawk changed to a Birmingham code of 0401 still with NMC so the controller requested TI from Birmingham. The ac's c/s was given, the PA28, and that it was believed to be at 2500ft. The Birmingham Radar controller, on observing the position of the ac, instructed the flight to vacate East Midlands' airspace to the W and transferred the ac to East Midlands' frequency. Once the level of the 0401 traffic was established it was called to the DHC8 flight and the crew became visual with the ac; they were passing abeam the PA28 by 0·25nm at 3300ft descending to 2000ft. The DHC8 crew had the PA28 on TCAS as proximate traffic and then a TA but did not query this on the frequency. The PA28 pilot was unaware of being within East Midlands CAS when calling Birmingham and both the pilot and Birmingham ATC had difficulties in hearing each other, possibly due to their range.

ATSI reports that the Airprox occurred at 1558:55 UTC, 10nm WNW of East Midlands Airport, within the East Midlands Control Area CTA-5, Class D airspace, which extends from an altitude of 1500ft to an altitude of 5500ft.

The DHC8 was inbound to East Midlands Airport, operating IFR from Belfast City and in receipt of a RCS from East Midlands Radar. The PA28 was operating VFR on a local flight from Wellesbourne Mountford and was in receipt of a BS from Birmingham Radar.CAA ATSI had access to RT recording of East Midlands Approach and Birmingham Approach; area radar recordings; written reports from both pilots and both controllers. The QNH used by the radar system was the same as the East Midlands QNH, 1017hPa.

The METARS for East Midlands and Birmingham Airports are provided:

EGNX 131550Z 07008KT 9999 FEW020 13/09 Q1017= and EGBB 131550Z 17005KT 130V200 9999 FEW045 16/07 Q1016=

At 1553:23, the DHC8 flight contacted East Midlands Radar in the descent to FL80, in receipt of information 'Q'. The controller asked the DHC8 crew to squawk ident and advised of vectors for the ILS RW09, new information 'R' with no significant changes from 'Q' and 32nm from touchdown. The DHC8 was given further descent to 6000ft on a new QNH, 1017.

At 1555:18, the DHC8 was 24·6nm NW of East Midlands Airport. The PA28 was squawking 7000, with NMC, 10·5nm SW of East Midlands and crossing the lateral boundary of the East Midlands CTA-5 (base 1500ft), on a NE'ly track.

At 1555:20, the DHC8 flight was placed on a heading of 115° to take the ac around gliding activity on the extended approach to RW09. At 1555:52, the DHC8 crew was advised 22nm from touchdown and given descent to 5000ft.

At 1556:52, the PA28 pilot contacted Birmingham Radar requesting zone transit. The Birmingham controller instructed the PA28 to squawk 0401 and to standby for transit. The PA28 was 9·5nm W of East Midlands Airport, within the lateral confines of CTA-5. The PA28 was observed to take up a LH orbit.

At 1556:56, the DHC8 crew was advised 17nm from touchdown, descended to 4000ft and shortly afterwards was given further descent to 3000ft.

At 1557:27, the squawk of the PA28 was observed to change to the Birmingham code 0401, as the PA28 continued in the LH orbit leaving and then re-entering the lateral confines of CTA-5.

At 1558:14, the DHC8 was turned R heading 130° to report LOC established and descended to 2000ft.

The East Midlands controller reported observing the unknown ac change squawk from the 7000 to 0401 and asked the Radar 2 controller to obtain altitude information on this ac from Birmingham Radar.

At 1558:20, the Birmingham controller asked the PA28 pilot, *"Report your altitude"* and there was no response.

At 1558:23, radar recording shows the distance between the 2 ac was 3·2nm. The DHC8 was indicating an altitude of 3900ft and the PA28 was not indicating Mode C level reporting.

At 1558:30, the Birmingham controller transmitted, *"(PA28 c/s) you're inside er you're very close to East Midlands I suggest you give them a call on one three four decimal one seven five"* and again there was no response.

At 1558:42, the Birmingham controller called again, *"(PA28 c/s) Birmingham"* and the pilot replied, *"(PA28 c/s)."* The distance between the 2 ac was 2·1nm, with the DHC8 at 3700ft and the PA28, without Mode C level reporting, in the LH orbit towards the DHC8. The controller responded, *"(PA28 c/s) what is your altitude."* The PA28 pilot replied, at 1558:55, *"Two thousand five hundred feet."*

The East Midlands controller then became aware of the PA28 level (2500ft) and at 1558:56, transmitted, *"(DHC8 c/s) I may have traffic just passing behind you at the moment possibly two thousand five hundred feet er it's unverified."* The DHC8 pilot responded, *"er we're visual er (DHC8 c/s)."*

At 1558:55, the 2 ac passed abeam on reciprocal tracks at a range of 1·1nm (CPA). The DHC8 was at an altitude of 3400ft and the PA28 was passing through a heading of 300° without Mode C level reporting. The PA28 continued the L turn leaving and then re-entering the confines of CTA-5.

At 1559:12, the Birmingham controller transmitted, *"(PA28 c/s) route to the west you're inside East Midlands airspace they have traffic just er passing you now three thousand feet in the descent call East Midlands on one three four decimal one seven five.*"

At 1600:10, the DHC8 crew reported established on the LOC and was cleared for descent on the GP and transferred to the Tower on 124·0MHz.

At 1600:25, the PA28 pilot contacted East Midlands Radar on transfer by Birmingham and was instructed to squawk 4552. At this point the SSR code is lost from the area radar recording and the PA28 is shown as a primary only contact. The PA28 was observed to make a R turn tracking SW, leaving the lateral boundary of CTA-5 at 1601:14, crossing into the lateral confines of CTA-13 (base 2500ft).

At 1602:57, the PA28 pilot reported routeing to Derby and then to Wellesbourne Mountford. The East Midlands controller responded, *"(PA28 c/s) you gonna no further east of your present position er you're just at two and half thousand feet inside our zone just."* The PA28 pilot read-back*, "two thousand er feet (PA28 c/s)"* and *"(PA28 c/s) we are heading er two seven zero ?????"*

At 1603:52, the East Midlands controller advised the PA28 pilot that transmissions were very weak and asked for confirmation that the PA28 was heading W. The PA28 pilot was subsequently asked to squawk 7000 and transferred to en-route. The PA28 pilot reported changing to Birmingham on 118·05MHz.

The PA28 pilot's written report indicated that the pilot was unaware that the ac was inside the East Midlands CAS.

The DHC8 was inside CAS and in receipt of a RCS from the East Midlands Radar controller. The Manual of Air Traffic Services (MATS) Part 1, Section 1, Chapter 5, Page 12, paragraph 13.1.4, states:

'…aircraft operating in controlled airspace are deemed to be separated from unknown aircraft in adjoining uncontrolled airspace...'

and paragraph 15.1 and 15.2 state:

A position symbol which cannot be associated with an aircraft known by the controller to be operating within the airspace concerned shall be considered to represent an unknown aircraft.

The action to be taken by controllers when they observe an unknown aircraft, which they consider to be in unsafe proximity to traffic under their control, in various types of airspace is as follows:

Class D: If radar derived, or other information, indicates that an aircraft is making an unauthorised penetration of the airspace, is lost, or has experienced radio failure:

IFR flights shall be given avoiding action and traffic information shall be passed.'

The unknown traffic (PA28) was shown on radar without Mode C level reporting and there was no radar derived or other information to indicate that this contact had entered CAS. Both East Midlands and Birmingham Radar controllers could reasonably have expected the unknown 7000 squawk, without any Mode C level reporting, to be below the base of CAS.

Ten seconds before the CPA occurred the pilot reported at 2500ft. The Birmingham Radar controller then advised the PA28 pilot that he was inside CAS, gave TI and instructed the pilot to route W and to contact East Midlands.

The East Midlands controller, having observed the squawk change to Birmingham 0401, asked the Radar 2 controller to make contact with Birmingham, requesting altitude information. This became apparent as the Airprox occurred and the East Midlands Radar controller passed TI to the DHC8 as the 2 ac passed abeam.

For a VFR flight entering Class D controlled airspace, the ANO RoA, Rule 29 (1) states:

'Subject to Rule 31, before an aircraft flies within Class B, Class C or Class D airspace during the notified hours of watch of the appropriate air traffic control unit, the commander of the aircraft shall:

(a) cause to be communicated to the appropriate air traffic control unit a flight plan which complies with paragraphs (2) and (3) (as appropriate); and

(b) obtain an air traffic control clearance to fly within that airspace.'

The Airprox occurred as a result of the PA28 entering CAS without a clearance.

There was no radar derived or other information to indicate that the unknown traffic (PA28) had entered CAS and the controllers at Birmingham and East Midlands regarded the unknown contact as being outside CAS, below the base of East Midlands CTA-5.

It only became apparent that the PA28 was in CAS as the Airprox occurred and both controllers passed TI to their respective ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

A CAT pilot Member commented that it was not uncommon for CAT traffic flying in CAS to receive a TCAS TA on traffic operating legitimately beneath CTA 'stubs' whilst displaying NMC. This alert was treated as a prompt to look out for possible conflicting traffic, mindful that any RA was inhibited owing to lack of relative altitude information. A controller Member remarked that it was normal practice to descend IFR traffic to a level 500ft above the base of CAS during vectoring with this traffic deemed separated from the traffic flying just below the base; however, best practice was not to allow radar returns to touch. There was no radar derived or other information to indicate the PA28 had entered CAS although it was clear from the ATSI investigation report that the PA28 had entered CAS without clearance, the infringement only becoming apparent to ATC immediately prior to the CPA. Despite the Birmingham controller passing the information to the East Midlands controller as soon as he became aware, there was only enough time to pass TI to the DHC8 crew as the ac passed abeam. The Board agreed that both Birmingham and East Midlands ATC had done the best they could in the circumstances. Pilot Members agreed that the Airprox was down to poor planning at the outset with the PA28 pilot apparently using an out of date chart and attempting to use a navaid that had been withdrawn from service 2 years previously. Given the vagaries of NDB/ADF tracking, pilot Members were acutely aware of the need to follow SOPs when practising I/F, particularly ensuring the nav beacon is identified prior to using the ADF instrument indications for navigation. This brought into question the supervisory aspects by the Instructor. The pilot was under the impression that this was an instructional flight, which was contrary to the Instructor's viewpoint. Members agreed that this difference of understanding indicated a breakdown in CRM; it highlights the vital importance of pre-flight briefings to establish a common understanding of each pilot's responsibilities in the cockpit. Notwithstanding that the PA28 pilot's misunderstanding of the Instructor's role, by not intervening as the ac was orbiting within the East Midlands CTA

while the pilot was attempting to call Birmingham for transit, it appeared that both pilots were unaware of the unauthorised penetration. This incursion led to the PA28 flying into conflict with the DHC8 which neither pilot had seen, further compounding the infringement.

The DHC8 crew was aware of the PA28's presence from TCAS but were ignorant of its altitude owing to its NMC until seeing it pass clear to their R and below as East Midlands Radar passed TI. One pilot Member thought that with any TCAS resolution inhibited there had been no other safety barriers remaining, and therefore safety was not assured. This view was not shared by the majority who felt that although this had had the potential for a more serious incident, the ac were not on conflicting flightpaths. The PA28 was orbiting L, on the boundary where the base level of the CTA changed from 2500ft to 1500ft, whilst the DHC8 flight was following vectors to intercept the RW09 ILS and was in a descent profile to ensure it remained within CAS. Its actual flight profile led to it descending through 3400ft as it passed abeam the PA28, whose pilot had just reported level at 2500ft, 900ft below the DHC8, with lateral separation of 1·1nm at the CPA and the ac diverging. These elements were enough to allow the Board to conclude that there had been no risk of collision during this encounter.

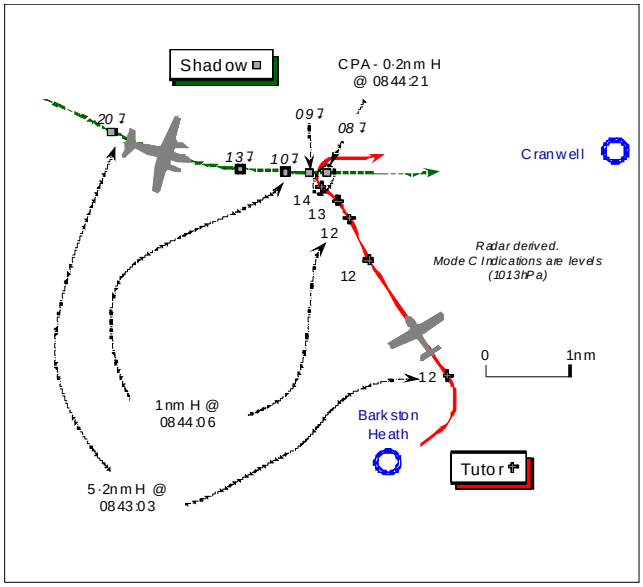
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot entered CAS without clearance and flew into conflict with the DHC8, which she did not see.

Degree of Risk: C.

AIRPROX REPORT NO 2012079

Date/Time:	14 Jun 2012 0844Z	
Position:	5301N 00035W (3·6nm W of Cranwell - elev 231ft)	
Airspace:	Cranwell CMATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Beech Shadow	Grob Tutor
Operator:	HQ Air (Ops)	HQ Air (Trg)
Alt/FL:	1500ft↓	1300ft
	QFE (1010hPa)	QFE (1010hPa)
Weather:	VMC	VMC
Visibility:	40km	30km
Reported Separation:		
	200ft V/0.5nm H	300ft V
Recorded Separation:		
	0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BEECH SHADOW R1 (SUPER KING AIR 350 ER) PILOT reports he was conducting a dual NDB/DME training approach at Cranwell (CWL), in VMC between layers of cloud and in receipt of a TS from CWL DIRECTOR (DIR). The assigned squawk was selected with Modes C and S on: TCAS is fitted. The ac has a grey colour-scheme but the HISLs, recognition lights and anti-collision beacons were on in addition to the landing and taxy lights.

Descending in accordance with the procedure through 1500ft QFE (1010hPa), wings level on the approach to RW08RHC and 'within the safety lane' between 6-5nm Finals heading 100° at 150kt, TCAS enunciated a TA on a contact 3nm away. They saw the Tutor, which was in the 1:30 position about 2nm away flying directly towards them. A TCAS RA was enunciated commanding them to MAINTAIN VERTICAL SPEED in the descent, which the PF complied with initially. However, after deciding to increase the separation between the ac visually, a slightly higher ROD was flown by the PF. Minimum vertical separation was 200ft and the Tutor passed about 0·5nm away to starboard with a 'medium' Risk of collision. When 'clear of conflict' was enunciated, the instrument approach was continued and ATC were informed of the RA. He subsequently reported the Airprox to ATC by landline.

He commented that there were a very high number of ac operating VFR in the CWL area. When the Airprox occurred his ac was in the late stages of an instrument approach and thus was in a low and slow configuration, with flap and gear down, resulting in reduced ability to manoeuvre.

THE GROB TUTOR T Mk1 PILOT, a QFI, reports that on completion of a navigation training sortie, the student PF was instructed to execute a PD to Barkston Heath (BKH), from which he was tasked to recover to CWL via the TOWER-to-TOWER (TWR-to-TWR) procedure. As the student had not flown this procedure before, the QFI directed him during the TWR-to-TWR transit. In receipt of a BS from CWL TOWER on UHF, they had been cleared to join for RW08RHC via initials. Flying level at 1300ft CWL QFE in VMC, as they approached the A/D he became aware from the standard instrument traffic broadcasts by TOWER of the Shadow - on an instrument approach. At a position about 3nm from touchdown he did not feel 'threatened' by the instrument traffic, which would be passing below his ac so he was content to cross the RW08 centerline whilst looking for the conflicting ac. As their Tutor approached the centre-line, heading 20° at 100kt, both he and his student sighted the Shadow about 1nm away, but there was a slight delay in informing TOWER of the sighting due to the busy RT frequency. He estimated that the Shadow passed from L – R 300ft beneath his Tutor with a 'low' Risk of collision. No avoiding action was taken as his flightpath was keeping them clear of the Shadow on approach, whereas a turn would have extended the time his Tutor would have spent in the close vicinity of the Shadow. Furthermore he was following the TWR-to-TWR procedure, which is flown at 1300ft QFE.

He states that his cockpit workload was relatively high, coupled with a busy RT frequency. His Tutor is coloured white; the white HISLs were on and he was squawking the assigned code with Mode C and S on; TAS (TCAS I) is fitted.

THE CRANWELL AERODROME CONTROLLER (ADC) reports that nothing was reported to him on the frequency about the Airprox between the Shadow and the Tutor. Completing his report over a week after the incident, he has no recollection of anything unusual during this period on TOWER and only became aware of the Airprox 4 days after the occurrence.

CRANWELL DIRECTOR (DIR) reports that he was mentor to a trainee; the workload was light with weather state colour code BLU. The Shadow was under TS at about 4nm final to RW08RHC indicating about 1200-1300ft Mode C (1013hPa). A contact [the Tutor] was seen in the Shadow's R 2 o'clock at a range of 3nm crossing R – L, squawking A2612 and indicating 1200ft Mode C (1013hPa). This contact was called to the Shadow crew and then called again at a range of 1nm; the Shadow crew acknowledged both calls. The conflicting Tutor ac was seen to turn L and climb to go behind the Shadow and at this point the Shadow crew asked for the C/S of the conflicting Tutor ac, which was subsequently identified recovering from BKH to CWL via the TWR-to-TWR procedure.

THE CRANWELL ATC SUPERVISOR (SUP) reports he was in the VCR discussing a point with the duty flying supervisor at the time of the occurrence and did not witness the Airprox. On arrival back in the ACR the DIR mentor informed him that a Tutor on a visual join had flown quite close to the inbound Shadow. No mention was made of any Airprox until the Shadow PIC telephoned some 1½hr after the occurrence.

BM SAFETY MANAGEMENT reports that the Shadow crew, conducting an NDB/DME approach, was in receipt of a TS from DIR and the Tutor crew was following the TWR-to-TWR procedure for a visual recovery to CWL from BKH and in communication with CWL TWR [under a BS].

The Shadow pilot reported VMC with 40km visibility in nil weather and SCT cloud at 1500ft. The Tutor pilot reported VMC with 30km visibility, nil weather.

Although the Shadow pilot reported filing a VFR flight plan, they were conducting an instrument approach at the time so it is reasonable to suggest that they were operating IFR.

DIR was manned by a trainee and a mentor; whilst the trainee was a highly experienced multi-tourist controller he was relatively inexperienced at CWL. DIR described the workload as 'low' with only the Shadow on frequency with 'routine' task complexity. The ADC could recall little of the incident as nothing untoward had been reported to him at the time or on the RT.

The diagram at Figure 1, extracted from the CWL FOB, depicts the ground track for ac conducting a TWR-to-TWR transit from BKH to CWL. The FOB states that the procedure should be flown in VMC, clear of cloud and in sight of the surface, with a minimum visibility of 1500m, at 1300ft QFE; furthermore, 'ac joining the CWL visual circuit are to cross the radar centre-line within 2nm of the airfield'. The FOB does not stipulate whether this is determined through the use of DME, or 2nm from the RW threshold or from the A/D Reference Point (ARP). In the case of RW08, the DME reads 0.73d at the threshold and the distance between the ARP and the threshold is approximately 0.9nm. The Missed Approach Point (MAPt) for the RW08 NDB-DME approach is 1.5d, approximately 0.8nm from the RW08 threshold.

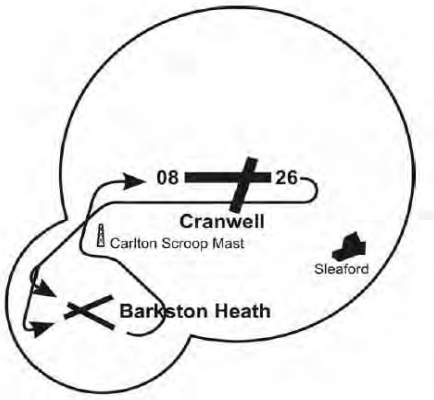


Figure 1: CWL – BKH TWR-to-TWR Procedure

Carlton Scroop mast is approximately 3.3nm SW of the RW08 threshold and 4.4nm SW of the ARP. The CWL FOB also states that airfield joins are:

'normally to be through the Initial Point (IP) unless ATC clearance is obtained for another type of join'.

The IP is situated 2nm from the threshold of RW08, 100m from the centre-line on the deadside.

The BKH ADC pre-noted CWL APP with the details of the Tutor crew's TWR-to-TWR transit at 0840:00 and the Tutor crew left BKH TOWER's frequency at 0842:31. The Tutor crew had conducted a practice diversion into BKH and retained the SSR code of A2612 previously assigned by CWL DEPARTURES throughout the remainder of the incident sequence. The CWL FOB states that:

'all aircraft intending to enter, or are established within, the CWL visual circuit are to squawk Mode 3/A 7010C on changing to the TWR frequency'.

The incident sequence commenced at 0843:00 when the Tutor crew requested to join the CWL cct for a, "..*visual run-in and break with Bravo*." [ATIS BRAVO: BLU; Sfc Wind 130/10; 20km visibility nil weather; Cloud, FEW 1300, SCT 8800, TEMPO SCT 015 WHT, QFE 1010hPa.] In reply, the ADC instructed the Tutor crew to, "*join runway 0-8 right hand, Q-F-E 1-0-1-0, join not above height 1 thousand 5 hundred feet, one in, radar traffic 4 and a ½ miles*", which was acknowledged. The radar traffic referred to by the ADC was the Shadow on the NDB-DME approach. The unit has stated that it is likely that the instruction to, "*join not above height 1 thousand 5 hundred feet*" was as a result of the activation of Waddington's Radar Training Circuit (RTC). [At 0843:02, the Shadow was 5·2nm NW of the Tutor, tracking SE'ly, indicating descent through 2000ft Mode C (1013hPa); the Tutor was tracking NNW'ly, indicating 1200ft Mode C (1013hPa).] The Tutor pilot reported that the student had not flown the BKH-CWL TWR-to-TWR procedure before; consequently, he 'directed the TWR-to-TWR transit.'

The NDB-DME RW08 procedure advises the following heights/ranges: 5d, 1300ft QFE; 4d, 1000ft QFE; 3d, 700ft QFE. The Shadow pilot has reported that the ac was 'descending in accordance with the procedure' and the SSR Mode C displayed on the radar replay supports this statement.

At 0843:47, DIR passed TI to the Shadow crew about the Tutor, "..*traffic right 2 o'clock, 3 miles* [radar replay shows 2.5nm]*, crossing right-left, same height*", which was acknowledged. At that point, the Tutor was 3.3nm SW of the CWL ARP and 2.5nm SW of the threshold to RW08RHC, tracking NW'ly, indicating 1200ft. The unit has confirmed that DIR had been advised by APP that the Tutor was conducting a TWR-to-TWR transit.

CAP774 Chapter 3 Para 5 guidance material states that:

'controllers shall aim to pass information on relevant traffic before the conflicting aircraft is within 5NM, in order to give the pilot sufficient time to meet his collision avoidance responsibilities and to allow for an update in traffic information if considered necessary.'

However, the Regulation also states that:

'high controller workload and RTF loading may reduce the ability of the controller to pass traffic information, and the timeliness of such information'.

On the RT transcript there is a period of 55sec, prior to DIR passing the TI message at 0843:47, where no transmissions or off-freq conversations were recorded. Subsequent to completing his report, the DIR mentor recalled that they liaised with APP over the identity of the Tutor and were advised by APP that the Tutor was conducting a TWR-to-TWR transit, although the audio tape does not confirm it. Moreover, the DIR trainee recalled considering breaking-off the Shadow from the NDB-DME approach due to the presence of the Tutor and what their options might have been to effect that, but could not remember whether he discussed this with his mentor, or whether it was a course of action that they were considering. Whilst DIR could not recall when the liaison or the discussion/consideration to breaking the Shadow off occurred, BM SM suggests that this occurred during the 55sec immediately prior to DIR passing TI at 0843:47.

The Shadow pilot reported that they received a TCAS TA between 5-6nm on the approach before visually acquiring the Tutor, perceiving the aircraft to be flying directly at them. Given the ranges involved, it is reasonable

to suggest that the TI provided by DIR coincided with the generation of the TCAS TA. Moreover, given that the Shadow would be descending through approximately 1300ft QFE at 5d and that the Tutor was at 1300ft QFE, this suggests that the Shadow visually acquired the Tutor at approximately 5d (4.3nm from RW08 threshold); equating to approximately 1.9nm lateral separation between the ac. This is in accord with the Shadow PIC's assessment of 2nm lateral separation existing on first sighting of the Tutor. The Shadow crew then received a TCAS RA directing them to MAINTAIN VERTICAL SPEED.

At 0844:02, DIR updated the TI to the Shadow on the Tutor, "*that traffic now right 2 o'clock, 1 mile, crossing right-left, same height*", which was acknowledged. The Shadow crew did not inform DIR that they were complying with a TCAS RA, nor that they had sighted the Tutor. (At 0844:06, the Tutor was 3.4nm WSW of CWL ARP and 2.5nm WSW of RW08 threshold, tracking NW'ly, indicating 1200ft Mode C.) The Tutor pilot reported that 'they were content to cross the centreline' at what 'he perceived to be 3nm from touchdown' and 'did not feel threatened by the instrument traffic which would be passing below.' Based upon the Tutor pilot's report, they sighted the Shadow as they approached the centreline at a range of approximately 1nm; however, their call to acknowledge sighting the Shadow was delayed by the busy RT frequency. Based upon analysis of the radar replay, transcripts and pilot's report, the Tutor pilot's sighting of the Shadow coincided with DIR's updated TI.

At 0844:11, utilising the Hi-Brite ATM, the ADC passed TI to the Tutor crew on the Shadow stating, "*traffic believed to be you has traffic just passing 12 o'clock, similar height*"; the Tutor pilot replied that they were, "*visual with that traffic*." At that point, the Tutor was maintaining a NW'ly track indicating 1200ft about 0.9nm SE of the Shadow, as the former crossed through the extended centreline. The Shadow was indicating descent through 1000ft Mode C ½nm N of the RW08RHC centreline, due to the final approach track (FAT) of the NDB-DME approach being offset 14° L (N) the RW08RHC centreline.

Although not mentioned in the Tutor pilot's report, the radar replay shows that at 0844:16 as the aeroplane passes 0.4nm SE of the Shadow, the Tutor crew commence a L turn to track WNW'ly and climb slightly. This concurs with the DIR's report, stating that they saw 'the conflicting aircraft [the Tutor]…turn left and climb to go behind [the Shadow]'. [The CPA occurs at 0844:20 as the Tutor indicating 1400ft - a height of about 1310ft CWL QFE (1010hPa) - passes 0.2nm SSW of the Shadow that is descending through 800ft - about 710ft CWL QFE.] The CPA occurred 3.6nm W of the CWL ARP and thus about 2.7nm W of the RW08 threshold. The Shadow crew did not report the Airprox on the RT to the ADC, but made a report by telephone about 1½ hours after the event.

The lack of a defined datum point for the range at which the extended centreline should be crossed, permits interpretation of the TWR-to-TWR procedure. Notwithstanding the relatively low performance characteristics of the Tutor, the requirement to route outside Carlton Scroop mast, cross the extended centreline within 2nm of the airfield and route through the IP would seem to be difficult to achieve. If the procedure were to be interpreted as crossing the centreline at 2nm from the threshold (2.73d), then in excess of 600ft vertical separation should exist between ac conducting the TWR-to-TWR transit and an IFR ac conducting an NDB-DME approach.

When considering the interaction of IFR ac with a VFR traffic conducting the BKH-CWL TWR-to-TWR procedure, as the IFR ac could abandon the approach at any point, there does not appear to be any procedural deconfliction between the 2 procedures. The sole safety barriers are the prior imposition of a climb out restriction on the IFR ac by ATC, active control by ATC at the point the approach is abandoned together with 'see and avoid'. Discussion with CWL ATC revealed that they were not cognisant of a requirement to impose a climb-out restriction on the IFR ac and perceived that a MAP would only be carried out from the MAPt; consequently VFR ac conducting the TWR-to-TWR procedure at 1300ft QFE would be above any IFR ac executing a MAP. Whilst this is understandable, it does not cater for the worst credible scenario. Positive control by ATC, at the point of abandonment of the procedure, is heavily reliant on timing and the reaction of the controller, making it an imperfect barrier. As evinced by previous Airprox, the sole remaining safety barrier of 'see and avoid' is also an imperfect barrier.

The Tutor pilot states that he crossed the extended centreline at what he 'perceived' to be 3nm from touchdown; the radar replay shows the Tutor crossing the centreline at 2.7nm - approximately 3.4d - reducing the procedural vertical separation between the Tutor and the Shadow to between 300-600ft. However, the Tutor pilot was cognisant of the approaching IFR traffic and 'did not feel threatened' by that traffic, knowing that it would pass beneath them. It is reasonable to suggest that the Tutor crew would have been actively scanning to their L as they approached the RW08RHC centreline in order to visually acquire the Shadow. On that basis, an issue worthy of consideration is whether the Shadow crew was aware of the TWR-to-TWR procedure and whether an awareness of that would have moderated their concern over the event. This could not be ascertained at the time of this

investigation. However, based upon both crews' accounts, they were able to discharge their responsibilities to 'see and avoid' each other, the Shadow crew aided by TCAS.

Albeit that the Tutor crew visually acquired the Shadow prior to receiving TI from the ADC, the ADC fulfilled his duty of care by providing a relatively timely warning to the Tutor crew of the confliction with the Shadow. Whilst the DIR's initial provision of TI to the Shadow crew was later than is required by the Regulation, it appears to have coincided with the Shadow's TCAS generating a TA and the crew correlating that information to visually acquire the Tutor. Consequently, BM SM contends that the timeliness of DIR's initial TI did not have a detrimental impact on the outcome of the incident. Moreover, whilst it has not been possible to determine conclusively why the TI was passed late, given the Shadow crew's training requirement to conduct the NDB-DME approach, BM SM contends that it is unlikely that earlier TI would have affected the outcome of the incident.

BM SM has requested that CWL review the CWL-BKH TWR-to-TWR transit procedure, specifically the datum used for '2nm from the airfield'.

HQ AIR (OPS) comments that this incident highlights the risk of aircraft getting close to one another when visual circuit traffic is required to integrate with an instrument approach pattern. Nevertheless, the Rules of the Air are quite specific; the Tutor was required to give way to the Shadow, who was on approach to land. It appears that the Tutor pilot, although visual with the Shadow, allowed the separation between himself and the Shadow to reduce to an extent that the Shadow pilot felt compelled to submit an Airprox. The message is clear - if in doubt give someone a wide berth! One final thing to note is that if the Airprox had been filed at the time of the incident, the actions of those involved in CWL ATC may have been more closely noted to aid the subsequent investigation. Therefore, all aircrew involved in an Airprox should report the incident directly to the ATC Unit concerned ASAP, if circumstances allow.

HQ AIR (TRG) comments that the TWR-to-TWR procedure limitations are exposed by this incident, in that the Tutor pilot would never be able to achieve an 'initial point', which should be passed on runway heading, to the north of the centre-line at 2nm if he is unable to cross that centre-line outside 2nm. The review of the procedure requested by BM SM is supported and HQ 22Gp has been asked to monitor progress on addressing the issue. Options for TWR-to-TWR traffic to hold clear of the circuit when conflicting instrument traffic is reported should also be considered. In the event, the Tutor crew initially relied on a perceived procedural separation from the instrument traffic and were fortunate that it was not high on the approach or going around, that all involved were receiving TI, that TCAS was available, and that each acquired the other visually in good time, resulting in a very low risk of collision. The Shadow crew's selection of TCAS RA mode on an approach where visual joiners are very likely to be encountered is potentially contributory in that the RA increased their level of concern. The Tutor pilot's decision to cross behind the Shadow, rather than turn E remaining S of the centre-line is understandable, but in doing so he inadvertently increased the Shadow crew's concern. An early orbit by the Tutor would probably have removed any perceived conflict.

UKAB Note (1): The CWL Unit Safety Management Officer reports that having discussed the Airprox at the CWL Airspace User Group and then at the Station Flight Safety Meeting, the Station elected to amend the current FOB entry for the BKH/CWL TWR-to-TWR procedure when both are on Easterly runways. The TWR-to-TWR procedure will no longer be approved for this configuration when there is any radar traffic, thereby reducing any potential for a recurrence and mitigating the Risk as low as reasonably practicable.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

This Airprox stemmed from the inevitable mix of instrument and visual traffic commonly encountered at this busy training A/D. The CWL TWR-to-TWR procedure for RW08 was aimed at affording some procedural separation between instrument traffic on final approach and traffic inbound for a visual join from Barkston Heath that had to cross the RW centre-line onto the deadside for RW08RHC. However, all ac joining visually through the IP (2nm from the threshold of RW08) are close to the FAT for the RW08 NDB/DME procedure, which is offset L of the RW centre-line.

DIR first passed the Shadow crew TI on the Tutor when the radar recording shows it was at a range of 2·5nm, crossing from R – L, crucially at the same height. This TI did not include any advice that it was VFR traffic inbound to join the visual cct and if the crew had been told that it might have been helpful. A Member suggested that as the Shadow crew was not CWL-based they would not be aware of the TWR-to-TWR procedure; however, a similar procedure is used between Waddington and CWL so they would probably have understood what the Tutor was doing. Nonetheless, simple amplification of the TI to highlight that it was traffic recovering visually might have allayed the crew's concerns. DIR conscientiously updated the TI at 1nm range, but by that stage the Shadow crew was responding to the TCAS RA having already acquired the Tutor visually at 2nm, which influenced the PF to fly a slightly higher ROD. It was noted that the Shadow crew did not advise DIR that they were responding to a TCAS RA, which Members realised should have been done when practicable and would have been helpful in maintaining the controller's SA.

The Tutor QFI, coaching his student through the TWR-to-TWR procedure, had been alerted to the presence of the Shadow on final by TOWER's broadcasts, but reports he did not spot the twin visually until it had closed to a range of 1nm. It was evident that the Tutor crew had crossed the RW centre-line at a greater distance from the A/D than specified in the FOB, and a Member suggested this was part of the Cause. However the Tutor was flying at the specified height and the BM SM report had revealed significant shortcomings in the promulgated TWR-to-TWR procedure. Plainly there is scope for instrument traffic to execute a MAP at any stage, which may result in a conflict inside the FAF with VFR traffic crossing the FAT to the deadside – even more so with the NDB-DME approach FAT being offset 14° L of the RW08RHC centre-line. The Board's CAA Strategy and Standards Advisor opined that the procedure was inherently unsafe, and subsequent to this Airprox and the review proposed by BM SM, it is evident that the Unit has taken a hard look at the procedure and wisely elected to discontinue its use for RW08RHC. The Members agreed that it was the procedure itself that was fundamental to the Cause of this Airprox. However, when the conflict was recognised, both crews were aware of each other's ac and took appropriate action to forestall a close quarters situation: the Shadow crew followed their TCAS initially and then increased the vertical separation visually against the Tutor, with the latter's crew maintaining their own visual separation that included a L turn and slight climb to increase the vertical separation as the Shadow crossed ahead. A Member suggested that the Cause was that the Tutor pilot flew close enough to trigger a TCAS RA. However a CAT pilot Member pointed out that a TCAS RA was inevitable in this situation and the system was working 'as advertised'. [Generally, TCAS RAs are inhibited below a height of 1000ft (+/-100ft), descend RAs are inhibited at 1100ft and all aural TCAS enunciations are inhibited at 500ft.] The Shadow pilot perceived the minimum separation to be 200ft and the radar recording confirms that at a range of 1nm the Tutor was 200ft above the twin; however, the combination of the Shadow's increased ROD and the Tutor's climb resulted in about 500ft abeam, with the CPA shown at 0·2nm as the Tutor drew aft some 600ft above the still descending Shadow. The Board concluded, therefore, that the Cause of this Airprox was that the TWR-to-TWR procedure was incompatible with the instrument approach to RW08RHC resulting in a conflict between the Shadow and the Tutor, which was resolved by both crews. In the Board's view, both crews' visual sightings and their prompt reactions had effectively forestalled any Risk of a collision.

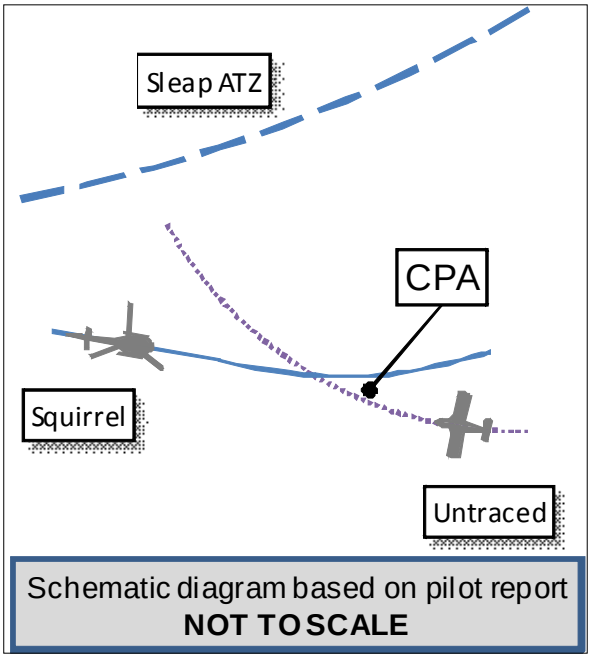
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The TWR-to-TWR procedure flown by the Tutor, was incompatible with the instrument approach to RW08RHC resulting in a conflict between the Shadow R1 and the Tutor, which was resolved by both crews.

Degree of Risk: C

AIRPROX REPORT NO 2012080

Date/Time:	14 June 2012 1035Z	
Position:	5248N 00246W (3nm W RAF Shawbury)	
Airspace:	Shawbury MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Squirrel	Untraced ac
Operator:	HQ Air (Trg)	NK
Alt/FL:	1000ft QFE (1007hPa)	NK
Weather:	VMC CLBC	NK
Visibility:	10km	NK
Reported Separation:	350ft V/100m H	NK
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL PILOT reports recovering to RAF Shawbury under VFR in a black and yellow helicopter with upper and lower strobes and navigation lights on. The SSR transponder was selected on with a discrete squawk and Modes 3/A and C. TCAS was not fitted. Passing Harmer Hill gate at height 1000ft, heading 090° at 100kts, he saw a low-wing, single piston-engine, blue and white ac 400m away heading directly towards him in a shallow R turn at the same level. He told the HP to initiate a descent and bank the ac L, away from the oncoming traffic. The other ac passed overhead and did not appear to take any avoiding action but maintained its shallow right bank. He reported that the HP had said he had not seen the other ac due to the aspect of the helicopter airframe and had wondered why they were initiating a descent. However, when told why he was manoeuvring, he then also saw the other ac. The Squirrel pilot noted that the crew were in agreement that the other ac had passed within 100m.

He assessed the risk as 'Very High'.

THE SHAWBURY AERODROME CONTROLLER reports that the Squirrel pilot called for a visual join from the western gate (Harmer Hill). A joining clearance was issued, after which the pilot stated he was avoiding an ac on his nose. He asked if the Controller had any details on the ac. On looking at the Hi-Brite radar slave the Controller saw a 7000 squawk without Mode C in the vicinity of the Squirrel helicopter. He passed this information to the Squirrel pilot and then observed the 7000 squawk track into the Sleap ATZ. He advised the Squirrel pilot that the other ac was within the confines of the Sleap ATZ and appeared to be in the cct pattern. He noted the Squirrel pilot informed him that the other ac was FW, that he did not believe the pilot of the other ac had seen him at any stage and that the 2 ac came within 100m of each other. He passed this information to the ATC Supervisor.

THE SHAWBURY ATC SUPERVISOR reports that the Squirrel pilot transferred to the ADC RT frequency at the appropriate VFR gate. He then heard on the ADC frequency that the pilot was avoiding a FW aircraft. The ac had left the Sleap ATZ and was not in RT contact with any Shawbury controllers. He contacted the Shropshire Aero Club at Sleap and was informed that the Sleap cct was too busy to identify the aircraft that had strayed out of the ATZ and that there were a number of visitors at Sleap who 'may not know the procedures'.

BM SAFETY MANAGEMENT reports that the Airprox occurred on 14 Jun 12 between a Squirrel HT2 operating VFR, recovering to RAF Shawbury through the Harmer Hill gate and in communication with Shawbury (SHY) TWR, and an untraced low-wing, single-engine, light ac.

Given the height at which the Airprox took place and the range from the closest NATS radar head, no radar replay was available with which to conduct the investigation.

The Squirrel pilot reported VMC with unlimited visibility and SCT cloud at 2000ft. He was conducting a visual recovery to SHY, routing east through the Harmer Hill gate (W of SHY), illustrated at Figure 1. Sleap airfield is NW of Shawbury and SW of Wem.

Figure 1. RAF Shawbury Local Area.

Given that the Airprox occurred on TWR freq, the unit did not perceive a requirement to complete a DASOR; consequently, their occurrence report was not completed until a significant time had elapsed after the incident and their recollection has suffered accordingly. Specifically, they were unable to provide an assessment of their workload or task complexity at the time of the occurrence. Furthermore, since submitting their DASOR the controller has been absent from work, so BM SM has been unable to obtain additional material. Consequently, the investigation has been based wholly on the reports of the Squirrel pilot and the ADC, the TWR and Low-Level R/T and landline transcripts.

The Squirrel pilot contacted Low-Level at 1022:55, "*east abeam Wrexham*", was provided with a BS and instructed to "*report at Harmer Hill*", which he acknowledged. Low-Level is a distinct control position operated by Shawbury ATC that provides a BS to all ac operating within LFA 9, Shawbury's Dedicated User Area. Analysis of the transcript has shown that, in the lead-up to the Airprox, Low-Level had at least 3 speaking units on freq; however, it has not been possible to determine the exact number. Moreover, it has not proved possible to determine whether the Low-Level position was band-boxed with another control position.

At 1031:41 Low-Level requested the Squirrel's position and was informed that it was, "*currently west abeam Sleap and just heading down towards the gate*." Low-Level replied to the Squirrel pilot, "*That's a known area of poor radar performance,* [unintelligible] *that explains it*" which he acknowledged. Based upon this exchange, it is reasonable to suggest that the Squirrel helicopter PSR or SSR returns were not visible on Low-Level's surveillance display at that time. The RAF Shawbury FOB 2309 (F12) states that radar services are limited between 7-15 miles on the 300-350 radials, up to 3000ft, due to poor radar performance or ground masking.

At 1033:26 the Squirrel pilot reported that he was, "*approaching Harmer Hill, stud 2*", which was acknowledged by Low-Level. At 1033:52 the Squirrel pilot first contacted TWR, requesting to join via Harmer Hill, which was acknowledged by the ADC and the airfield details were passed. The ADC described their workload as low with 3 ac on freq and routine task complexity. Immediately after this transmission, the Squirrel pilot transmitted that he was, "*descending, traffic avoidance on the nose*" which was acknowledged by the ADC. Based upon the Squirrel pilot's reported speed, he had flown approximately 1¼nm between leaving the Low-Level freq and reporting taking avoiding action. The ADC looked at the Hi-Brite VCR Radar Display (VRD), observed a '7000 squawk in [the

Squirrel's] vicinity' and 'watched the 7000 squawk track into the Sleap ATZ'. The Supervisor subsequently spoke to an individual from the Shropshire Aero Club, which operates from Sleap, and was informed that there was a number of visiting ac who 'may not know the procedures.'

Based upon the ADC's report, the untraced GA aircraft was believed to have been conducting ccts at Sleap at the time of the Airprox and had flown outside the ATZ. The Supervisor stated that the untraced GA ac was not in communication with any Shawbury controller.

The Letter of Agreement between RAF Shawbury and the Shropshire Aero Club states that 'during the normal operating hours of the RAF Shawbury CMATZ, civil aircraft **will** contact Shawbury Zone before leaving the Sleap ATZ. In contrast, the AIP entry for Sleap states that 'Aircraft intending to penetrate Shawbury MATZ **should** contact Shawbury Zone…prior to leaving Sleap ATZ' and that 'PPR and a briefing by telephone from Sleap is essential'.

The MMATM Chapter 18 Para 7 states that 'provided that appropriate training objectives have been defined and met…and aircraft have been identified' the Hi-Brite VRD may, exceptionally, be used to pass TI 'when the controller considers that doing so would aid the integration of traffic'. Notwithstanding the controller's Duty of Care, the Regulator has confirmed that this provision of TI is related solely to the integration of participating traffic and not to provide TI on non-participating, conflicting traffic.

CAP774 Chapter 2 Para 5 states that pilots in receipt of a BS 'should not expect any form of traffic information from a controller… and the pilot remains responsible for collision avoidance at all times'.

Notwithstanding the fact that the Squirrel crew were in receipt of an ATS, they were operating VFR and as such were required to discharge their responsibilities to 'see and avoid' without ATC assistance; this they did, albeit with reduced safety margins.

From Low-Level's perspective, at the point at which the Squirrel pilot left Low-Level's freq, it is likely that the untraced GA was within the Sleap ATZ and could be deemed to be no threat. More so given that no ac departing Sleap were in communication with Shawbury Zone at that point. Therefore, there was no imperative, nor requirement, for Low-Level to have passed a traffic warning to the Squirrel.

From the ADC's perspective, the Regulation for the use of the Hi-Brite VRD is explicit in excluding the provision of TI on conflicting traffic and focuses on its use in integrating circuit traffic. Whilst the controller's Duty of Care towards the Squirrel's crew remains, this requires the controller to perceive a potential confliction and given that the ADC was not required to integrate traffic, their focus would have been on visual scan, specifically toward the other ac established within the visual circuit, not the Hi-Brite VRD. Thus the controller was unable to perceive the confliction which, in this case, came about through the flight of the untraced GA ac outwith the agreement between RAF Shawbury and Shropshire Aero Club.

Whilst the statement made by the individual at the Shropshire Aero Club to the Shawbury Supervisor is not necessarily representative of the Club's policy, it is of concern nonetheless. More so, given that the safe operation of these neighbouring aerodromes is based upon compliance with the procedures laid down in the Letter of Agreement and the AIP. BM SM contends that Shropshire Aero Club must be able to assure RAF Shawbury that their briefing process for visiting ac operators is robust, in order that the associated operating risks are tolerable and ALARP. Moreover, whilst compliance with the Sleap AIP entry may have prevented this Airprox, it does differ from the Letter of Agreement; a difference which should be researched. RAF Shawbury remains engaged with Shropshire Aero Club to ensure that their common operating practices permit continued safe operations.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Squirrel pilot, transcripts of the RAF Shawbury RT frequencies, a report from the RAF Shawbury air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Board Members discussed the geometry of the Airprox and questioned whether the untraced light ac was in fact outside the Sleap ATZ. The Military Advisor amplified on the location of the Harmer Hill VFR Gate and the Board Members accepted that the Squirrel pilot would be used to transiting past the geographical location of the VFR

Gate and that his route took him clear of the Sleap ATZ. Consequently, the light ac was operating outside the Sleap ATZ. Notwithstanding this, the GA Member pointed out that the light ac was operating in Class G airspace, albeit within the RAF Shawbury MATZ, and that the principle of see and avoid applied. He also opined that the Squirrel pilot saw the light ac at sufficient range that he took appropriate action and was able to attain an estimated miss-distance of 350ft vertically and 100m horizontally.

The issue of the explicit exclusion on passing TI of conflicting traffic using the Hi-Brite display was also discussed. The Military ATC Member stated that the Hi-Brite display was not taken as a primary feed from the radar head, but rather as a 'feed from a feed' of another display in ATC and as such could be subject to latency and display of erroneous information. It was therefore not reliable or safe to use for TI on conflicting traffic. Other members opined that this was an undesirable state of affairs but also that it was not germane to this Airprox.

The Military Training Member questioned whether the Letter of Agreement (LoA) had been complied with. The Board agreed that it had not, but were of the view that a Letter of Agreement was established between units, not individuals. It was therefore the responsibility of Shropshire Aero Club to ensure that its members and visiting pilots conformed to the LoA. The GA Member also expressed his concern at the apparent lack of co-operation from the Shropshire Aero Club described by the Shawbury ATC Supervisor and commented on in the BM SM Report. The Board questioned whether the LoA applied just to members and visitors to the Shropshire Aero Club or to all visitors to Sleap A/D.

[UKAB Post-meeting Note: UK AIP AD 2-EGCV-1-1 refers. The Shropshire Aero Club is the A/D administrator and as such is responsible for the operation of ac from the A/D iaw local regulations.]

Members accepted that the Squirrel pilot would not have expected to meet another ac at that position in the MATZ and that his sighting of it was late. However, given the miss-distance he achieved, it was clear that his avoiding action was effective in removing the risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

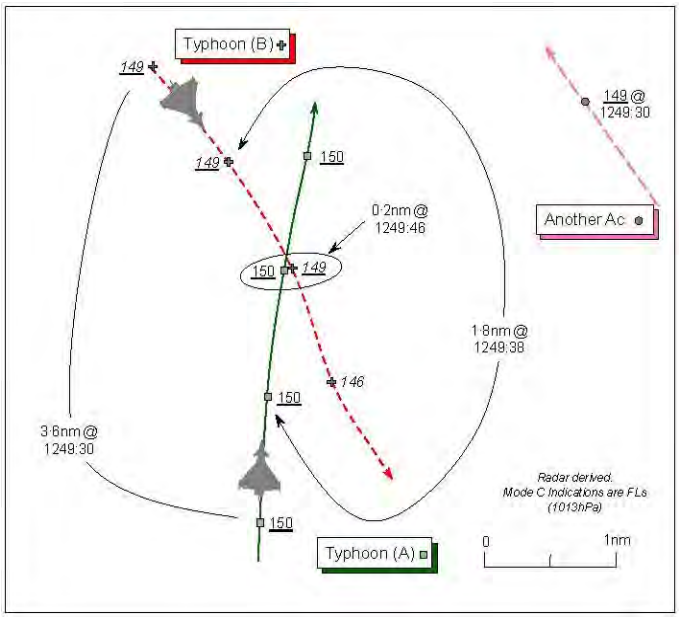
Cause: A late sighting by the Squirrel crew of the untraced light ac operating outside the Sleap ATZ.

Degree of Risk: C.

AIRPROX REPORT NO 2012081

Date/Time: 14 Jun 2012 1249Z
Position: 5335N 00003E
(3nm SW Spurn Pt Lt - 3nm NW of the b'dry of D307 - Donna Nook)
Airspace: London FIR (Class: G)

	Reporting Ac	*Reported Ac*
Type:	Typhoon T Mk1A	Typhoon FGR4
Operator:	HQ Air (Ops)	HQ Air (Ops)
Alt/FL:	FL150	NR
	SAS (1013hPa)	QNH
Weather:	VMC CAVOK	NK CAVOK
Visibility:	60km	30km
Reported Separation:	300ft V	800ft V
Recorded Separation:	100ft V/0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF THE BAe TYPHOON T Mk1A [TYPHOON (A)] reports he was departing from Coningsby on a dual training flight to AARA 7 flying the SID2, which terminates at FL150 with a track of 010°. Towards the top of climb, Coningsby DEPARTURES handed them over to London MILITARY on 275·50MHz under a TS. The controller informed them that Donna Nook Range [D307] was active and they elected to route to the N of the range. Flying in VMC level at FL150 at 0.85M, as they began a R turn from N onto E, traffic was called to them in their R 3 o'clock at 5nm and indicating 300ft below. As they looked into the Range pattern to their SE, they saw a Typhoon fly about 300ft beneath them heading N to S; no avoiding action was taken as it was seen too late and was flying away from them when they first saw it. They recovered to straight and level flight and were then told there was traffic 1nm N of them, 300ft below their level heading S. Looking to the N, they saw another Typhoon flying approximately W about 3nm away [shown as Another Ac].

The assigned code was selected with Mode C on; neither TCAS nor Mode S is fitted. The ac has a low-conspicuity grey colour-scheme but the HISLs were on.

THE PILOT OF THE BAe TYPHOON FGR4 [TYPHOON (B)] reports he was conducting air-to-surface weapons training in Donna Nook Range and was in communication with Range PRIMARY. A squawk of A7002 [Danger Areas General] was selected with Mode C; Mode S is fitted, TCAS is not fitted.

The pattern for air-to-surface weapons training involves exiting the confines of the promulgated Danger Area into Class G Airspace. During this time, N of the Range heading 170°, he held a radar contact from a range of about 10nm that was becoming a confliction and suitable avoidance was initiated with a L turn. Visual contact was achieved with a Typhoon at a range of about 2nm, which passed 800ft above his ac with no danger of collision.

THE LATCC (MIL) LJAO NE SECTOR TACTICAL CONTROLLER (NE TAC) reports he was providing a TS to Typhoon (A) that had departed Coningsby and climbed to FL150. The ac was due to fly into D323B. He was also working a 3-ship of Typhoons in East Anglia and another ac that was handed over to LJAO EAST. At the time, there were 2 other tracks prenoted and a PLANNER was in place; he assessed his workload as 'medium to high'.

He had considered obtaining a crossing clearance through Donna Nook Range for Typhoon (A), but noted that it was active with traffic manoeuvring within the range, so he advised the crew that he would not be able to arrange a crossing clearance due to the activity and asked them to confirm that they would be remaining outside the range, which they did.

Meanwhile, the 3-ship Typhoon formation was transferred on to a discreet frequency for GH. One of the formation required a separate squawk, which was allocated and the ac identified and Mode C verified. He then called traffic in Donna Nook to the crew of Typhoon (A) at a range of 5nm some 300 feet below. He then prenoted Typhoon (A) for their work in 323B. It was then that he saw that the range traffic was in Typhoon (A)'s 12 o'clock at 1nm at almost the same level; he called the traffic, which the crew saw and manoeuvred to avoid, he thought. In the next transmission, he passed TI on a second ac wearing a range squawk that was approximately R - 1 o'clock at a range of about 5nm.

THE LATCC (MIL) LJAO SUPERVISOR (SUP) reports that at the time of the incident the EAST and NORTH EAST Sectors were split with a PLANNER on NORTH EAST. Traffic levels had been medium to high and the PLANNER had been in place for approximately 15min when the incident occurred. NE TAC had been working a mixture of traffic which, though relatively straight forward, required constant division of attention. He did not directly observe the incident but the pilot of Typhoon (A) called to speak to him after he had landed and stated that he would be submitting a report. The pilot opined that TI had been passed, though perhaps a little late, but the other ac had passed within approximately 300ft of his ac. He also stated that the Donna Nook Range Pattern is flown at 15000ft RPS and the Coningsby SID directs ac to a similar position at FL150, which he believed to be the cause of this incident.

BM SAFETY MANAGEMENT reports that this Airprox occurred between Typhoon (A) transiting at medium level in receipt of a TS from LJAO NE, and Typhoon (B) operating VFR in the Donna Nook Air Weapons Range (AWR) pattern, in communication with Donna Nook.

AWR controllers do not provide an ATS to ac utilising the range and have no surveillance capability to provide traffic warnings on non-participating traffic. The AWR controller was not notified of anything untoward by Typhoon (B); consequently, no reporting action was taken.

LJAO NE was manned by 2 TAC controllers and a PLANNER, with medium to high traffic levels on the Sector. Based upon the SUP'S report, the PLANNER had been in place for approximately 15mins at the time of the Airprox. NE TAC described their workload as high to medium, with moderate task complexity, providing ATSs to a 3-ship of Typhoons manoeuvring 50nm SE of the CPA and to Typhoon (A) transiting at medium-level to route beneath EGD 323B. Whilst NE TAC stated in their report that, at the time of the Airprox, it had been 2 hours since their last break, unit manpower records indicate that the controller assumed the control position at 1243:00, having previously been the EAST PLANNER until 1159:00. However, it has not been possible to determine whether NE TAC utilised these 44mins as a break, or as an opportunity to complete non-controlling related duties.

At the time of the Airprox, LATCC (Mil) did not perceive a requirement for occurrence reporting action to include PLANNER controllers; hence NE Planner did not submit a report and their landline tape was not impounded. Furthermore, the transcript provided by LATCC (Mil) did not include NE TAC's landline comms. When an amended transcript was requested, the Unit stated that the tape had been returned to operational use, thus the data was lost. Whilst this has not affected the finding of Cause, it is disappointing nevertheless. In the absence of a transcript of the NE TAC and PLANNER's landlines, the Unit's investigation, based upon the original NE console recording, has been utilised to inform this investigation. Both LATCC (Mil) & ScATCC (Mil) have been reminded over the requirement to conduct all occurrence reporting activities for notified incidents in accordance with BM safety policy.

The incident sequence commenced at 1246:42 as the crew of Typhoon (A) made their initial call to NE TAC, was identified and placed under a TS, climbing to FL150. Typhoon (A) was 6.8nm NE of Coningsby, tracking NNE'ly with no SSR Mode C evident on the radar replay; Typhoon (B) was 18.6nm NNE, tracking E'ly, descending through FL104 manoeuvring within the confines of Donna Nook AWR.

At 1247:28, NE TAC advised Typhoon (A) that they couldn't provide, "*a transit of Donna Nook..due to traffic operating in that area, confirm you will be remaining clear*?" The crew of Typhoon (A) replied, "*affirm, we will proceed north of Donna Nook and we will be looking to..transit 3-2-3 Bravo low altitude, below 5 thousand feet*", which was acknowledged by NE TAC. At this point, Typhoon (B) was 15.6nm NE of Typhoon (A), in a LH turn passing through N, climbing through FL132; Typhoon (A) was level at FL150, tracking NE'ly.

At 1247:48, Typhoon (A) adopted a N'ly track to pass 1.6nm W of Donna Nook AWR. At 1249:00, NE TAC passed accurate TI to Typhoon (A) on un-related traffic operating within the confines of Donna Nook AWR. This was the

TI referred to in the report of the pilot of Typhoon (A) as 'right 3o'clock at 5miles, indicating 300ft below'. Typhoon (B) was 10.4nm N of Typhoon (A), indicating FL149, in a LH turn passing through W. Based upon the Unit's investigation report, having passed TI to the crew of Typhoon (A), NE TAC then attempted to contact CRC Boulmer to obtain a crossing clearance of EGD 323B for Typhoon (A). Whilst this liaison would routinely be conducted by the PLANNER, the Unit's investigation found that NE PLANNER was engaged in accepting a pre-note from another unit. CRC Boulmer stated that CRC Scampton was controlling EGD 323B; consequently, NE TAC terminated the call and immediately contacted CRC Scampton. The Unit's investigation determined that whilst the Planner had completed the pre-note and had the capacity to make the call to CRC Scampton, NE TAC did not request that the NE Planner undertake this task.

At 1249:13, Typhoon (B) rolled out of the LH turn, adopting a SSE'ly track, 4.1nm N of Typhoon (A) indicating FL149. At 1249:14, the unrelated Typhoon 3-ship requested a "*discrete freq for the next 5 mikes*" from NE TAC. Based upon the unit's investigation report, at the time when CRC Scampton answered the landline call from NE TAC, NE PLANNER informed NE TAC of the discrete frequency required by the unrelated Typhoon 3-ship. Prior to passing this frequency to the Typhoon 3-ship formation, NE TAC would have been required to 'go heads-down' to input the new frequency into their comms panel. At 1249:29, NE TAC replied to the unrelated Typhoon 3-ship, instructing the formation to "*re-contact me 2-8-4 decimal 6-7*."

At 1249:45, NE TAC passed TI to Typhoon (A) on, "*previously reported traffic 12 o'clock, 1 mile* [radar replay shows 0.5nm] *crossing left-right, same level*." Based upon their choice of words, NE TAC erroneously believed that the conflicting ac was the subject of the TI passed at 1249:00; however, the subject of this TI at 1249:45 was Typhoon (B). Although not stated in the Unit's investigation report, it is likely that during the 16sec from 1249:29 to 1249:45, NE TAC was engaged with the landline conversation with Scampton CRC with regard to the transit of Typhoon (A) below EGD 323B. The pilot of Typhoon (A) does not mention receiving this TI in their report, stating that as they 'looked into the range pattern to their SE and saw a Typhoon fly approximately 300ft beneath them heading north to south'. Based upon the geometry of the Airprox, this suggests that the pilots of Typhoon (A) saw Typhoon (B) as it passed down their starboard side.

The pilot of Typhoon (B) has stated that they obtained radar contact with Typhoon (A) at approximately 10nm range, visually acquired Typhoon (A) at approximately 2nm and initiated suitable avoidance. The CPA occurred at 1249:46, as Typhoon (A) passed 0.2nm W of Typhoon (B) that was indicating 100ft below Typhoon (A).

In terms of the ATM aspects of this Airprox, the dual requirements to liaise with the CRC and obtain a discrete UHF for the unrelated Typhoon 3-ship, combined with the NE Sector workload, conspired to distract NE TAC at a critical point. This distraction significantly delayed the provision of TI to Typhoon (A) on Typhoon (B), rendering the TI nugatory. On that basis, the safety barrier provided by ATM did not function, leaving platform and aircrew based mitigations. In accordance with the Rules of the Air, the pilot of Typhoon (B) was required to give way to Typhoon (A) and, having obtained sensor and then visual contact with the ac, this was achieved and the conflict in their re

Recommendation

BM SM has requested RAF ATM Force Cmd to direct a review of LATCC (Mil)'s occurrence reporting procedures.

HQ AIR (OPS) comments that the pilot of Typhoon (B) was attempting to perform a complex weapons delivery profile, which would require a degree of heads-in time; ideally this would be carried out within the confines of the AWR which would have afforded the pilot a degree of protection. However, it has been reported that due to the dimensions of the AWR being insufficient to practice these profiles, ac routinely exit the confines of the range during their manoeuvring. HQ Air has requested a review of the dimensions of AWRs to determine whether Airspace Change Proposals are required to ensure aircrew can practice these profiles within the confines of the AWR. However, although the pilot of Typhoon (B) had radar contact on, and then gained visual with, Typhoon (A), the avoiding action he took was insufficient to prevent causing concern to the crew of Typhoon (A).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

The HQ Air (Ops) Member reiterated a concern expressed by the PIC of Typhoon (A) that the Coningsby SID terminated at FL150 in the vicinity of the Donna Nook AWR pattern, which introduced a potential conflict with any ac operating in the AWR pattern at medium level, as occurred here. A military area controller Member opined that the AWR was too small to contain the range patterns commonly in use, but the Board's low-flying Ops Advisor explained that the promulgated AWR boundaries are delineated solely to encompass any inherent danger from the ordnance in use and not to provide any measure of 'protection' to traffic in the range pattern. The airspace in the vicinity of the range was Class G where 'see and avoid' prevailed; as such it was available for use by all aviators, so good airmanship and sound flight planning dictated how much leeway non-participating pilots should afford the range when transiting in the vicinity. Similarly, pilots in the AWR pattern needed to maintain a good lookout scan for non-participating traffic. However, the Board was reassured to learn that a review of the dimensions of the AWRs was being sought and an HQ Air fast-jet pilot Member advised the Members that Coningsby was also addressing the issue of the SID locally within a local airspace user working group.

Without the benefit of a radar service to supplement his lookout, the pilot of Typhoon (B) reports that he held an AI radar contact on a conflicting ac - Typhoon (A) - from a range of about 10nm, gained visual contact at a range of about 2nm and his ac had passed 800ft below Typhoon (A) with no danger of collision. For their part, the crew of Typhoon (A) first saw Typhoon (B) about 300ft beneath them flying away to the S and were unable to take any avoiding action as it was seen too late. However, the recorded radar data reflected that the vertical separation based on Mode C was only 100ft as Typhoon (B) underflew Typhoon (A), both ac having maintained level flight immediately before the encounter. The Board was aware that the tolerance applicable to verified Mode C was +/-200ft adding weight to Typhoon (A) crew's estimate, which was in-line with the upper tolerance. However, the Board could not reconcile the account from the pilot of Typhoon (B), which was not substantiated by the available radar data. It seemed inconceivable to other pilot Members that the pilot of Typhoon (B) would knowingly fly a mere 100ft beneath another ac and, given the significant disparity between the pilot's report compared to the recorded radar data, some Members perceived that the pilot of Typhoon (B) had not seen the ac flown by the reporting pilot. However, the HQ Air (Ops) Member briefed the Board that the pilot of Typhoon (B) had indeed seen Typhoon (A), had given a 'wing waggle' before they passed and had been entirely content with the extant vertical separation as he underflew it, albeit that it was somewhat less than 800ft.

Conversely, it was evident that the crew of Typhoon (A) without any apparent AI contact on Typhoon (B), had been surprised by the sudden appearance of another ac passing so close beneath them with very little warning from ATC under the TS being provided. The HQ BM report had concluded that the LJAO NE TAC controller had become distracted with other tasks, which had significantly delayed the transmission of TI on Typhoon (B) to the crew of Typhoon (A), effectively rendering the TI of negligible value. Under the TS agreed with NE TAC, the crew of Typhoon (A) could reasonably have expected TI to have been passed to them in sufficient time to make practical use of it to assist them discharge their responsibilities to 'see and avoid' other ac operating in Class G airspace. This had not occurred here and it was evident to controller Members that NE TAC, having identified activity in the AWR pattern, was remiss in not passing TI much earlier through not apportioning his work priorities correctly. In the absence of landline transcripts and a report from NE PLANNER the Board concluded this was indicative of poor teamwork between the NE TAC controller and NE PLANNER. As it was, the TI passed by NE TAC was inaccurate and only transmitted 1sec before the CPA shown on the radar recording, which was wholly inadequate and gave the crew of Typhoon (A) no warning at all that they were about to be underflown at close quarters. In some Members opinion this was part of the Cause; however, others disagreed and following a lengthy debate, the Board agreed by a majority that the late transmission of TI to the crew of Typhoon (A) was a contributory factor in this Airprox.

Plainly all the pilots involved here were operating in Class G airspace and in this situation the pilots of both ac were equally responsible to 'see and avoid' each other. Pilot Members were concerned that Typhoon (A) crew's lookout scan had not detected Typhoon (B) beforehand in the prevailing CAVOK conditions. On the other hand, some Members considered that the pilot of Typhoon (B) had to 'give way' to Typhoon (A) on his R, and a Member suggested that the pilot of Typhoon (B) might have been too intent on maintaining his range profile to the detriment of giving Typhoon (A) a safe berth. However, others recognised the inherent pressure to complete the range detail with as little disturbance as possible whilst keeping all 'the variables' to a minimum but still accomplishing the aim of the sortie safely. Unbeknown to the crew of Typhoon (A), the pilot of Typhoon (B) was aware of the impending conflict, had seen their ac and indicated to them that he had. Unfortunately this 'wing waggle' was not seen by the crew of Typhoon (A), who didn't see Typhoon (B) until it was passing beneath them. Whilst the pilot of Typhoon (B) might have been able to react instantly to any further manoeuvre, it was he who had engineered the eventual separation that was too close for comfort and had caused the crew of Typhoon (A) concern. The Board concluded,

therefore, that the Cause of this Airprox was that the pilot of Typhoon (B) flew close enough to cause the crew of Typhoon (A) concern, but in these circumstances no Risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The pilot of Typhoon (B) flew close enough to cause the crew of Typhoon (A) concern.

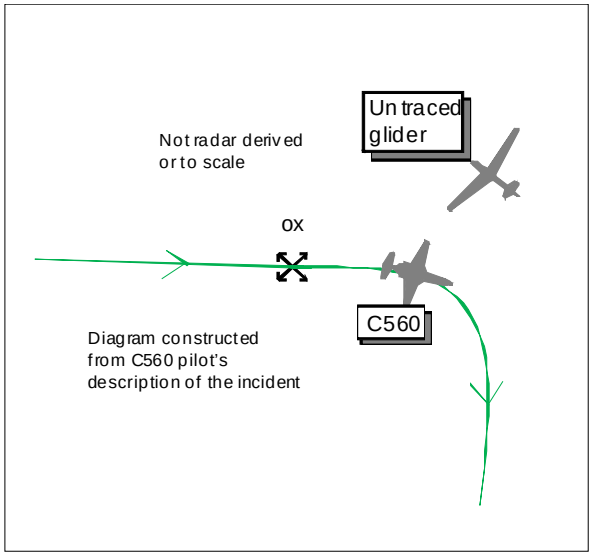
Degree of Risk: C.

Contributory Factors: Late TI to Typhoon (A) crew.

AIRPROX REPORT No 2012082

AIRPROX REPORT NO 2012082

Date/Time:	27 May 2012 1331Z (Sunday)	
Position:	5150N 00119W (O/H OX NDB)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C560XLS	Untraced Glider
Operator:	Civ Comm	NK
Alt/FL:	3500ft (QNH)	NK
Weather:	VMC NK	NK
Visibility:	10km	NK
Reported Separation:	0ft V/50m H	NK
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C560XLS PILOT reports inbound to Oxford, IFR and in communication with Oxford Tower, [actually Approach] squawking 7000 with Modes S and C; TCAS was fitted. The visibility was 10km in VMC and the ac was coloured white with nav, taxi and anti-collision lights all switched on. While turning R entering the OX hold, he thought, at 3500ft and 160kt they crossed a glider in a RH spiral on their L at the same altitude. They did not have the glider in sight until they had passed abeam it and it looked like the glider did an avoiding manoeuvre. The estimated distance was 50m. They continued the NDB approach [NDB(L)DME RWY01] as cleared and descended on the procedure. Established on the outbound leg, the PIC saw a group of gliders (around 5) on a spiral under a big cumulus cloud on the extended RW centreline 4nm from the airfield. They immediately cancelled IFR, left the standard approach flight path in order to avoid the traffic and continued visually in an offset centreline final RW01 before performing a successful landing.

UKAB Note (1): The C560 Capt was contacted to clarify the geometry of the incident. He could not remember entering the OX hold (L turn at OX) and thought he had turned R and flown straight outbound into the procedure. The glider passed to his L as he turned R outbound for the procedure.

RAC MIL reports that despite extensive tracing action the identity of the glider remains unknown. The radar replay was inconclusive and procedural tracing action via numerous glider sites did not elicit any likely candidate that matched the glider's profile.

ATSI reports that the Airprox was reported to have occurred at 1331 UTC, in the vicinity of Oxford Airport, within Class G airspace and outside the Oxford ATZ, between a Cessna Citation 560XLS (C560) and a glider.

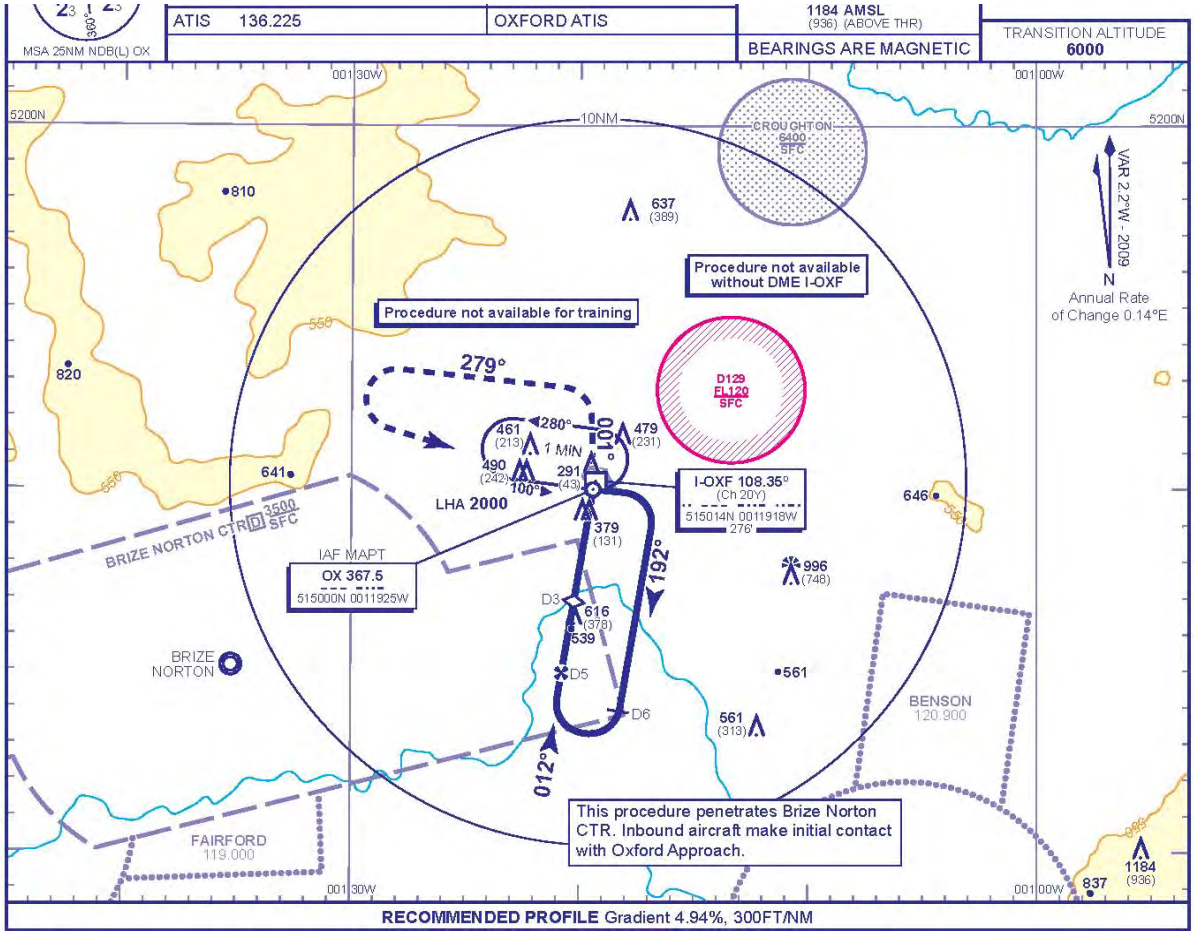
The C560 was an IFR flight, inbound to Oxford from Ajaccio-Corsica (LFKJ) and in receipt of a PS from Oxford Approach on frequency 125·325MHz. The glider was untraced but believed to be one of a number of gliders operating in the vicinity of Oxford.

The Oxford controller was providing Approach control services, without the aid of surveillance equipment.

CAA ATSI had access to area radar recordings, together with a written report from the C560 pilot. Although gliders had been mentioned to the controller, no Airprox report was made to the ATSU, therefore no incident was recorded and the controller did not complete a report. The RT recordings were impounded, but due to a technical problem it was not possible to obtain a replay of the incident. The CAA transcription unit has discussed the issue with the ATSU, who have updated their procedures for checking and impounding both RT and Radar recordings. CAA ATSI visited the unit in order to discuss the incident with the controller concerned and the ATSU. The flight progress strips for the period were copied.

The weather for Oxford was not available; however the weather for Brize Norton is provided: METAR EGVN 271250Z 08008KT CAVOK 25/13 Q1018 BLU NOSIG=

The Approach controller, when questioned, reported that the C560 was coodinated inbound, descending to 3500ft, routeing to the Oxford NDB(L)OX from the SW. The C560 flight was cleared to enter the holding pattern prior to commencing the NDB(L)DME RWY01 procedure (see below), which would require the C560 to turn L at the NDB(L)OX, for the outbound leg 280^{o} of the hold and then inbound leg 100^{o}. The AIP page AD 2-EGTK-8-1, requires that entry into the racetrack procedure for the NDB(L)DME runway 01, is restricted to Sector 3 entry from the inbound leg 100^{o}M of holding pattern.



At 1326:39, radar recording shows the C560 overflying the Brize Norton CTR on a N'ly track, passing an altitude of 4600ft in the descent to 3500ft. As the C560 cleared the Brize Norton Zone, the ac turned onto a NE'ly track towards Oxford maintaining an altitude of 3500ft. Radar recording showed a number of intermittent contacts operating in the vicinity of Oxford which CAA ATSI considered to be gliders.

The Oxford controller was aware of the glider activity in the vicinity of Oxford. The controller indicated that on initial contact the C560 crew was informed about gliding activity in the area. The controller also mentioned that due to the good weather conditions, after the previous week of poor weather, there was an increased number of gliders operating in the area.

At 1328:48, the C560 was maintaining an altitude of 3500ft, on a NE'ly track and crossing the OX NDB, followed by a L turn into the holding pattern (outbound leg 280^{o}). At 1330:00, the C560 was W'bound in the entry procedure at 3500ft and passing 0·1nm N of a contact (This may have been the glider mentioned in the pilot's written description). The controller indicated that the pilot made no comment about gliders until later when outbound in the procedure.

At 1332:27, the C560 was outbound in the NDB(L)DME RWY01 procedure, 2·2nm SE of Oxford, at an altitude of 3100ft. Also shown are intermitent contacts 2·5nm ahead of the C560. The controller indicated that at this point,

towards the end of the outbound leg, the C560 pilot had reported sighting gliders and had requested an earlier R turn for a visual approach, which was approved. The C560 turned early, passing NW of the unknown contacts.

When questioned the controller indicated an expectation that the pilot had resolved any potential conflict by turning in early on a visual approach. No further comment was made by the pilot and no Airprox report was filed at the unit.

The C560 was in receipt of a PS from Oxford Approach. CAP774 UK Flight Information Services, Chapter 4, Page 5, states:

'A Procedural Service is an ATS where, in addition to the provisions of a Basic Service, the controller provides restrictions, instructions, and approach clearances, which if complied with, shall achieve deconfliction minima against other aircraft participating in the Procedural Service. Neither traffic information nor deconfliction advice can be passed with respect to unknown traffic.

The controller shall provide traffic information, if it is considered that a confliction may exist, on aircraft being provided with a Basic Service and those where traffic information has been passed by another ATS unit; however, there is no requirement for deconfliction advice to be passed, and the pilot is wholly responsible for collision avoidance. The controller may, subject to workload, also provide traffic information on other aircraft participating in the Procedural Service, in order to improve the pilot's situational awareness.'

The Oxford controller provided TI on glider activity in the vicinity of Oxford airport, which most likely increased the C560 pilot's situational awareness and lookout for gliding activity.

The pilot's written report indicated that the C560 passed close to a glider whilst in the hold [see UKAB Note (1)] and the time of the radar recording (1330) correlates with the time of the reported Airprox. CAA ATSI considered it most likely that this was the glider (untraced), involved in the Airprox. The controller indicated that the pilot only reported sighting gliders when outbound in the NDB(L)DME RWY01 procedure and elected to turn R early, completing a visual approach in order to avoid the gliders.

The incident occurred when the C560 came into proximity with a glider operating in the vicinity of Oxford Airport. The Oxford controller passed TI about the glider activity in the area which most likely increased the pilot's situational awareness and lookout, resulting in the sighting of the glider, with appropriate action to resolve the conflict.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of the C560XLS, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The Chairman expressed disappointment that the reported glider remained untraced, which left Members with only one side to the story. A pilot Member opined that transiting ac are squeezed by the Weston-on-the-Green Danger Area and the Brize Norton CTR and that the glider pilot was probably unaware of the OX holding procedure O/H Oxford aerodrome. Given that this encounter occurred in the Class G airspace of the Oxford AIAA, the pilots of both ac were responsible for maintaining their own separation from other traffic through see and avoid. Prior to its arrival in the O/H, the Oxford controller had alerted the inbound C560 crew to the presence of gliders in the area by passing a generic warning. Members were acutely aware of the difficulty faced by flight crews operating under IFR in meeting their responsibilities to maintain a good lookout when under a high workload, flying an instrument approach procedure where the procedure is not protected by CAS. However, the C560 crew only saw the glider as they turned outbound at the OX, estimating it passed 50m clear to their LHS which Members agreed was effectively a non-sighting and the cause of the Airprox. Without a report from the glider pilot, it was impossible to state whether the pilot had seen the C560 and taken avoiding action or the pilot may have been oblivious to the C560 and just been manoeuvring as it passed.

Without the incident being captured on radar and without a report from the glider pilot, Members pondered as to how much risk the incident carried. Some Members believed that, owing to the inherent difficulty of estimating distances, particularly when a brief encounter occurs, the separation may have been more than 50m when the ac passed, albeit safety was compromised. Others thought that the ac had passed by chance, with there being no time for the C560 crew to take avoiding action, where an actual risk of collision existed. In the end, on the limited

information available, the Board concluded that luck had played a major part such that a definite risk of collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the C560XLS crew.

Degree of Risk: A.

AIRPROX REPORT No 2012083

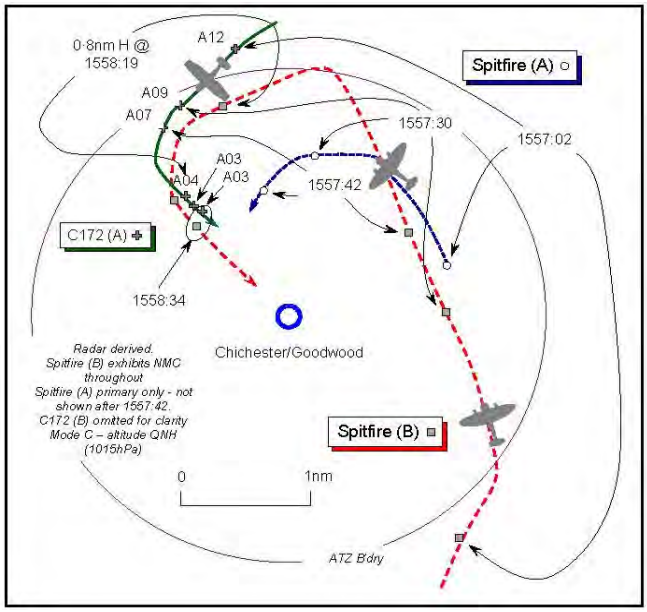
AIRPROX REPORT NO 2012083

Date/Time: 20 Jun 2012 1558Z

Position: 5052N 00046W (1nm final RW14R at Chichester/Goodwood A/D - elev 110ft)

Airspace: Goodwood ATZ (Class: G)

	Reporting Ac	*Reported Ac*
Type:	Cessna C172	VS Spitfire TR9
Operator:	Civ Trg	Civ Trg
Alt/FL:	300ft↓	400ft
	QFE (1011hPa)	QFE (1011hPa)
Weather:	VMC CLBC	VMC NK
Visibility:	50km	CAVOK
Reported Separation:	Nil V/100ft H	150ft V/0·25nm H
Recorded Separation:	0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF THE CESSNA C172 [C172 (A)], a flying instructor, reports he was instructing a student on their first cct detail at Chichester/Goodwood A/D and in receipt of a BS from Goodwood INFORMATION on 122·450MHz. A squawk of A7000 was selected with Modes C and S on.

They were established in the LH cct pattern to RW14R when two Spitfire pilots called to join the cct from a 'running break' [actually a 'run-in and break'] and were informed by the FISO of the two ac already established in the cct. The lead Spitfire pilot replied they would position high and behind. Turning on to final [No2 in the pattern] whilst demonstrating the cct, the first Spitfire - Spitfire (A) – entered the cct area from above and in front of his aeroplane, then passed down the starboard side of the ac ahead on final – the No1 - and proceeded to cut in front and perform a 'running break'. About 30secs later, at 1nm final heading 140° at 65kt descending through 300ft QFE (1012hPa), the second Spitfire – Spitfire (B) – was spotted as it flew past his starboard wing at the same height about 100ft away. Spitfire (B) then proceeded to cut in front of his aeroplane with a 'high' Risk of a collision whilst executing a 'running break'. He considered going around but, because of its speed, he did not know where Spitfire (B) was going or where the pilot of Spitfire (A) had positioned his ac, so he continued his approach and took no avoiding action. He did not report an Airprox on the RT, but after landing did so in person with ATC.

His ac has a white colour scheme; the HISL, beacon, landing and taxi lights were all on.

THE PILOT OF THE VICKERS SUPERMARINE SPITFIRE TR9 [SPITFIRE (B)] reports he was recovering to Chichester/Goodwood A/D, VFR, during an instructional sortie with a student. The two Spitfires, flying 1nm in trail but as separate speaking units with Spitfire (A) ahead, called Goodwood INFORMATION on 122·450MHz for rejoin. The cct was busy so an O/H join was requested. As the cct traffic density reduced [by about a third] and the two ac in the cct [the two C172s] were seen from a range of 4nm, a trail 'run-in and break' was requested. Whilst heading 140° at 240kt, level at 400ft A/D QFE, C172 (A) on final approach [registration given] was avoided visually by 150ft vertically above and ¼nm horizontally as the aeroplane passed to port 1nm NW of the A/D during the 'run-in and break'. He assessed the Risk as 'none'; his was the second Spitfire to recover.

The Spitfire TR9 has a grey and dark green WWII camouflage scheme; the nav lights were on.

ATSI reports that the Airprox occurred 1nm NW of Goodwood, within the Class G Goodwood ATZ in the final approach area to RW14. The Goodwood ATZ comprises a circle radius 2nm, centred on the midpoint of RW14R/32L, extending from the surface to a height of 2000ft above the A/D elevation of 110ft.

The C172 flown by the reporting pilot – C172 (A) - was on a local VFR flight from Goodwood operating in the visual LH cct to RW14R together with another C172 – C172 (B). The subject Vickers Supermarine Spitfire TR9 Spitfire (B) was returning VFR to Goodwood together with another Spitfire - Spitfire (A) - following a training detail. The flight academy operates the Spitfires two days a week from Goodwood. These days vary subject to weather. The two Spitfires were not flying in formation. The LAC Radar recording shows Spitfire (B) displaying an SSR code 7000 without Mode C; Spitfire (A) is shown as a primary contact only. Altitudes displayed on the radar recording are based on the London QNH (1015hPa).

Goodwood ATSU was manned by a FISO, callsign Goodwood INFORMATION; ATSI assessed the FISO's workload as medium/heavy. A report was not available from the FISO.

The UK AIP entry for Goodwood at EGHR AD 2.22 – Flight Procedures, states:

'Fixed-wing circuit height 1200ft or as directed by ATS.

Fixed-wing standard join is overhead at 2000ft. 'Straight-in' and 'base' joins are strongly discouraged when the circuit is active. ATS can advise on circuit status. Outside ATS hours or after sunset, overhead join is mandatory.'

The Goodwood QNH was 1015hPa and the QFE 1011hPa.

In the absence of a Goodwood weather, the Shoreham METAR for 1550Z was: 14012KT 9999 FEW042 17/12 Q1015=

At 1551:30, C172 (A) departed from RW14 to position into a LH visual cct shared with C172 (B). The two Spitfire pilots had called separately for a rejoin from the S and, when advised the cct was active, indicated an intention to position for the standard O/H join.

At 1555:28, Spitfire (B) pilot was asked to report through the O/H or downwind as the pilot wished; Spitfire (B) pilot responded that he may well join downwind but would advise when closer and indicated he was just crossing the coast.

At 1556:10, C172 (B) pilot reported short final and was given a discretionary touch and go. C172 (A) was on L base.

At 1557:02, Spitfire (A) pilot reported visual with both of the cct ac and requested *"..am I clear to break to the deadside"*. The FISO asked if Spitfire (A) pilot was following the No2 ac [C172 (A)] and added that both of these light ac were remaining in the cct for a touch and go. Spitfire (A) pilot replied that he would be well above the No2 - C172 (A) - and overtaking No1 in the pattern - C172 (B). Spitfire (B) is shown approaching the cct area in the vicinity of the downwind leg.

At 1557:30, Spitfire (B) pilot reported visual with both C172s and Spitfire (A) to position behind Spitfire (A) stated *"..I'd like to roll in behind for a run-in and break as well".* The FISO advised Spitfire (B) pilot, *"obviously if you could make sure you don't get in front of the circuit traffic that's not a problem",* thereby acknowledging the run-in and break; Spitfire (B) pilot acknowledged with Wilco.

At 1557:35, the radar recording shows Spitfire (A) N of the A/D with no SSR and 1nm inside of C172 (A), which was approaching a 1.8nm final at an altitude of 800ft. C172 (B) was below radar coverage on very short final.

Spitfire (A) continues through the RW14R centreline at the short final position and the pilot reported deadside descending now. Spitfire (A) continued O/H the A/D on the deadside before positioning into a short cct pattern. C172 (B), still below radar coverage, is believed to be climbing out after a touch and go.

At 1558:14, Spitfire (B) pilot reported "[Spitfire (B) C/S] *is long final* (sic) *visual with both Cessnas for a run-in and break I'll be inside both Cessnas",* (It is believed that Spitfire (B) pilot intended, after the break to remain inside of C172 (B), which was on climb-out). The FISO reminded Spitfire (B) pilot that both light ac would be remaining in the cct and asked Spitfire (B) pilot to report again downwind. The FISO added that obviously they would be in the cct and climbing out again. Spitfire (B) pilot replied, *"that's affirmative visual with all circuit traffic".*

At 1558:19, C172 (A) is shown 1·2nm from the A/D at an altitude of 400ft and indicated groundspeed of 56kt. Spitfire (B) is shown turning towards the RW into the final approach area 0·8nm behind C172 (A) with no Mode C but with an indicated radar groundspeed of 232kt. At 1558:30, C172 (A) is shown at an altitude of 300ft, with Spitfire (B) indicating a groundspeed of 242kt in C172 (A)'s 5 o'clock at 0·2nm. Spitfire (B) continued to pass to the R of C172 (A). The projected paths and plotted positions indicate that the CPA is at 1558:32, between radar sweeps, as Spitfire (B) passes 191m [0.1nm] to the R of C172 (A). At 1558:34, Spitfire (B) is shown in the C172 (A)'s 2 o'clock position at a range of 230m. Spitfire (B) pilot's written report states he was flying at a height of 400ft above the airfield, which equates to an altitude of 510ft.

At 1558:42, the pilot of C172 (A) reported on final and was given touch and go at discretion by the FISO (Surface Wind 120/10). At that point, C172 (A) has faded from radar but is believed to be about ½nm from touchdown with Spitfire (B) commencing a L turn into the short cct pattern as it passed the RW14R threshold ½nm ahead of C172 (A). Spitfire (A) and Spitfire (B) continued in a short cct pattern to land ahead of C172 (B) without further incident.

The FISO indicated that his initial expectation was that with an active cct the Spitfire pilots had intended to make standard O/H joins. When the Spitfire pilots requested run-in and breaks with two ac already in the cct, the FISO acknowledged this and passed TI with an expectation that the two Spitfires would remain on the deadside, well clear of C172 (A), as was the usual practice.

The ATS Unit reports that the Spitfire pilots prefer, subject to traffic, the run-in and break option as a method of allowing the ac to bleed off speed. The Unit expressed some concerns regarding the mix of training ac and variations of speed with students in the cct. There was a recognition that student pilots might be unsure of the intention of the high-speed ac joining the cct in this way.

Unless otherwise approved the standard join is O/H at 2000ft. The cct was reported as active and both Spitfires reported their intention to make a standard join. Spitfire (A) joined the cct first, closely followed by Spitfire (B) and with only two ac ahead in the cct both Spitfire pilots requested a run-in and break.

The FISO passed appropriate traffic information to the Spitfires and acknowledged the 'run-in and breaks'. However, it was noted that the FISO did not pass the two C172 ac, TI regarding the intentions of the two Spitfires, although it was likely that they were listening out on the RT and would have been aware of the arriving Spitfires. The FISO asked Spitfire (B) pilot not to get in front of the cct traffic on final and advised both Spitfires that the cct traffic was remaining in the cct.

The Manual of Flight Information Services, CAP410 Part B, Chapter 1, Page 1, Paragraph 2.1, states:

'The FISO has the following specific responsibilities:

a) issuing information to aircraft flying in the aerodrome traffic zone to assist the pilots in preventing collisions.'

Page 4, Paragraph 7.4, states:

'Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly. Although there is a legal requirement for pilots to report entering and leaving the ATZ [Rule 45 of the Rules of the Air Regulations], this is not the case for other reports in the circuit. Any requests for position reports downwind, final etc., for the purposes of passing traffic information, only have the status of a request although it is expected that most pilots will comply.'

The Airprox occurred when the pilot of C172 (A) on short final for RW14, with a student pilot, became concerned about the relative position and proximity of Spitfire (B), which had positioned to the R of C172 (A) during the run-in and break manoeuvre that that had been acknowledged by the FISO.

It is recommended that the ANSP, in consultation with local operators, review the requirements and procedures for unusual manoeuvres during periods of normal operation when training ac and student pilots may be operating in the cct.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings and a report from the appropriate ATC authority.

Members noted that the UK AIP specifies that the standard fixed-wing join at Goodwood is a conventional civilian overhead join at 2000ft, with a cct height of 1200ft. However, the run-in and break executed by the Spitfire pilots seems to have been a modified form of the normal military procedure designed to allow high performance ac to join and land quickly usually crossing the A/D boundary below cct height with a climbing break to wash-off speed as the ac breaks upwards onto the downwind leg. The run-in and break is not a normal procedure at civilian A/Ds and would be unknown to many civilian pilots. A GA Member opined that mixing civilian and military procedures is undesirable and this Airprox had raised a legitimate concern about the operation of ac, of widely dissimilar performance, operating in the same cct, but in differing ways; trying to integrate faster high performance ac into an already established pattern with slower training ac could prove difficult and/or disconcerting to those not familiar with the procedure. In the Member's view, both Spitfire pilots had not paid sufficient regard to the ac already in the cct pattern and had not conformed to the pattern formed by the two C172s established in the conventional LH cct to RW14, as they were required to do by the Rules of the Air. Another concern was how other pilots operating in the cct were supposed to understand what the Spitfire pilots were doing if the procedure was not promulgated to them, especially if it happened to be a student pilot on a solo landaway.

Since Goodwood employs FISOs, the Board recognised that it was entirely a pilot responsibility on how a joining pilot should position his ac in relation to other ac in the cct pattern and determine whether it was safe to do so. Members understood that FISOs are not empowered to instruct pilots where or how to join the cct and the ATSI report had made it plain that they are limited to passing information on known traffic flying within the ATZ and the immediate vicinity. Members perceived that the FISO had done as much as he could to ensure that the Spitfires could recover expeditiously and prevent a confliction with the other ac in the cct. Although it was likely that the pilot of C172 (A) would have been aware of other ac arriving in the cct from other pilot's RT calls, it was noted that the FISO did not pass TI to the two C172 pilots already established in the cct regarding the intentions of the two Spitfire pilots when their intention to conduct run-in and breaks was announced. Moreover, it seemed that the pilot of C172 (A) was not overly familiar with this procedure and just by listening out on the RT he would have gleaned little.

A helicopter pilot Member was also not persuaded that a run-in and break was a sensible method of joining in this environment. The pilot of Spitfire (A) had joined very tight ahead of C172 (A) and Spitfire (B) had run-in from an approximate IP position – about 1½nm on the centreline deadside - but a descending or level break to cct height might have been more appropriate. To overtake ac on final at low level into a climbing break would be most unexpected by other civilian pilots in the cct. Although it was clear that the pilot of Spitfire (B) was visual as he caught-up on C172 (A), his own RT call at 1558:14, when he was about 1nm behind, "..*long final visual with both Cessnas for a run-in and break I'll be inside both Cessnas"* was confusing; a fast-jet pilot Member noted that the terms 'long final' used jointly with 'run-in and break' were mutually exclusive. This might have suggested to the pilot of C172 (A), who would have been unable to see the other ac astern, that the pilot of Spitfire (B) was overtaking him on final to land first. As it was, Spitfire (B) pilot was still in the process of running in low on the deadside to break downwind into the cct and was not trying to land ahead of C172 (A). However, the pilot of C172 (A) reports he was unsure what Spitfire (B) pilot was doing when he flew past and did not know where Spitfire (A) was in the pattern.

A civilian controller Member who also undertakes FISO duties during special events, advised that at Duxford an additional '30 sec to the break' RT call was made, which worked well and gave additional warning to other circuiting pilots. Another civilian area control Member noted that the C172 pilots operating in the conventional 1200ft cct would not be expecting ac to fly past them on final this close and then climb to cct height from 400ft. A military pilot Member considered that this was an acceptable method of joining the cct if all concerned were aware of what was happening; here the pilot of Spitfire (B) had sight of the two C172 ac in the cct and Spitfire (A) ahead throughout the manoeuvre and believed that he had afforded adequate separation. The Member perceived that the main Cause was that the pilot of C172 (A) was concerned by the presence of Spitfire (B). However another

experienced fast-jet test pilot Member contended that the pilot of Spitfire (B) had flown too close to the C172 (A) on final whilst running-in for the break. Weighing all the various factors carefully, the Members finally concluded that the Cause of this Airprox was that the pilot of Spitfire (B) flew close enough to cause the C172 pilot concern. However, the pilot of Spitfire (B) had passed C172 (A) on the dead-side and afforded no less than 0·1nm horizontal separation according to the radar recording, keeping C172 (A) within sight throughout the manoeuvre. The Members agreed unanimously, therefore, that no Risk of a collision had existed in these circumstances.

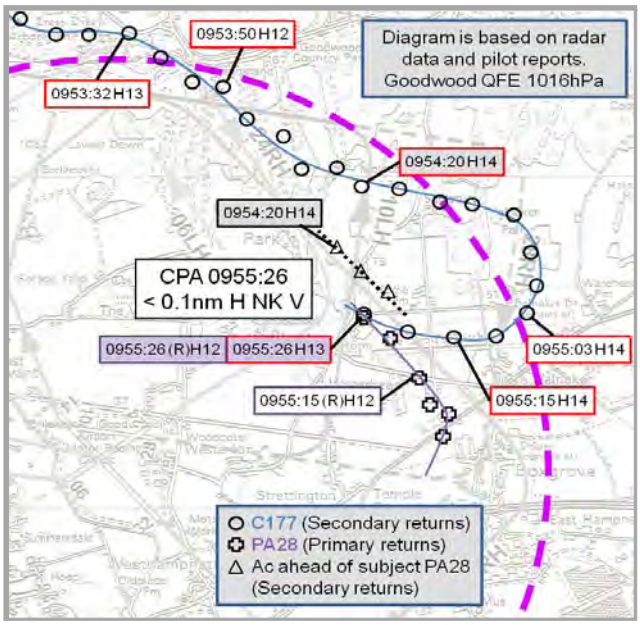
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The pilot of Spitfire (B) flew close enough to cause the C172 pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 2012084

Date/Time:	19 June 2012 0955Z	
Position:	5052N 00043W (RW14 LHC Chichester/Goodwood - elev 110ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	C177
Operator:	Civ Pte	Civ Pte
Alt/FL:	1200ft (QFE 1016hPa)	1200ft (NK)
Weather:	VMC OOS	VMC OOS
Visibility:	>10km	10km
Reported Separation:	25ft V/0m H	NR
Recorded Separation:	NK V/<0.1nm H	



[UKAB Note (1): Each time annotation is followed with either the radar-derived height (hgt), H, or the pilot reported hgt, (R)H.]

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports taking-off from Chichester/Goodwood A/D at 0948 with the intention of performing some ccts. Wingtip strobe lights were selected 'on' and the SSR transponder was selected 'off'. RW14 LHC was in use, hgt 1200ft [QFE 1016hPa]. On his 3rd cct he was number 3 to 2 other A/D based ac and was aware from R/T transmissions that 2 further visiting ac were joining. He recalled both these ac being told to join overhead. He was visual with the cct traffic ahead (on base leg) and upon approaching the mid point of the downwind (DW) leg, level at 1200ft, Hdg 320° at 90kts, he carried out his pre-landing checks. His attention was focussed inside the cockpit while he performed the checks. On completion he looked up and saw a Cessna ac crossing at 90° from R to L directly above his ac at an estimated separation of 25ft to 50ft. He estimated an elapsed time of 1 second between his first sighting of the conflicting traffic and it passing over his canopy. He did not report the Airprox over R/T due to other traffic calls and concentrated his attention on flying the remainder of the cct. He stated that the other ac was not at the correct hgt for an overhead join and took no action to avoid him. He noted that in the past he had observed many visitors seemed unaware of the unusual 1200ft cct hgt at Goodwood.

In his opinion there was a very real risk of collision.

THE C177 PILOT reports flying from EIER [Erinagh Aerodrome, 5249N 00817W, 20nm NE Limerick] to Goodwood and that due to the elapsed time of some 20 days between the Airprox and his submission his recall may be subject to error.

[UKAB Note(2): The C177 closely resembles the C172 but without the cantilever wing bracing struts.]

SSR Mode C was selected 'on' [he did not report whether Mode S was fitted or if the external lighting was also selected 'on']. Upon approach to Goodwood at approximately 0955 he changed from Solent Radar frequency to Goodwood Information frequency; he was advised to join L DW for RW14 and that there were a number of ac in the cct. He was joining from the NW and headed SE to keep well clear of the cct pattern. When abeam the end of RW14 he contacted Goodwood information and advised his location and intention to turn R onto a R DW for RW14. He was advised that he would be number 4 in the cct pattern. At this point he '... only had sight of the other 3 ac in the circuit ahead ...'. He then turned R and as he completed his '... right turn in for the left downwind run' he had a glimpse of an aircraft coming up from behind. At this point he was at 1200ft [pressure setting not reported] heading 320° at 100 kt. He immediately increased power to increase separation from the other ac.

He noted ATC was under immense pressure as there were a large number of ac in the area. He also noted that ATC commented to the same effect, that it was extremely busy.

He assessed the risk of collision as 'Medium'.

ATSI reports that the Airprox occurred at 0955:32 [UKAB Note (3): CPA occurs just before 0955:26], 1.5nm NE of Chichester/Goodwood A/D, within Class G airspace and inside the A/D ATZ. The ATZ comprises a circle radius 2nm, centred on the midpoint of Runway 14R/32L and extends to 2000ft aal (elevation 110ft).

[UKAB Note(4): Chichester/Goodwood A/D operates adjacent NW/SE RWYs, 14L/32R (726m x 30m) and 14R/32L (1300m x 46m). The promulgated cct direction for RWYs 14L/14R is LH.]

The PA28 was on a local VFR flight and operating in the RW14 LH visual cct. The C177 was inbound, under VFR, from EIER. A/D ATSU was providing a FISO service, C/S 'Goodwood Information'. CAA ATSI assessed the workload as medium.

UK AIP, EGHR AD 2.22 – FLIGHT PROCEDURES, states:

Fixed-wing circuit height 1200ft or as directed by ATS.

...

Fixed-wing standard join is overhead at 2000ft. 'Straight-in' and 'base' joins are strongly discouraged when the circuit is active. ATS can advise on circuit status. Outside ATS hours or after sunset, overhead join is mandatory.

...

CAA ATSI had access to R/T and NATS area radar recordings together with written reports from both pilots. The A/D ATSU were not advised about the Airprox until 8 days after the event and consequently there was no written report from the FISO, although the incident was discussed with him subsequently by telephone.

In the absence of recorded weather for Chichester/Goodwood A/D, the Shoreham METAR was reported as follows:

METAR EGKA 190920Z 19007KT 9999 SCT020 16/12 Q1020=

[UKAB Note(5): METAR EGKA 190950Z 18006KT 9999 FEW020 16/12 Q1020]

When questioned, the FISO indicated that the C177 pilot had previously telephoned in accordance with the requirement for PPR and was advised of the A/D conditions, RW in use and cct direction. The C177 pilot first contacted Goodwood Information at 0950:25, reporting 5 miles NW of Goodwood inbound for landing with a squawk of 7000 and requesting A/D information. The FISO informed the C177 pilot that RW14 was in use with 3 ac in the cct and QFE 1016hPa. The C177 pilot acknowledged the QFE and RW and added LHC in use.

At 0951:43, the radar recording showed the C177 4.3nm NW of the A/D indicating alt 2100ft [London QNH (1020hPa) and therefore A/D hgt 2000ft]. At 0952:40 the C177 was shown 2.6nm NW at alt 1300ft [hgt 1200ft] on the centreline for RW14 where a L turn onto an E track was made. At 0953:32, the C177 was shown 2.3nm N where a R turn was made. The ac tracked SE and entered the ATZ against the flow of the DW cct traffic.

At 0953:50, the C177 was shown passing the LHS of a DW C172 [radar derived 0.4nm laterally and 100ft higher] on a reciprocal track. The C172 pilot asked the FISO if traffic was joining DW from the N at 1300ft. This was confirmed by the C177 pilot, who then requested to join L DW. The FISO advised the C177 pilot of opposite direction cct traffic and suggested he position E, outside the cct pattern, to rejoin with 4 ac in the cct. The C177 pilot acknowledged 4 ac in the cct and advised he would route to the E and join DW. The FISO asked the pilot to report DW and again reminded him to keep wide, out of the way of the opposite direction cct traffic, with 4 ac in the cct.

At 0954:20, the C177 was shown passing just to the N of a 2nd DW ac [radar derived 0.3nm laterally and co-alt] where the C177 pilot commenced a L turn onto an E track, leaving the ATZ. The C177 pilot then made a 180° R turn onto a W track, re-entering the ATZ at 0955:03, and converged with a primary contact, believed to be the subject PA28 on the DW leg.

At 0955:09, the C177 was shown at alt 1500ft [hgt 1400ft] in the PA28's half past one position at a range of 0.5nm, on a R to L crossing track. The PA28 pilot reported DW for a touch and go and was informed of 3 ac ahead in the cct. The FISO advised the PA28 pilot that he was unsure how the C177 planned to join the cct. At 0955:15 the C177 was shown in the PA28's 1 o'clock position, at a range of 0.2nm, crossing from R to L. The FISO advised the PA28 pilot that the C177 may join in the cct ahead. At 0955:26, radar recording showed the tracks of the 2 ac to have just crossed with the C177 at alt 1400ft [Hgt 1300ft], < 0.1nm W of the PA28. At 0955:32, the PA28 pilot reported that the C177 had just passed over him. The FISO advised the C177 pilot that the PA28 was now behind him, with 3 ac ahead in the cct. At 0955:55, the C177 was shown late DW at alt 1300ft [hgt 1200ft] with the distance between the 2 subject ac increasing to 0.4nm as the tracks diverged.

[UKAB Note (6): The radar recording showed the C177 tracked 305° from the CPA, crossing the RW14 LHC base leg halfway between the end of the DW leg and the start of final at 0956:38, before commencing a L turn on to final.]

The Manual of Flight Information Services, CAP410 Part B, Chapter 1, Page 1, Paragraph 2.1, states:

'The FISO has the following specific responsibilities:

a) issuing information to aircraft flying in the aerodrome traffic zone to assist the pilots in preventing collisions.'

...

Additionally, Chapter 1, Page 4, Paragraph 7.4 'Joining circuit', states:

'Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly. Although there is a legal requirement for pilots to report entering and leaving the ATZ (Rule 45 of the Rules of the Air Regulations), this is not the case for other reports in the circuit. Any requests for position reports downwind, final etc., for the purposes of passing traffic information, only have the status of a request although it is expected that most pilots will comply.'

Both aircraft were operating within the ATZ, in receipt of a service from the FISO. CAP774, UK Flight Information Services, Chapter 1, Page 1, Paragraph 2 'Flight Outside Controlled Airspace', states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment. ...'

The FISO passed sufficient information to the C177 pilot to enable him to intelligently position his ac in relation to other ac in the cct. Rather than making the standard join overhead, the C177 pilot initially positioned NW of the airfield at 1500ft against the flow of the cct pattern. He then turned E and completed a 180° RH turn to join DW, converging with the PA28 already DW. The Airprox occurred when the C177 joined the cct in a manner that caused the pilot of the PA28 to be concerned about the proximity of the C177 to his own ac.

[UKAB Note (7): The Rules of the Air Regulations 2007 (incorporating The Rules of the Air (Amendment) Regulations 2009), Schedule 1, Section 4, Paragraph 12 state:

12(1)Subject to paragraph (2), a flying machine, glider or airship flying in the vicinity of what

the commander of the aircraft knows, or ought reasonably to know, to be an

aerodrome shall:

(a) conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed; and

(b) make all turns to the left unless ground signals otherwise indicate.

(2) Paragraph (1) shall not apply if the air traffic control unit at that aerodrome otherwise authorises.

This extract is also published in CAP393, Air Navigation: The Order and the Regulations, section 2, section 4, para 12.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, a verbal report from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

Members agreed unanimously that the C177 pilot did not integrate with the cct traffic in his attempt to join the A/D and consequently did not conform to the pattern of traffic, as required by Rule 12 of the RoA. The members opined that the C177 pilot did not expedite his recovery by attempting to join DW and that had he flown a standard O/H join, as recommended in the UK AIP, he would not have conflicted with 3 ac DW in the cct pattern, missing the PA28 by the narrowest of margins.

A controller member observed that the PA28 pilot could usefully have turned his SSR transponder on, squawking a VFR conspicuity code, with Mode C selected. While the use of SSR would not have had any bearing on this Airprox, had the ac joining the cct been fitted with some type of conflict avoidance system the use of SSR may have provided critical situational awareness. Members agreed that, as a general rule, SSR with Mode C should be selected on unless there is a positive and specific reason to do otherwise.

The CAA ATSI Advisor commented that had the PA28 pilot reported an Airprox on RT at the time of the incident, or advised the FISO of his intention to do so after landing, then the Board would have had better quality information available to them. He also made the general point that the sooner an ATS is advised of the intention to file an Airprox, the better the quality of information that can be captured.

On the question of risk, The Board were of the opinion that there was sufficient evidence from the radar replay and pilot reports to support the contention that an actual risk of collision existed. The PA28 pilot saw the C177 too late to take avoiding action; effectively this was a non-sighting. The C177 pilot reports seeing the PA28 behind him and increasing speed to increase the separation; however, this was at, or shortly after, the CPA where his change of speed was too late to affect the separation at the CPA. Therefore this was also effectively a non-sighting. Since no avoiding action was taken by either pilot before the CPA, the separation was entirely fortuitous, meriting the Board's unanimous assessment of Risk Category A.

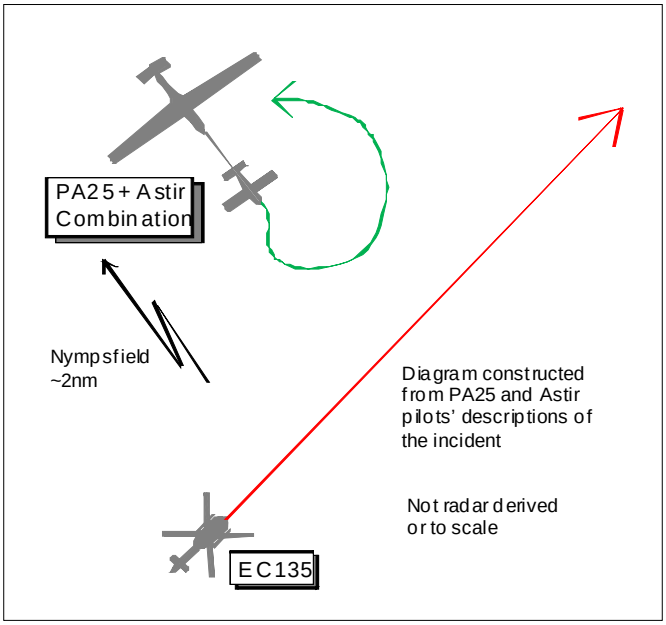
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C177 pilot did not conform to the traffic pattern, iaw Rule 12 of the RoA,and flew into conflict with the PA28 downwind, which he had not seen.

Degree of Risk: A.

AIRPROX REPORT NO 2012085

Date/Time:	20 Jun 2012 0935Z	
Position:	5141N 00215W (2nm SE Nympsfield G/S - elev 700ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA25+Grob Astir Combination	EC135
Operator:	Civ Club	Civ Comm
Alt/FL:	1660ft↑ (QNH)	1500ft (QNH)
Weather:	VMC CLBC	VMC CLBC
Visibility:	50km	>10km
Reported Separation:	100m H	Nil V/0·5nm H
Recorded Separation:	Returns merge (See ATSI report)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA25 + GROB ASTIR COMBINATION PILOT reports carrying out an aerotow with a Grob Astir from Nympsfield and in communication with the launch point on 129·975MHz. The visibility was 50km clear below cloud in VMC and the ac was coloured orange with 2 strobe and landing lights switched on. About 2nm SE of Nympsfield, heading 120° climbing through 1660ft QNH at 65kt, she saw a yellow helicopter at a similar height approaching fast on an almost reciprocal track (320° she thought) about 800m away. She immediately executed a steep L turn through 270° but lost sight of the helicopter during the turn. Fortunately the instructor in the glider was the handling pilot and was able to stay on tow. She estimated the helicopter passed 100m away. If the glider had released it would have been in the path of the helicopter. She thought it unwise to waggle the ac's wings because the helicopter was approaching too fast and it is the emergency signal to the glider pilot to release. After this they were able to complete the tow and release as normal.

THE GROB ASTIR PILOT reports instructing a new pupil on the first flight of a 1-day course and he, the instructor, was PF. The PA25 had just started turning gently R before suddenly it turned hard L, using considerably more bank than is usual during an aerotow. His immediate reaction was that the PA25 had a technical problem and was returning to Nympsfield with great urgency. It was only a couple of seconds after the start of the turn that he saw a helicopter and realised what the problem was. He watched the helicopter fly below and R of them as they turned hard L and climbed. He did not see the helicopter change course. Although he had 5750hr gliding experience, of which 1600hr were instructing, he was interested that his initial reaction was completely wrong. He wondered what was wrong with the PA25 and did not immediately look around to see if the PA25 pilot was avoiding another ac. Clearly when on aerotow one attempts to keep a good lookout but inevitably, especially on a thermic day like the day of the incident, much of one's attention is on keeping station behind the tug ac in what is close formation flying in turbulent conditions. It is not possible to look away from the tug for more than a few seconds without getting out of position. Glider pilots are used to flying close to other ac and taking avoiding action from both gliders and powered ac. He believed that this was a very close encounter by any standards.

THE EC135 PILOT reports en-route to Wickenby, VFR and in receipt of a BS from Filton on 122·725MHz, squawking a discrete code with Modes S and C; TCAS 1 was fitted. The visibility was >10km clear below cloud in VMC and the helicopter was coloured yellow with HISLs switched on. Cruising at 1500ft QNH at 120kt heading NE'ly about 2·5nm E of Nympsfield he saw a single piston ac towing a glider in his 10 o'clock at a similar level about 0·7nm away in a climbing L turn away from his track. He maintained his height and heading and the separation increased as the tug and glider continued the turn, estimating they passed 0·5nm at the CPA. He assessed the risk as low.

UKAB Note (1): The EC135 pilot was contacted owing to the disparate reported separation distances. He confirmed the tug/glider combination was in a turn when first seen, perhaps 500m at the closest, not as close as 100m. He did not feel he was in any way dangerously close or needing to take avoiding action.

ATSI reports that the Airprox was reported in the vicinity of Nympsfield gliding site (Class G airspace), between a PA25 and an EC135. The UK Aeronautical Information Publication promulgates Nympsfield as a glider launching site centered on 514251N 0021701W where aerotows may be encountered and winch launching takes place up to 3000ft agl during daylight hours, site elevation 700ft amsl.

The PA25 was operating VFR, towing a Grob 103 Astir glider, from Nympsfield gliding site and was in communication with Nympsfield launch point on frequency 129·975MHz. The EC135 was operating on a VFR flight from Bristol to Wickenby and was in receipt of a BS from Filton Radar on frequency 122·725MHz.

CAA ATSI had access to recordings of RT and radar from Filton together with written reports from both pilots. The timing of the Filton radar recordings was different to the time stamp on the RT and the area radar. Screenshots have been produced using the Filton radar but with the time adjusted to correlate with the RT and area radar recordings which are considered to be correct.

The Filton METARs were provided for 0920 and 0950 UTC: EGTG 200920Z 15004KT 9999 FEW030 19/10 Q1017= and EGTG 200950Z 15006KT 9999 FEW030 19/09 Q1017=

At 0925:00 the EC135 flight contacted Filton Radar and a BS was agreed.

At 0933:27 the EC135 was approximately 4nm to the S of Nympsfield, tracking NE, at altitude 1700ft, while a faint primary return was showing in the vicinity of the Nympsfield gliding site. The primary return remained visible as the EC135 continued to track NE (Figure 1). By 0935:05 the EC135 was approximately 2nm SE of Nympsfield with the primary return in its 10 o'clock position at a range of approximately 0·5nm (Figure 2). At 0935:18 the primary return and the EC135 appeared to merge (Figure 3) before the primary return separated and tracked to the W at 0935:35 (Figure 4).

Figure 1

Figure 2

Figure 3

Figure 4

Filton ATSU advised that they do not receive notification when Nympsfield is active; however, they do pass TI that the site is active when radar derived information suggests that is the case.

The written report from the pilot of the PA25 stated that she saw the helicopter at a similar height approaching fast on an almost reciprocal track so she immediately executed a steep L turn.

The written report from the pilot of the EC135 stated that he saw the PA25 and the glider as they were in a climbing L turn away from him. The pilot of the EC135 stated that he maintained height and heading and separation increased from the tug and glider.

At 0936:10 the pilot of the EC135 informed Filton Radar that he was changing to Gloucester.

At 0938:00 the Filton Radar controller advised other traffic on the frequency that both Nympsfield and Aston Down gliding sites appeared to be active.

Both flights were operating VFR in Class G airspace therefore both pilots were ultimately responsible for collision avoidance.

The EC135 was in receipt of a BS from Filton Radar. Under a BS there is no requirement for the controller to monitor the flight.

The Filton Radar controller advised other traffic on frequency that Nympsfield was active after the reported Airprox occurred. It is likely that the controller was not aware of activity taking place at Nympsfield until after the reported Airprox occurred.

The Airprox occurred at 0933:58 UTC, in the vicinity of Nympsfield gliding site when the EC135 and PA25 came into proximity to the extent that the pilot of the PA25 was concerned about the position of the EC135.

As both flights were in Class G airspace, VFR, the pilots of both ac were ultimately responsible for collision avoidance.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings and reports from the appropriate ATC authorities.

As the incident occurred in Class G airspace, pilots were responsible for maintaining their own separation from other ac through see and avoid. A pilot Member commented that the routeing options for the EC135 pilot to remain clear of aeronautical hazards were limited in the area; the helicopter tracked between Nympsfield to the W and R105 as well as Aston Down to the E. There was no doubt that both the PA25 and EC135 pilots were reporting the same incident but Members could not resolve the disparate separation distances reported by all parties. The PA25 pilot reported 100m, the Grob Astir pilot reported 'very close' whereas the EC135 pilot reported 0·5nm at the CPA. The PA25 pilot had seen the EC135 at about 800m, a late sighting, and had executed a steep L turn to avoid, an usual manoeuvre whilst carrying out an aerotow. The Astir pilot, after initially thinking the PA25 had a problem, had quickly seen the EC135 and remained on tow and followed the PA25's L turn to the W whilst watching the EC135 pass to his R and below. A pilot Member informed the Board that the PA25 pilot had done well as the ac had restricted visibility ahead, owing to the ac's long nose, and that there was a need to weave in the climb to clear the airspace ahead. The EC135 flight was under a BS from Filton so there was no requirement for the controller to monitor its progress and the controller only became aware that Nympsfield was active after the Airprox. The EC135 pilot reported seeing the combination in his 10 o'clock range 0·7nm already in a climbing L turn away from his track; Members concluded that this was after the tug-glider combination's avoiding action turn and effectively a non-sighting.

Turning to risk, with the difference in perceived separation Members were torn between levels of risk for this encounter. Taking the EC135 pilot's estimated distances and combining those with the actions taken by the PA25 pilot it was possible for the Board to assess the risk as C, no risk of collision. However, after considering the radar data, the late sightings and distances reported by both the PA25 and Grob Astir pilots and the fact that the ac passed with the EC135 temporarily unsighted to the PA25 pilot whilst belly-up in the turn, the Board were persuaded that safety had not been assured during the encounter.

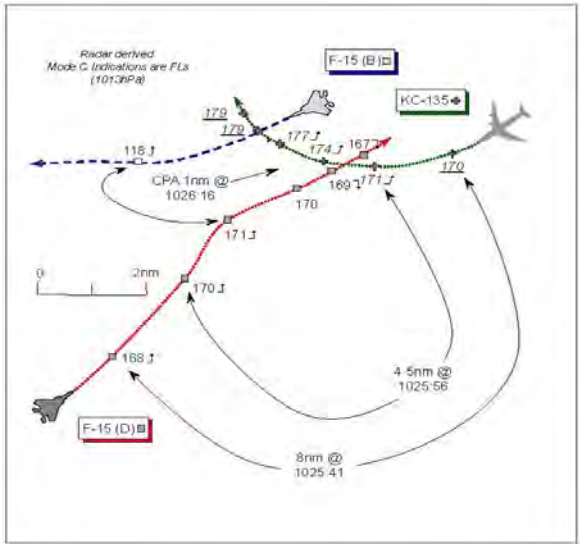
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the EC135 pilot and late sightings by the PA25/Grob Astir combination pilots.

Degree of Risk: B.

AIRPROX REPORT NO 2012086

Date/Time:	28 May 2012 1026Z	
Position:	5243N 00146E (18nm E of Norwich)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	KC-135R	F-15C
Operator:	Foreign Mil	Foreign Mil
Alt/FL:	FL170	↑FL190
Weather:	VMC	VMC N/K
Visibility:	>10km	NR
Reported Separation:		
	100ft V/0.1nm H	1000ft V/2nm H
Recorded Separation:		
	100ft V @ 4·5nm H	
	1nm H @700ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KC-135R PILOT reports he was holding over the sea at a position of about 056° MLD (Mildenhall TACAN) 75nm, making R turns, whilst executing fuel jettison procedures. They were in receipt of a TS from London MILITARY on 277·775MHz [LJAO E TAC], level at FL170 operating IFR in VMC; the assigned squawk was selected with Modes C and S on, TCAS is fitted.

Whilst finishing their checklist in preparation for fuel jettison, London MILITARY advised them of traffic below them in the area. They suggested to the controller that the other traffic should be vectored out of their holding area to prevent fuel landing on the other ac and then spotted a 2-ship of F-15s turning L onto their heading about 3000ft below them. London MIL told them to move instead, to a left-hand holding track 10nm N of their position. At that point heading 235° a TCAS TA was enunciated against traffic in their 11 o'clock - low – 5nm away in a climbing turn. They began their R turn back onto the inbound leg of their holding pattern, but soon afterwards whilst turning R at 300kt, TCAS enunciated a CLIMB RA commanding a 2500ft/min ROC, which they followed immediately, whilst also continuing the turn. The next RA directed a level-off, which they followed. A further RA then directed a 2000ft/min CLIMB, which was complied with. These RAs happened quickly, back to back, and resulted in a climb to FL179 before they were complete. Minimum separation was 100ft vertically and 0·1nm horizontally; his co-pilot saw the traffic [F-15(D)] in a climbing turn through their level. They returned to their assigned level of FL170 and subsequently called the F-15 leader on the RT who said they were operating in a block FL70-FL250. He assessed the Risk as 'high' and reported the Airprox to London MIL on the RT.

The ac has a grey colour-scheme and the HISLs were on.

THE PILOT OF THE F-15C [F-15 (D)] provided a brief account about 4 months after the event, reporting that he was the No4 of a 4-ship F-15 formation, operating VFR under a TS from London MILITARY [LJAO E TAC] on 259·6MHz; the assigned squawk was selected with Mode C. Climbing in VMC to FL190 at 350kt, radar contact was obtained and the KC-135 was seen; visual deconfliction was effected by passing >2nm away separated vertically by 1000ft. He assessed the Risk as 'none', adding that there was no concern by the formation and did not consider this occurrence to be an Airprox. TCAS is not fitted; Mode S was selected 'off'.

THE LATCC (MIL) LJAO EAST TACTICAL CONTROLLER [E TAC (2)] reports he was the oncoming controller in the E TAC position and had been briefed that 4 F-15s were operating in the Lakenheath ATA between FL50 and FL240 [the CPA occurred about 2nm W of the western boundary of the ATA]. He was also handed the KC-135 dumping fuel at FL170 before recovering to Mildenhall. During the position handover, the off-going controller – E TAC (1) - stated that the KC-135 would be setting up L hand orbits on a bearing of 050° Mildenhall at range of 70nm. The off-going E TAC (1) informed him that all traffic had been called to each other, that an F-15 pilot had called 'tally' with the KC-135 and that the latter's pilot had called 'roger', before stating that he didn't think it was a

good idea for the F-15s to be manoeuvring below his ac whilst he was trying to dump fuel. The off-going E TAC (1) controller then pointed out that the F-15 pilots were operating on another discreet frequency. He completed the handover and observed an F-15 climbing rapidly towards the KC-135. His PLANNER also noticed this and he called the KC-135 to the pilot of F-15 (D), who responded 'tally'. The 5 ac were all manoeuvring in close proximity and it took some time to differentiate the ac trails on radar, such that the traffic call was made at ½nm range; however, having been told by the off-going E TAC (1) that the 4 F-15 pilots were visual with the KC-135, he did not consider that this was an issue. He then observed the KC-135 climb rapidly to FL177, whose pilot stated that he had received a TCAS RA and had climbed to avoid an F-15 – F-15 (D). The KC-135 pilot asked for the callsign of F-15 (D), stated that he would be filing an Airprox report and requested that LATCC (Mil) impound the RT and radar tapes. When the F-15 leader switched back to 259.6MHz and called for recovery, he was informed by the KC-135 pilot that an Airprox was being filed.

THE LATCC (MIL) LJAO EAST TACTICAL CONTROLLER [E TAC (1)] did not submit a report.

THE LATCC (MIL) LJAO EAST PLANNER CONTROLLER (E PLAN) did not submit a report.

THE LATCC (MIL) LJAO SUPERVISOR (SUP) reports that at the time of the incident he was rotating controllers to allow breaks, when he was called to the E Sector position following notification of a TCAS RA from the KC-135. The 4 F-15s were conducting ACT in the Lakenheath ATA with the KC-135 at FL170 in close proximity to the N. All ac were in receipt of a TS and the E TAC controller confirmed that TI had been passed to the KC-135 and the F-15s by the off-going controller.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a KC-135R operating IFR and F-15(D) operating VFR as part of a 4-ship, both in receipt of a TS from LJAO E TAC.

The E Sector was manned by PLANNER and TAC controllers. E TAC reported that their workload was high to medium with low task complexity. At the time of the incident, LATCC (Mil) did not perceive a requirement for occurrence reporting action to include PLANNER controllers; hence the E PLANNER did not submit a report and their landline tape was not impounded. Moreover, the controller who submitted the DASOR for the event assumed the control position approximately 6secs prior to the Airprox. Consequently, this report refers to E TAC (1) Was the controller in place at the start of the incident sequence and E TAC (2) as the controller in place for the final stage of the incident sequence. Unfortunately, the Unit did not perceive a requirement for E TAC (1) to submit an occurrence report, albeit that the Unit's investigation was informed by an interview with E TAC (1). BM SM contends that whilst these issues have not affected the finding of Cause, they are nevertheless disappointing.

The incident sequence commenced at 1020:59, as the F-15 formation contacted E TAC (1) on a discrete UHF frequency. At this point, the formation had separated into 4 distinct speaking units and were manoeuvring between 5000 – 24000ft YARMOUTH RPS (29.97in), about 20nm SW of the KC-135. The KC-135 was holding in the Mildenhall fuel dump area on the 056° radial Mildenhall 75nm, at FL170, preparing to jettison fuel. From 1021:18, throughout the remainder of the incident sequence, E TAC was only providing an ATS to the 4 F-15s and the KC-135.

At 1022:46 [3½mins before the CPA], E TAC (1) passed TI to the pilot of the KC-135 on F-15 (C) as, "*traffic south, 5 miles, manoeuvring at flight level 1-6-0, manoeuvring in the block flight level..5-0 to 2-4-0*." The KC-135 pilot replied that they had the, "*traffic in sight*." F-15 (C) was 6.7nm S of the KC-135 indicating FL150. E TAC (1) then passed TI to the pilot of F-15 (C) on the KC-135 as, "*traffic north 5 miles tracking south-west at Flight Level 1-7-0*." The pilot of F-15 (C) replied, "*radar tra…contact*." The remainder of the F-15 formation were operating between 15-20nm WSW of the KC-135.

Immediately after the acknowledgement by the pilot of F-15(C), at 1023:08, the KC-135 pilot advised E TAC (1) that they were, "*going to be adjusting gross weight shortly, so traffic beneath us is probably not wise*." E TAC (1) acknowledged this stating that there were, "*F-15s manoeuvring in the East Anglia area so err if you wish to dump fuel if you could turn north about 10 miles, there's no traffic up there to effect*." The KC-135 pilot replied, "*understand you'd like us to move 10 miles to the north*?" E TAC (1) answered, "*affirm, there are 4 F-15s manoeuvring in your present area*" to which the KC-135 pilot replied, "*Okay* [KC-135 (C/S)] *how about we hold at the same point, the 0-5-6 at 7-5 but we'll do left hand turns to keep us more to the north*?" There was no reply from E TAC (1).

At 1024:35, the KC-135 pilot called E TAC (1) again and asked, "*would you like us to hold to the north of 0-5-6 at 7-5 DME from Mildenhall but do right turns to keep us more to the north?...I'm sorry, left hand turns at that radial*." In reply E TAC (1) stated, "*affirm if that takes you err to the err north of the err F-15s*". The KC-135 pilot replied, "*Okay I'm trusting you I can't see them so I'm gonna do the left hand turns at that radial DME and adjust gross weight and if you could keep traffic away from beneath us while we do that that would be great*." E TAC (1) then asked the KC-135 pilot to, "*say again the radial from Mildenhall where you're going to be manoeuvring*?" To which the KC-135 pilot replied, "*0-5-6 at 0-7-5 D-M-E left hand turns 20 mile legs*", which was acknowledged at 1025:28 by E TAC (1).

The changeover of control of the E TAC position was achieved at around this point [<1min before the CPA]. Although the conversation relating to the TAC position handover was not recorded, the incoming controller, E TAC (2), has stated that E TAC (1) briefed them that 'all traffic had been called to each other, that [F-15 formation (C/S)] had called 'tally' with [KC-135 (C/S)] and that [KC-135 (C/S)] had called 'roger' before stating that he didn't think it was a good idea for the F15s to be manoeuvring below whilst he was trying to dump fuel'. Based upon this, it is clear that E TAC (2) believed that all elements of the F-15 formation had acquired the KC-135 and that the KC-135 pilot was aware of all elements of the F-15 formation. Analysis of the RT tape transcript has demonstrated that this was not the case. Moreover, it is reasonable to suggest that E TAC (2)'s understanding of the situation was wholly reliant on the handover from E TAC (1) as E TAC (2) had not heard the KC-135R pilot's transmissions between 1023:08 and 1025:28 directly. However, it has not been possible to determine exactly the content of the handover from E TAC (1) to E TAC (2); it may be that E TAC (1) provided an accurate handover that was either perceived or recalled incorrectly by E TAC (2).

The confliction between F-15 (D) and the KC-135 became evident at 1025:39, as F-15 (D) steadied on a NE'ly track, converging with the KC-135. Whilst it has not been possible to determine exactly when the transfer of control was achieved, E TAC (2)'s first transmission occurred at 1026:11; this was, when E TAC (2) passed TI to the pilot of F-15 (D) [indicating FL171] on the KC-135 as, "*traffic west 2 miles* [sic] *tracking correction..north half a mile* [recorded at 1·3nm] *tracking west is a K-C-1-3-5 Flight Level 1-7-0.*.[indicating FL174] *dumping fuel*."

[UKAB Note (1): The pilot of F-15 (D) replied, "..[F-15 (D) (C/S)] *has tally that traffic*" at 1026:25, when F-15(D) was indicating FL167 passing 2·5nm SE of the KC-135, the latter indicating FL179 after manoeuvring in accordance with the reported TCAS RAs. At 1026:29, the KC-135 pilot reported, *"and LONDON MIL* [KC135 C/S] *we just had a resolution advisory with someone in our holding pattern here".* This was followed at 1026:32 by a transmission on the discrete frequency using the F-15 formation C/S, *"recommend we stay below 17".* The KC-135 pilot added at 1026:37, *"we climbed a thousand feet to avoid er collision and we're now descending back to 1-7-0 towards the radial we've been cleared to".*]

E TAC (2) reported that having assumed control of the position, they and E PLANNER observed F-15 (D) 'climbing rapidly' towards the KC-135; however, as the KC-135 and the F-15 formation were all in close proximity, the respective ac's tracks 'took some time to differentiate and as such the traffic call was made at half a mile'. The ATS to both the KC-135 and the F-15 formation had not been reduced due to high traffic density. Moreover, E TAC (2)'s surveillance display was orientated to observe the KC-135 and F-15 formation and the OTR area, in anticipation of traffic leaving the en-route structure at DOLAS, routeing OAT to NAVPI. Consequently, they had limited ability to manipulate their picture further to differentiate the tracks of the F-15s and the KC-135. E TAC (2) also reported that as they believed that all elements of the F-15 formation were visual with the KC-135, they did not consider the TI provided at 1026:11 was late.

The CPA occurred at 1026:17, [2nm W of the western boundary of the ATA] as F-15 (D) indicating FL170 passed 1nm SSE of the KC-135 that had entered a right-hand turn through NW onto a NE'ly heading climbing through FL177.

[UKAB Note (2): When the CPA occurred F-15 (A) was 3½nm NNE of the KC-135 westbound in a slow climb through FL125; F-15 (B) was steady westbound in a slow climb through FL120 and F-15 (C) was over 12nm SE, turning onto NW, level at FL60.]

The confliction between the F-15(D) and KC-135 was resolved through the latter crew's compliance with their multiple TCAS RAs and the pilot of F-15 (D) discharging his responsibility to 'see and avoid' the other ac. The timing of the TI from E TAC (2) to F-15 (D) on the KC-135 did not provide sufficient warning for the pilot to assimilate this information and to act, effectively rendering the TI nugatory.

Whilst E TAC (1) provided initial TI to one pilot within the F-15 formation, E TAC (1) did not provide TI for situational awareness to all members of the formation. Moreover, at times during the incident sequence the KC135R was within 5nm laterally and 3-5000ft of F-15 (A) and F-15 (B) and within their manoeuvring block, with no TI passed by E TAC (1) to either F-15 crew, or the KC-135 crew; this might suggest a limited awareness of the high energy manoeuvring capability of the F-15. Furthermore, as highlighted by the Unit's investigation, a reduction of the ATS for high traffic density may have provided a warning to the crews that E TAC (1) was unable to provide timely TI, yet such a reduction was not forthcoming. Finally, both the situation and the KC-135 crew called for some form of lateral deconfliction measure to be introduced; E TAC (1) did not act positively to effect this.

Whilst it has not been possible to positively determine the point that E TAC (2) assumed responsibility for the control position, nor at what point the handover started, E TAC (2) was afforded very little time to affect the situation. Moreover, whilst it has not been possible to determine the content of the brief that E TAC (2) received from E TAC (1), it is possible that E TAC (2)'s perception of that brief was not an accurate representation of the situation and, arguably, provided assurance to E TAC (2) that action was not required. This Airprox highlights the critical nature of the position handover, specifically the accuracy of the information contained therein and the timing of the handovers when ac are in close proximity.

As a result of the investigation conducted into Airprox 2012081, BM SM requested RAF ATM Force Cmd to direct a review of LATCC (Mil)'s occurrence reporting procedures; the occurrence reporting action taken by LATCC (Mil) in regard to this Airprox provides additional supporting evidence for this recommendation.

BM SM will utilise the findings of this Airprox to highlight to RAF controllers the criticality of console handovers.

THE F-15C PILOT'S UNIT comments that if a KC-135 is operating under a TS they must accept the possibilities of RAs.

USAFE-UK comments that the F-15 formation were advised of the position and intentions of the KC-135 and had confirmed they had it contact; all 5 ac were VMC. Nevertheless, F-15 (D) flew sufficiently close to the KC-135 to trigger a TCAS RA, not once but twice and, unlike many TCAS events, was acquired visually by the co-pilot. Further, there is the question of a 4 ship formation manoeuvring in the same airspace as a tanker dumping fuel, the timing of the handover from E TAC (1) to E TAC (2) and finally, the forced use of a range scale too great to maintain identification of all 5 ac and thus provide an effective TS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, radar video recordings, a report from two of the four air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board was briefed that the KC-135 crew was commencing their fuel dump procedure in the normal location out to sea, but the USAFE-UK Advisor commented that further research suggested that some F-15C pilots were not aware that this was the recognised location for this procedure adjacent to the Lakenheath ATA boundary. As the conflict had occurred some 2nm W of the western boundary of the ATA, it was evident that some of the formation elements had momentarily 'spilled out' of the Area. A military area controller Member opined that trying to move or impose restrictions on a formation of 4 F-15s is difficult and incompatible with allowing them the tactical freedom to complete the aim of the sortie, and a military pilot Member agreed. Other controller Members contended that F-15 formations have invariably been highly co-operative and acceded to such requests whenever it was feasible. However, the KC-135 crew had been requested to move to the N at short notice and it was apparent that the tanker was flying in the middle of the formation's level block. Controller Members perceived it was an easier proposition to move the tanker clear of the vicinity as vertical separation could not be engineered and enable the fuel dump to be accomplished safely. The Board understood the KC-135 pilot's concern about ac under flying his tanker as the fuel dump was about to start, but on the other hand, if he was expecting LATCC (Mil) to move all other flights in Class G airspace out of his way then that was exceeding the controller's remit under the established TS. Some Members were critical of the KC-135 crew for conducting such an evolution under a TS and if the PIC wanted separation against other traffic operating in the vicinity to be provided by the controller then a DS would have been the correct radar service. Nevertheless, a controller Member opined that the off-going E TAC (1) controller had not gripped the situation from the outset; the controller was working both flights and it should have been apparent that their different tasks required spatial deconfliction rather than simply TI. Furthermore, the

F-15 pilots had not been informed that the KC-135 was intending to dump fuel until about 4secs before the CPA occurred - within E TAC(2)'s first transmission of TI. The BM SM report highlights the inadequacy of the TS provided by E TAC (1) both to the KC-135 crew and the F-15 formation. TI was passed by E TAC(1) to the KC-135 crew about F-15(C) and vice versa, but the oncoming E TAC (2) was under the impression that all elements of the F-15 formation had been called to the KC-135 crew by the off-going E TAC(1) controller. It was plainly unrealistic to expect the tanker crew to maintain visual contact on 4 highly agile fighters conducting high energy manoeuvres in a block from 5000–24000ft amsl, whilst they maintained a race track holding pattern, even with the benefit of TCAS. The BM SM report shows that in the period leading up to this Airprox E TAC (1) had not provided an appropriate level of service and to expect the KC-135 crew to maintain SA without a satisfactory flow of accurate TI on the formation ac was indicative of poor appreciation by E TAC (1) of the task at hand. The Board was again dismayed at the absence of reports and landline transcripts from LATCC (Mil) controllers involved in an Airprox – here the off-going E TAC (1) and the E PLANNER – which did not allow the Board to take a comprehensive view of what had happened.

Controller Members noted that this was another Airprox where a conflict had developed during the hand-over of a control position (ostensibly <1min before the CPA) and which, in the view of some Members, was a significant issue. A military controller Member opined that when the Airprox occurred it was a dynamic high workload situation and it did not seem to be an appropriate point to hand-over to another controller; he perceived that the PLANNER or the SUPERVISOR could have interjected and delayed the hand-over between the off-going E TAC (1) and the oncoming E TAC (2) to a more appropriate point – perhaps waiting till after the KC-135 had relocated or the F-15s had cleared from the vicinity. Nevertheless, the two TAC controllers should have realised themselves that it was unwise to hand-over control at this juncture. E TAC (2) reports that the hand-over had been completed just before he noted the developing conflict between the KC-135 and F-15 (D) and it was difficult to distinguish the respective ac's tracks, hence the late TI. The BM SM report confirms that TI was given to the pilot of F-15(D) within E TAC(2)'s first transmission and was issued a mere 6sec before the CPA; moreover the TI was ambiguous and inaccurate. Members agreed it was far too late to be of practical use when the two ac were only 1·3nm apart and the climbing F-15 (D) was only 300ft beneath the KC-135 that was evidently already responding to the TCAS CLIMB RA. Indeed the BM SM view was that this TI was nugatory. This was also the first mention to any of the F-15 pilots that the tanker was about to dump fuel. Fortunately, the pilot of F-15(D) reports that he had already obtained radar contact and seen the KC-135 visually, enabling him to effect deconfliction, calling "..*tally..*" when he was already some 1000ft below and 2·5nm SE of the KC-135 that was still climbing in response to the multiple CLIMB RAs. Nevertheless, the pilot of F-15(D) was mistaken in his belief that he passed >2nm away, separated vertically by 1000ft, as the radar recording shows that at the closest point horizontally the F-15 (D) passed 1nm to the SSE of the climbing KC-135 that was turning through NW away from F-15(D).

A Military controller Member opined that the pilot of F-15(D) should have been aware that turning to cross ahead of the KC-135 whilst climbing rapidly up through its level close would trigger a TCAS RA in the tanker. Nevertheless, a military fast-jet pilot Member opined this was Class G airspace where 'see and avoid' prevails. Whilst the Member did not agree with the comment from the F-15(C) pilot's unit that when operating under a TS the KC-135 crew must accept the possibilities of RAs and it was a valid report, the pilot of F-15(D) had not flown within 1nm of the tanker and had clearly adjusted his flight path to manoeuvre away from the tanker. Other Members agreed and the Board concluded that the Cause of this Airprox was that the pilot of F-15(D) flew close enough to cause TCAS RAs in the KC-135. However, given the radar contact, visual acquisition and that the pilot of F-15 (D) had afforded no less than 1nm of separation and passed clear astern and below the KC135, the Members agreed by a majority verdict that no Risk of a collision had occurred in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

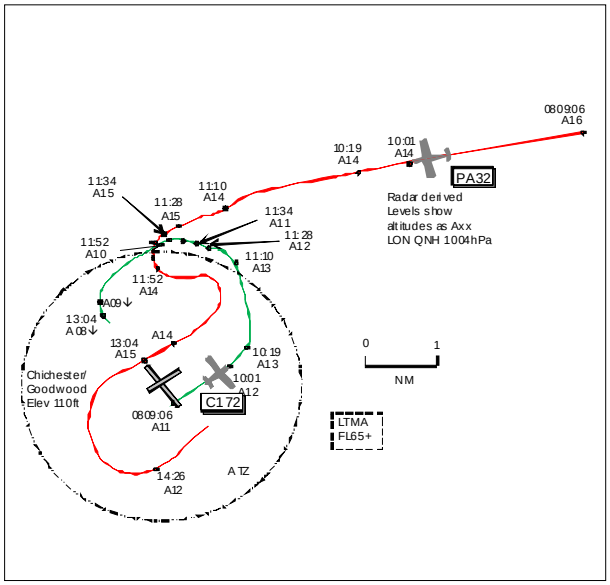
Cause: The pilot of F-15(D) flew close enough to cause TCAS RAs in the KC-135.

Degree of Risk: C.

AIRPROX REPORT No 2012088

AIRPROX REPORT NO 2012088

Date/Time:	28 Jun 2012 0812Z	
Position:	5054N 00045W (2·1 nm N Chichester/ Goodwood - elev 110ft)	
Airspace:	LFIR/ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C172	PA32
Operator:	Civ Pte	Civ Pte
Alt/FL:	1100ft↓	NR
	QFE (1002hPa)	QNH (1002hPa)
Weather:	VMC CLBC	VMC NR
Visibility:	10km	
Reported Separation:		
	100ftV/500m H	Not seen
Recorded Separation:		
	400ft V/0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C172 PILOT reports en-route to Chichester/Goodwood, VFR and in communication with Goodwood Information on 122·45MHz, squawking 7000 with Mode C. The visibility was 10km flying 1400ft below cloud in VMC and the ac was coloured white/blue with strobe, nav and anti-collision lights all switched on. He had joined the cct to RW14 LH and had just established on base leg. Heading 230° at 80kt and descending through 1100ft QFE 1002hPa he saw a low-wing retractable-undercarriage ac appear in his 1-2 o'clock range 600m, slightly above at about 1200ft, and crossing from R to L. He turned R to manoeuvre behind it to increase separation, estimating it passed 100ft above and 500m ahead with a low risk of collision. He immediately reported his sighting of the ac to the FISO on RT and the FISO tried to identify the other ac. He continued to watch the ac out to his port side on a track of 120° assessing there was no further risk of collision so he continued the cct to land. After landing and while taxying in he saw the other ac make an approach to RW24, the RW he was about to cross. At the time of the Airprox the RT was busy with 3 fixed-wing ac and 1 helicopter on the frequency. He assessed the risk as low.

THE PA32 PILOT reports inbound to Chichester/Goodwood, VFR and was unaware of being involved in an Airprox. He arrived at Goodwood and thought he was told to call downwind and final for RW24. When he called final for RW24 he was told to overshoot and make a LH cct for RW14. When he called final RW14 he was told to land at his discretion. He saw a number of ac but did not recall seeing the reporting C172. After landing he heard the FISO say that there were 5 ac about to join O/H.

THE GOODWOOD FISO reports the PA32 pilot called inbound from the N and requested airfield information. RW14 LH cct was in use with multiple event traffic inbound and joining. The PA32 pilot read back the details, in particular RW14 in use, and confirmed he would report O/H. The C172 was already in the cct at the time and reported downwind. When late downwind the C172 pilot reported a 'retractable ac' at around 1100ft (below O/H join height of 2000ft) in his 12 o'clock and he commenced an abrupt turn away from the cct. The ac, at the time, was unidentified and visual sight of it was lost momentarily from the VCR. The flight was asked to identify itself on frequency but no reply was received. The PA32 pilot then reported O/H and shortly after this an ac was observed to be turning tight R base, he thought, for RW24 opposite direction to the RW14 cct. This ac was identified as the PA32 and he immediately informed the pilot of his error and conflict with the RW14 cct traffic. The PA32 pilot commenced a go-around on RW24 with hesitation and while in the climbout the pilot was asked if he was visual with RW14 as the ac was now tracking parallel to RW14 to the SE; the pilot replied "negative". Assistance was provided and the ac positioned crosswind and continued the cct without further incident. Shortly afterwards the pilot of the C172 telephoned the Tower to comment on what had happened and that he was unhappy with the actions and airmanship of the PA32 pilot.

ATSI reports that the Airprox occurred at 0811:38 UTC, 2·1nm N of Goodwood Airfield, within Class G airspace and just outside the Goodwood ATZ. The Goodwood ATZ comprises a circle radius 2nm, centred on the midpoint of RW14R/32L and extending to a height of 2000ft above aerodrome level (elevation 110ft).

The C172 was inbound VFR from Haverford West, with an approved slot time and had joined the visual cct for RW14 LH. The PA32R was inbound VFR from Stapleford Airfield, with an approved slot time and was joining the cct.

The Goodwood ATSU was providing a FISO service, callsign Goodwood Information. The special event 'Festival of Speed' was promulgated by NOTAM L2657/12, from 0600 UTC on 28th June 2012 until 1830 UTC on 1st July 2012. The event arrangements and pilot instructions were accessible via the internet. Slot numbers and times were issued to arriving ac in accordance with the PPR requirements. The special event arrangements included instructions for arriving fixed-wing pilots and states:-

'**All runways**

Arriving fixed-wing aircraft should join overhead Goodwood Aerodrome not below 2000ft Goodwood QFE…

Pilots should descend on the circuit 'deadside' to join crosswind not below 1200ft Goodwood QFE…

Warning-Helicopter Arrivals/Departures

Pilots are warned that multiple helicopter arrivals 'not above 900ft Goodwood QFE' will take place simultaneously via the 'Trundle Gate' Goodwood Racecourse Heliport…'

The AIP entry for Goodwood EGHR AD 2.22 – Flight Procedures, states:

'Fixed-wing circuit height 1200 ft or as directed by ATS.

Fixed-wing standard join is overhead at 2000ft. 'Straight-in' and 'base' joins are strongly discouraged when the circuit is active. ATS can advise on circuit status. Outside ATS hours or after sunset, overhead join is mandatory.'

ATSI had access to RT recording and NATS area radar recordings together with written reports from both pilots and the Goodwood FISO. CAA ATSI considered the FISO's workload was high with additional ground movement instructions and advice due to the special event. The RT recording at Goodwood was not continuous and consequently was adjusted by a few seconds to match the radar data. Radar altitude indications were based on the London QNH 1005. Goodwood QNH 1005, QFE 1002.

In the absence of Goodwood weather, the METAR for Shoreham is provided:-

METAR EGKA 280750Z 12012KT CAVOK 22/19 Q1005=

The ATSU reported that both pilots had booked in by telephone in accordance with the requirement for PPR. The 2 pilots were allocated slot times and advised about aerodrome conditions, RW in use and cct direction. Wx and pressure information is provided if requested by the pilot as an unofficial observation.

Arriving fixed-wing ac were positioning O/H at 2000ft for the standard O/H join for RW14 LH traffic pattern. Helicopter arrivals were routing E of the Trundle Gate not above 900ft and then via the RW24 designator numbers to the helicopter parking areas.

The C172 was inbound to Goodwood and at 0805:50, reported O/H.

At 0806:08, the PA32 pilot contacted Goodwood Information. Radar shows the PA32, 14nm NE of Goodwood. The FISO replied that RW14, LH cct was in use, with QFE 1002. The pilot was asked to report O/H. The PA32 pilot acknowledged with: "14, LH cct 10022, report overhead". The PA32 pilot's written report indicated that he was using a QNH (rather than QFE) setting of 1002 but no level was specified.

(It was noted that the 2 in 10022 was repeated twice. It was considered a remote possibility, that the pilot may have set 1022 on his altimeter, which would then have indicated to the pilot a level of approximately 2000ft, being 540ft higher than that reported by Mode C and indicated on the radar. However there is no evidence to confirm that this was the case.)

At 0809:06, radar shows the C172 crosswind at altitude 1100ft, with the PA32 6·9nm NE of the airfield tracking towards the N of the airfield and indicating an altitude of 1600ft.

At 0811:10, as the C172 reached the end of the downwind leg indicating 1300ft, the PA32 is shown 0·9nm ahead of the C172 at 1400ft crossing from R to L. The C172 then turned onto base leg.

At 0811:28, the C172 shows on base leg at 1200ft and 2·1nm N of the airfield, just outside the ATZ. The PA32 is shown 0·5nm NW of the C172, on a wide L base at 1500ft. At this point the C172 pilot reported sighting a retractable ac just ahead, turning onto final at an estimated height of 1100ft.

[UKAB Note (2): The next sweep at 0811:34, the CPA, shows the C172 having turned slightly R to pass behind the PA32 the ac separated by 400ft vertically and 0·4nm horizontally. This separation remains over the course of the next 3 radar sweeps with the PA32 in a L turn as the C172 tracks approximately WNW'ly.]

The FISO attempted to ascertain the identity of the retractable ac by asking the PA32 for a position check. The PA32 pilot reported having just passed O/H but unable to make a call because the radio was busy.

At 0811:52, radar shows the PA32 had entered the ATZ at 1400ft, in a L turn 1·7nm N of the airfield. The PA32 continued E and then turned onto a SW'ly track towards the airfield.

At 0813:04, the PA32 is shown crossing the RW14 threshold at 1500ft and the PA32 pilot again reported O/H. (standard join is at 2000ft)

At 0814:26, an inbound EC120 helicopter is shown approaching the RW24 numbers and the PA32 is shown turning downwind for a LH pattern RW24. At this point the PA32 pilot reported "downwind 24" (the incorrect RW). However this was not detected by the FISO who asked the PA32 pilot to report final.

At 0815:58, a second helicopter is shown 2nm NE of the airfield tracking towards the 24 numbers. The PA32 is also shown on L base for RW24 turning towards final.

At 0816:12, the PA32 is shown at 800ft, on the final approach for RW24, with the helicopter 0·2nm behind the PA32 at 600ft. The PA32 pilot reported final RW24 and this was initially missed by the FISO who asked the ac to standby. Shortly afterwards the FISO advised the PA32 flight to land RW14 at discretion with wind 140° at 18kt. The PA32 pilot indicated that he was lined up on RW24. The PA32 flight was instructed to go-around and then to reposition LH for RW14. At 0818:40 the PA32 pilot reported final and landed without further incident.

The ATSU has indicated that after reviewing the ATS workload associated with such events, the approved act movement rate of 7 ac per 15min has been reduced to 5 ac per 15min.

The PA32 approached the airfield and into conflict with the C172 which was on L base for RW14. The PA32 should have made a standard O/H join at 2000ft for whichever RW was notified in use as specified in the AIP and special event arrangements:

'Arriving fixed-wing aircraft should join overhead Goodwood Aerodrome not below 2000ft Goodwood QFE….'

The FISO passed a QFE of 1002 and the PA32 pilot's read back of the pressure setting was incomplete, repeated as 10022. In a busy operational environment the read back most likely sounded correct to the FISO and it was only with the benefit of replay that this was highlighted. Had the pilot used a setting of 1022, his altimeter would have indicated approximately 2000ft. The pilot's written report indicated 1002 was being used as a QNH value and in the absence of any other information the possibility of 1022 being used was considered remote.

It was not clear why the pilot, having acknowledged, 14 LH cct, subsequently considered that RW24 was in use. The 2 helicopters inbound at the time were advised to report crossing the 24 numbers but it was considered unlikely, due to the timing of the calls, that these references to 24, could have misled the pilot.

After passing the C172, 2·1nm N of the airfield, the PA32 pilot then reported O/H the airfield. It is considered likely that the PA32 pilot may have been or became disorientated. After the Airprox occurrence, the PA32 then entered the ATZ at an altitude of 1400ft in the vicinity of the L base and final approach for RW14. The PA32 turned E and then SW to cross the RW14 threshold and then positioned LH for RW24. The PA32 pilot incorrectly positioned and reported downwind for RW24. The FISO did not detect the incorrect position report and responded by asking the PA32 pilot to report final. This will have served to reinforce the PA32 pilot's mistaken belief that RW24 was in use. The FISO was not aware of the PA32's position at any stage of the ac's approach, until it became apparent that the PA32 was on short final for RW24.

The considerable workload of the FISO associated with the busy special event, together with the added complexities of parking and managing ground movements was a significant factor in the FISO's late detection of the PA32 pilot's QFE read-back error and the incorrect call downwind. The Manual of Flight Information Services, CAP410 Part B, Chapter 1, Page 1, Paragraph 2.1, states:

'The FISO has the following specific responsibilities:

a) issuing information to aircraft flying in the aerodrome traffic zone to assist the pilots in preventing collisions.'

Page 4, Paragraph 7.4, states:

'Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly. Although there is a legal requirement for pilots to report entering and leaving the ATZ (Rule 39 of the Rules of the Air Regulations), this is not the case for other reports in the circuit. Any requests for position reports downwind, final etc., for the purposes of passing traffic information, only have the status of a request although it is expected that most pilots will comply.'

Both ac were operating just outside the ATZ, in receipt of a service from the FISO. CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment...'

The Airprox occurred when the PA32 pilot did not follow the guidance to make a standard join O/H at 2000ft but joined the cct in a position that caused the pilot of the C172 to be concerned about the relative position and proximity of the PA32.

ATSI Recommendation:

CAA ATSI are content with the action taken by the ATSU to reduce workload during the period of special events by reducing the planned movement rate from 7 movements to 5 movements each 15min.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the FISO involved and reports from the appropriate ATC authorities.

Members initially discussed the role of a FISO, who is permitted to control ac on the ground but limited to passing information to airborne flights. The special events instructions and UK AIP both recommend flights execute a standard O/H join to enable safe integration into the cct pattern; however, the FISO was not allowed to enforce

this on the RT. Members again reiterated the advantage of carrying out the O/H procedure particularly when a pilot is unfamiliar with the airfield or if the cct is active. That said, it was clear that the PA32 pilot was intending to join O/H but he had routed into the ATZ too low at about 1400-1500ft (vice a minimum of 2000ft on Goodwood QFE) and manoeuvred through the live side of the RW14 cct whilst erroneously joining for RW24 having previously read back RW14. In doing so he did not conform to the established traffic pattern and flew into conflict with the C172 which he did not see which had caused the Airprox. It was unclear why the PA32 pilot had reported O/H when the FISO asked for his position post Airprox as radar showed the ac 1·7nm N of the airfield but he had then correctly called O/H just over 1min later.

The C172 pilot was concerned when established on base leg to see the PA32 appear in his 1-2 o'clock about 600m ahead and about 100ft above crossing from R to L; he turned R to increase separation estimating the PA32 passed 500m ahead and 100ft above. Although the C172 passed unsighted to the PA32 pilot, the Board were content that the visual sighting by the C172 pilot and his prompt action taken had been enough to ensure that any risk of collision had been quickly and effectively removed.

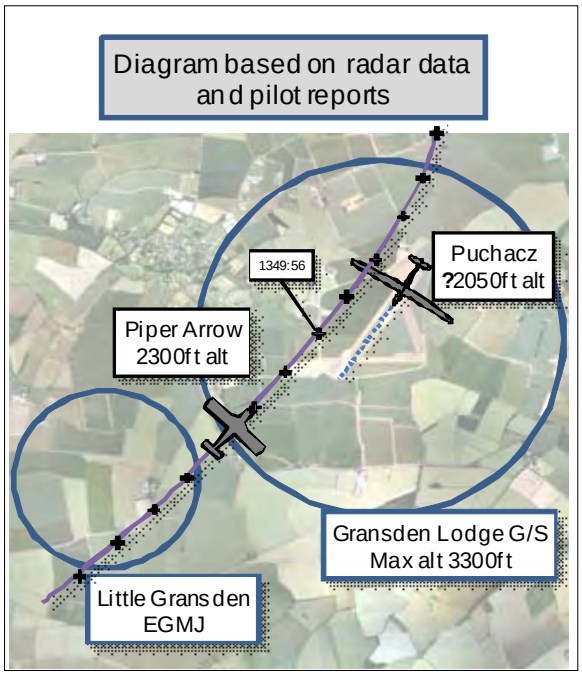
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA32 pilot did not conform to the established traffic pattern and flew into conflict with the C172, which he did not see.

Degree of Risk: C.

AIRPROX REPORT NO 2012089

Date/Time:	30 Jun 2012 1350Z (Saturday)	
Position:	5210N 00007W (O/H Gransden Lodge Airfield - elev 254ft)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Puchacz Glider	Piper Arrow
Operator:	Civ Club	Civ Trg
Alt/FL:	1800ft (QFE NR)	2300ft Lon QNH (1008hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:	150ft V/100m H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PUCHACZ GLIDER PILOT reports carrying out a winch launch from Gransden Lodge G/S RW22 in a white glider with no external lighting. The ac was not fitted with a transponder or FLARM. He stated that about half way up the launch, heading 220° at 55kts, he saw a blue/grey low-wing single engine, propeller driven, light ac, on an exactly reciprocal heading, displaced slightly to the R and slightly above. At the top of the launch [height 1800ft, QFE NR] he assessed his separation as 100-200ft below and 100m horizontally displaced to the L of the conflicting ac, which did not deviate in heading or height.

[UKAB Note(1): Gransden Lodge is promulgated in the UK AIP (ENR 5-5-1-2) as a Glider Launching Site, operating during daylight hours, at which aero-tows take place and winch launches may be encountered up to 3000ft agl].

He also reported that the winch driver had seen the conflicting ac through the roof windscreen during the latter stages of the launch and had identified it as a low wing, single engine, propeller driven ac, possibly a red Piper, tracking NE, almost directly O/H, slightly NW of the RW22 C/L.

The Puchacz pilot assessed the risk of collision as 'Low', stating that he had seen the other ac early enough to have taken avoiding action should that have been necessary. However, he also stated that if the conflicting ac had been 100ft lower and not displaced to one side he probably would not have seen it behind the nose, as the glider has a pitch attitude of some 40° nose-up during winch launch.

THE PIPER ARROW PILOT reports carrying out an instructional navigation exercise in a white ac with a blue fuselage stripe. Navigation lights and strobes were selected on, as was the SSR transponder with modes 3/A and C. The ac was not fitted with Mode S or TCAS. The pilot (PNF) was sitting in the RHS with the student (PF) in the LHS and another student observing from the rear.

Approaching a planned TP at Little Gransden [approximately 2nm SW of Gransden Lodge G/S], heading 045° at 120kts, all three occupants were focused outside the ac in order to identify the TP and to maintain a visual scan for possible traffic from the gliding site at Gransden Lodge. The A/G Station at Little Gransden had also been informed of their presence.

Neither the instructor nor students recalled seeing an ac in the area of Little Gransden. The pilot expressed the opinion that as the reporting ac was below them, and they were flying a low wing ac, that may have contributed to the non-sighting.

[UKAB Note (2): The Cambridge METAR was reported as:

EGSC 301350Z 21013KT 160V240 9999 SCT030TCU 20/12 Q1007].

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

The Board established that both pilots had an equal and shared responsibility to see but that the Piper Arrow pilot had responsibility to avoid iaw Rule 9 of the RoA.

[UKAB Note (3): RoA 2007, Rule 9 'Converging' states:

> (1) Subject to paragraphs (2) and (3) and to rules 10 and 11, aircraft in the air shall give way to other, converging aircraft as follows—
>
> (a) flying machines shall give way to airships, gliders and balloons;
>
> (b) airships shall give way to gliders and balloons;
>
> (c) gliders shall give way to balloons.
>
> (2) Mechanically driven aircraft shall give way to aircraft which are towing other aircraft or objects.
>
> (3) Subject to paragraphs (1) and (2), when two aircraft are converging in the air at approximately the same altitude, the aircraft which has the other on its right shall give way.]

Despite the glider pilot's confidence that he could have taken avoiding action, the Gliding Member opined that this is frequently not practical during the winch launch phase and could have resulted in substantially increased risk to the glider pilot, for example by releasing early.

Members agreed that Little Gransden A/D was a poor selection of TP by the Arrow pilot. Little Gransden A/D is a relatively insignificant ground feature when compared with Gransden Lodge G/S and it would appear from the radar recording that the Arrow pilot had indeed misidentified the TP and started the L turn on to W at Gransden Lodge G/S. Additionally, the selection of a cruising altitude of 2300ft was a poor choice by the Arrow pilot in that only a slightly late turn on the planned track would result in flight into a notified glider site with a maximum winch launch altitude of 3300ft.

Notwithstanding these factors, the Board were content that in this incident the glider was only ever going to attain a maximum height of 1800ft [altitude 2050ft] and as such there was no risk of collision.

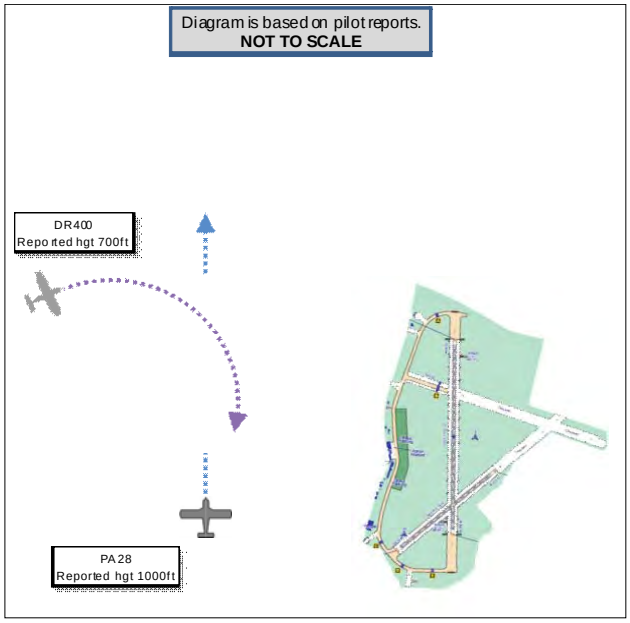
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Piper Arrow pilot flew overhead a promulgated and active glider site, below the vertical limit of the winch launch, and into conflict with the launching Puchacz glider, which he did not see.

Degree of Risk: C.

AIRPROX REPORT NO 2012090

Date/Time:	27 Jun 2012 1450Z	
Position:	5211N 00137W (DW RW18 RHC Wellesbourne Mountford - elev 159ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	DR400
Operator:	Civ Trg	Civ Pte
Alt/FL:	1000ft	800ft
	QFE (1012hPa)	(1015hPa)
Weather:	VMC CLBC	VMC Haze
Visibility:	>10km	>10km
Reported Separation:	50ft V/0m H	200ft V/60m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports flying downwind (DW) RW18 RHC, level at 1000ft QFE 1012hPa, heading (hdg) 360° at 90kt. The SSR transponder was selected 'on' with modes 3A/C and S, as were the '...anti-collision strobe and HISL'. He was flying an instructor training detail, teaching flapless approach instructional techniques, which required him to fly further DW than for a normal cct. His intentions were announced on RT prior to each cct. Additionally, the A/D requires a wide cct for noise abatement reasons but the ac remained within the ATZ during the incident cct. The pilot of a joining ac was heard on RT [reporting] 5nm NW of the A/D and stating his intention to join DW; he called "Wellesbourne Radio" which indicated he might not have been familiar with Wellesbourne as it operates under a FIS [C/S 'Wellesbourne Information']. The joining ac was not seen when he scanned visually to the W.

When he was late DW, abeam the RW18 threshold, the joining ac was sighted flying towards him on an estimated hdg of 170° at a similar level and an estimated range of 100m. The late sighting was attributed to the joining ac appearing from behind a blind spot and his lookout being concentrated towards where he assumed the joining ac would be. The joining ac pilot had been made aware on several occasions of the PA28's position by the FISO. Once he had climbed to avert the immediate collision risk, he declared an Airprox on RT. The other pilot was heard to say, "that was a close one" or words to that effect.

He assessed the collision risk as 'Medium'.

THE DR400 PILOT reports flying VFR from Blackpool to Wellesbourne. When the Airprox occurred he was in a RH turn at 80kt, level at 800ft with an altimeter setting of 1015hPa [height (hgt) 700ft Wellesbourne QFE 1012hPa]. The SSR transponder Mode 3A/C was selected 'on' with no Mode S fitted. The strobes and landing light were also selected 'on'. He had visited the A/D many times previously and it had been his habit to join the cct DW, a practice which had never attracted comment in the past. He also believed this practice made it easier to avoid noise sensitive areas 'under the cct'.

He had telephoned the A/D prior to departure and was told there '... was nothing particularly to know about ...', and that RW18 was in use. He arrived at the A/D from the W, having called joining and confirmed the RW in use at a range of 10nm. At that time he was aware of 2 ac in the cct, one of which was on approach, and the other that 'had just rolled through'.

He had some difficulty identifying the A/D, and then in confirming the A/D layout due to haze. He approached in a gentle descent, and by the time he had established his position he was well down the DW side of the RW having

descended to 800ft [hgt 700ft]. However, he believed he was still some distance from the airfield, outside what he would normally have regarded as the cct pattern, so he turned R to intercept the upwind end of the DW leg. He remained level at hgt 700ft and informed Wellesbourne of his actions.

The FISO warned him of another ac close to his position [the subject PA28] which he saw almost simultaneously, 250m ahead, 200ft above and to his L. He continued his R turn maintaining visual contact with the PA28.

Recognising that he had a responsibility when joining the cct to give way to ac already established, he spoke with, and apologised to, the PA28 pilot on landing who pointed out that the O/H join was the preferred join at the A/D although there was no mention of this in the DR400 pilot's flight guide.

[UKAB Note(1): UK AIP, AD 2-EGBW-1-5, 2.22 – FLIGHT PROCEDURES states:

.....

2.Arrivals

a.Pilots are requested to contact Wellesbourne at least 10 minutes before ETA Wellesbourne.

b.Overhead joins preferred.]

He also remarked that a call of "flapless" may not be enough for other pilots to fully understand how that may change an ac's cct pattern.

He assessed the collision risk as 'Low'.

THE WELLESBORNE MOUNTFORD FISO reports that the DR400 pilot contacted him for joining information, inbound from the NW. The PA28 pilot was already established in the RW18 cct pattern.

The DR400 pilot then requested to join DW, to which the FISO replied with cct traffic information and that a DW join would be at his discretion. He saw the DR400 pilot approaching from the W at cct height and realised there was a possible confliction with the PA28 pilot, who was DW at the time. He advised the DR400 pilot of the DW traffic [the subject PA28] in his 2 o'clock. The DR400 pilot reported that he was visual with the traffic. The PA28 pilot was then observed to take avoiding action by climbing, shortly after which he reported an Airprox.

ATSI reports that the pilot of a PA28 reported an Airprox in the Wellesbourne Mountford ATZ when he came into conflict with a DR400 at approximately 1450 UTC. The ATZ comprises Class G airspace defined by a circle radius 2nm centred on RW18/36 from surface to hgt 2000ft aal (elev 159ft).

The PA28 was operating VFR, undertaking instructor training ccts in the RW18 RHC and was in receipt of a BS from 'Wellesbourne Information' [124.025 MHz].

The DR400 was operating VFR on a flight from Blackpool to Wellesbourne Mountford and was in receipt of a BS from 'Wellesbourne Information'.

CAA ATSI had access to written reports from the pilots of both ac and the A/D FISO. It was not possible to extrapolate any details of the incident from area radar recordings as there was no Clee Hill radar availability at the time and therefore no recorded tracks below 2300ft in the subject location.

The Coventry METARs for 1420 and 1450 were reported as:

METAR EGBE 271420Z 21012KT 170V240 9999 SCT017 22/18 Q1016=

METAR EGBE 271450Z 22008KT 190V250 9999 SCT017 22/17 Q1016=

The written report from the A/D FISO stated that the DR400 requested joining instructions and was informed that there was a PA28 in the RW18 RHC. The DR400 requested a DW join and the FISO informed him that would be at his discretion. The FISO saw the DR400 approaching from the W, advised him of the potential confliction with

the PA28 and expected him to position accordingly in the cct. The FISO observed the PA28 climb to avoid the DR400.

The Manual of Flight Information Services, CAP410 PART B, Chapter 1, Paragraph 7.4 states:

'Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern.'

Both ac were operating VFR in class G airspace so were ultimately responsible for collision avoidance.

[UKAB Note (2): The Rules of the Air Regulations 2007 (incorporating The Rules of the Air (Amendment) Regulations 2009), Schedule 1, Section 4, Paragraph 12 (Rule 12) states:

12(1)Subject to paragraph (2), a flying machine, glider or airship flying in the vicinity of what

the commander of the aircraft knows, or ought reasonably to know, to be an

aerodrome shall:

(a) conform to the pattern of traffic formed by other aircraft intending to land at that

aerodrome or keep clear of the airspace in which the pattern is formed; and

(b) make all turns to the left unless ground signals otherwise indicate.

(2) Paragraph (1) shall not apply if the air traffic control unit at that aerodrome otherwise

authorises.

This extract is also published in CAP393, Air Navigation: The Order and the Regulations, section 2, section 4, para 12].

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included written reports from the pilots of both ac and the Wellesbourne Mountford FISO.

The Board noted that although both pilots had an equal and shared responsibility to see and avoid, the DR400 pilot was required to conform to the pattern of traffic iaw Rule 12 of the RoA. Indeed, this Airprox was a prime example of why an O/H join is normally the safest way of joining a cct pattern. The Board opined that the slant range visibility in haze seemed to cause the DR400 pilot concern and that an O/H join would have kept him deconflicted from cct traffic whilst establishing the cct pattern wrt the A/D position and layout. The Board also noted it was probable that the DR400 pilot's habit of joining DW was reinforced by the absence of comment after previous DW joins. A DW join does not necessarily result in increased risk, but the habitual use of such a join does not take variable conditions into consideration and hence increases risk.

Although the PA28 pilot saw the DR400 late he increased separation by climbing and the Board was satisfied that his avoiding action had been effective. The Board also commended the FISO's actions in providing traffic information to the ac involved. Nevertheless, at the close ranges involved in this Airprox, Members agreed that safety had been compromised.

AIRPROX REPORT No 2012090

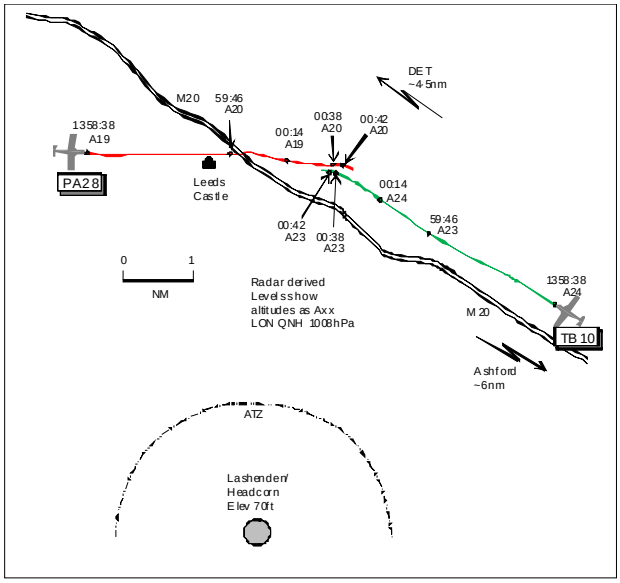
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The DR400 pilot did not conform to the cct traffic pattern, contrary to Rule 12 of the RoA, and flew into conflict with the PA28 downwind.

Degree of Risk: B.

AIRPROX REPORT NO 2012091

Date/Time:	30 Jun 2012 1401Z (Saturday)	
Position:	5115N 00041E (4·5nm SE DET)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	TB10	PA28
Operator:	Civ Pte	Civ Trg
Alt/FL:	2400ft	2200ft
	QNH (1011hPa)	QNH
Weather:	VMC NR	VMC
Visibility:	Unltd	NR
Reported Separation:		
	50ft V/300m H	<100ft V/50-100m H
Recorded Separation:		
	300ft V/<0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TB10 PILOT reports en-route from France to Biggin Hill, VFR and not in communication with any ATSU, squawking 7000 with Modes S and C. The ac was coloured white/blue with anti-collision beacon switched on. Heading 290° at 115kt he descended from 4000ft to 2400ft just S of Ashford in order to clear a bank of cloud and remain below the London TMA. He had been in receipt of a BS from Lydd Approach until he reported at Ashford when he was advised to squawk 7000 and freecall Farnborough Radar on 123·225MHz. He received no response to his call to Farnborough (not unusual as they are often shut on busy afternoons) and he elected to continue non-radio until nearer Biggin Hill. Leaving Ashford, he routed just to the E (ie the RHS) of the M20, intending to turn L at Maidstone, towards Sevenoaks to join the Biggin cct. He deviated W a couple of miles to avoid a number of gliders operating in the vicinity of Challock, then continued up the RHS of the M20; the sun was in his 8 o'clock. His first view of the other ac was as it banked and began a turn to the E/N. It appeared to be coming directly towards him, and no movement was visible until the ac banked. The oncoming ac was in his 1 o'clock range 0·5nm and slightly below. He instinctively jerked the controls to the L, and turned for an estimated 5sec at approximately 45° bank. His own wing then blanked his view of the other ac. Rolling out of the turn, he saw the PA28 pass 50ft below and 300m to his R. At this point, quite unnerved, he checked his position on the ground and noticed Leeds Castle just in front of him. He checked his altitude (which had deviated by about 60ft) and descended back to 2400ft. Then (in all honesty, simply to hear a friendly voice), he contacted London Information on 124·6MHz and requested a BS. As he proceeded towards Sevenoaks, he considered the events and elected to report an Airprox. The initial filing was made to the London Information operator while orbiting to the E of Sevenoaks, before he transferred to Biggin Approach. The flight then proceeded uneventfully. He assessed the risk as low. It is worth noting that there were some moderate thermals in the area (giving about 500fpm) that made accurate altitude holding more difficult; this undoubtedly distracted from his visual scan. However, in the excellent visibility at the time, he spotted a number of other ac and gliders. He had recently purchased a PCAS unit, but had not yet had a chance to familiarise himself with it, and so did not use it on this flight. Apart from the thermal activity, his workload was light – he was in a familiar area, monitoring his position on a panel mounted GPS and by reference to the DET VOR. Normally he would have a portable GPS recording his flight route, but the battery was flat so this information was sadly unavailable.

THE PA28 PILOT reports flying a dual VFR navex from Biggin Hill via N Sevenoaks (M26 motorway) to Deal Kent (track 096°M) with an unknown diversion. The NOTAMs were checked prior to the flight and detailed an airshow at Rochester airport during the period of the flight; this was discussed with the student. They signed off from Biggin approach frequency at Sevenoaks and requested a frequency change to Farnborough Radar E on frequency 123·225MHz. They then turned onto a heading of 105°M, and changed squawk code from 7047 to 7000 as is the normal procedure. The student then attempted to contact Farnborough Radar E for a BS or TS. No reply was received after several attempts. One other flight was heard calling Farnborough on this frequency but also

received no reply; no other radio traffic was heard on frequency. Their track took them 2nm S of Rochester ATZ so the student called Rochester Information on 122·25MHz requesting a BS. Rochester replied acknowledging a BS and suggested they stay well S of the ATZ due to the airshow. They were also informed of reports of gliders in the vicinity of DET, presumably from Challock gliding site. They later observed 2 gilders at a lower level closer to Challock. Their track should have taken them 1·5nm N of Leeds Castle but they had drifted S so that they passed just to the S of Leeds Castle. At this point it became evident to the student that they were S of intended track and after a couple of minutes the student informed him he was making a heading correction to the L onto a heading of 095°M. He pointed out that they needed to make an early correction as their projected current track would take them close to Challock gliding site. The student agreed and turned L from 103°M onto a heading of 090°M. He asked the student how he had arrived at his choice of heading and they discussed this for a very brief period. Their position was about 3·5nm SSE of DET flying level at 2200ft QNH, 300ft below cloud in VMC and at 90kt. When he looked up he observed another ac maybe slightly higher at about their 1 o'clock position, range 1nm, just N of the M20 motorway on a reciprocal but parallel track. He assessed that the other ac would pass down their RHS and they made a small turn to the L to ensure that they were on a divergent track; it passed <100ft above and 50-100m clear. He assessed the risk of collision was very low. He did not note the other ac's registration nor did they observe any heading changes by the other ac. Once due S of Sittingbourne they changed frequency to Manston Radar and continued with their planned route.

THE SWANWICK FIS OFFICER reports a moderately busy Saturday afternoon and at 1405 the TB10 pilot (in receipt of a BS) reported an Airprox in the vicinity of Maidstone. The TB10 was heading 290° at 2400ft when another ac (reported to be a PA28) passed 50ft below in the opposite direction. The other ac was not in receipt of a service from himself. Details were taken and the TB10 transferred to Biggin Hill at 1411.

ATSI reports that the Airprox occurred at 1400:42 UTC, 9nm SE of Rochester Airport and 2nm E of Leeds Castle, between a TB10 and a PA28.

The TB10 was operating VFR on a flight from Le Touquet to Biggin Hill and was not in receipt of an ATS. After the Airprox the TB10 pilot contacted London FIS to make a report. The PA28 was operating on a local VFR flight from Biggin Hill and was in receipt of a BS from Rochester Information (AFIS) on frequency 122·25MHz.

Farnborough ATSU reported that LARS N and E were closed from 1330 to 1439 due to staff being required to facilitate CAS(T) operations. A NOTAM is not issued for a short closure. The Airprox occurred outside the Farnborough LARS-E area of responsibility.

CAA ATSI had access to: RT recording of Rochester Information; area radar recordings; written reports from the both pilots and a written report from the London FISO. The radar system QNH was 1008hPa.

The Biggin Hill METAR shows: EGKB 301350Z 22013KT 190V260 9999 SCT030 18/10 Q1009=

At 1345:08, the radar shows the TB10, 12·6nm E of Lydd Airport approaching the UK coastline at FL040 and squawking 7066, the Lydd Approach VFR conspicuity code.

At 1350:16, the PA28 is shown 6nm SE of Biggin Hill squawking 7000. The PA28 pilot's written report indicated departing from Biggin Hill on a dual VFR navex and after passing Sevenoaks, the PA28 pilot attempted to contact Farnborough LARS E on frequency 123·225MHz, without a response.

At 1353:03, the PA28 pilot contacted Rochester Information requesting a BS, and reported routeing from Biggin Hill via Deal, Whitstable, to pass S abeam Rochester. The PA28 was 7·8nm SW of Rochester Airport and the pilot reported level at an altitude of 2200ft on 1009hPa. The Rochester FISO passed the QNH as 1009 and reported that a display was taking place at Rochester, with 3 other ac operating in the local area. The PA28 pilot advised that he would report passing S abeam Rochester.

At 1353:31, the TB10 is 4·2nm SE of Ashford indicating FL024. The TB10 pilot's written report indicated descending to 2000ft to the S of Ashford changing squawk to 7000 and leaving the Lydd frequency to call Farnborough Radar on frequency 123·225MHz, without any response. The pilot decided to continue non-radio until nearer Biggin Hill. At this point the TB10 was outside of the Farnborough LARS E area of responsibility but within the coverage of Manston and Southend LARS.

At 1356:15, the TB10 at 2400ft, is shown 2·8nm N of Ashford, squawking 7000. The PA28, at 2100ft, is tracking SE'ly and the distance between the 2 ac is 15·6nm. By 1358:38 the distance between the 2 ac is 7·1nm, the PA28 at altitude 1900ft and the TB10 at altitude 2400ft.

At 1400:14, the TB10 at 2400ft, is shown 9nm NW of Ashford, on a NW'ly track. The PA28 is in the TB10's 11 o'clock at a range of 1·6nm, at 1900ft on an E'ly track.

[UKAB Note (1): The CPA occurs between radar sweeps. At 1400:38, the PA28 at 2000ft is shown 0·2nm NW of the TB10 at 2300ft. The PA28 is tracking E and the TB10 is shown commencing a L turn. The next radar sweep at 1400:42 shows the 2 ac have passed abeam and are diverging at a range of 0·2nm, with the TB10 at 2300ft and the PA28 at 2000ft. It was estimated that the 2 ac passed abeam at a range of <0·2nm with a vertical distance of 300ft.]

At 1401:23, the PA28 pilot reported passing abeam Rochester and requested a change of frequency to Farnborough on 123·225MHz.

The TB10 pilot contacted London Information on frequency 124·600MHz. The written report from the London FISO indicated that at 1405 the TB10 pilot reported an Airprox in the vicinity of Maidstone, on a heading of 290° at 2400ft. The PA28 was reported as the other ac travelling in the opposite direction and 50ft below. The TB10 was transferred to Biggin Hill at 1411.

The TB10 flight was not in receipt of an ATS at the time of the Airprox. The PA28 flight was in receipt of a BS from Rochester AFIS. CAP 774, UK Flight Information Services, Chapter 2, Page 1, Paragraph 1, and 5, states:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.'

Rochester Information (AFIS) were able to provide information regarding ac operating in the vicinity of Rochester Airport. The Airprox occurred 9nm SE of Rochester and the FISO was not aware of the TB10. The Manual of Flight Information Services, CAP410 Part B, Chapter 1, Page 1, Paragraph 1, states:

'The FISO's area of responsibility is the aerodrome, the aerodrome traffic zone and the immediate surrounding local area.

The FISO may pass traffic or essential aerodrome information to anyone who calls on RTF. Any traffic information passed can relate only to known traffic operating, or intending to operate within the area of responsibility.'

Both flights were operating within Class G airspace. CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment…'

The Airprox occurred when the TB10 pilot became concerned about the proximity and relative position of the PA28.

The Rochester FISO was not aware of the TB10 and was unable to provide TI to the PA28 pilot.

In Class G airspace, the pilots are ultimately responsible for collision avoidance and should consider service provision to be constrained by the unpredictable nature of this environment.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the Rochester FISO RT frequency, radar video recordings, reports from the London FISO involved and reports from the appropriate ATC authorities.

Both pilots were responsible for maintaining their separation from other traffic through see and avoid within the Class G airspace. Both had tried to supplement their SA by obtaining a service from Farnborough LARS but were unsuccessful owing to its temporary closure. The PA28 pilot elected to contact Rochester FISO who was unaware of the TB10 whilst the TB10 pilot was not in receipt of any ATS at the time of the Airprox. From the reports provided it appeared that both pilots had seen each other's ac at about the same time, within 1nm, which Members thought were late sightings and were the cause of the Airprox. The ac had approached each other on a line of constant bearing with the conflicting traffic appearing as a stationary object within the pilot's field of view making the ac more difficult to detect owing to there being no relative movement. The same visual perspective of the incident (1 o'clock sightings) was presented to both pilots who both turned L which resulted in the ac passing starboard to starboard. Taking these elements into account, the Board were able to conclude that the actions taken by both pilots had been enough to remove quickly and effectively any risk of collision.

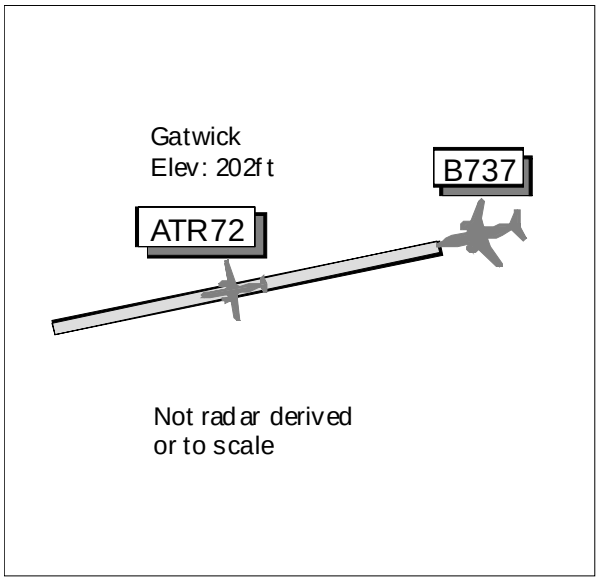
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the pilots of both ac.

Degree of Risk: C.

AIRPROX REPORT NO 2012092

Date/Time:	2 Jul 2012 1104Z	
Position:	5109N 00011W (O/H RW26L Gatwick - elev 203ft)	
Airspace:	Gatwick ATZ	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-800	ATR72
Operator:	CAT	CAT
Alt/FL:	100ft↓ (agl)	↑ (QNH)
Weather:	VMC NR	VMC NR
Visibility:	NR	10km
Reported Separation:	Nil V/4000ft H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Gatwick RW26L, IFR and in communication with Gatwick Tower on 124·225Mhz squawking an assigned code with Modes S and C. On final approach they were told to continue approach and they slowed to minimum approach speed as normal with an approach speed of 150kt. They were then told to expect late landing clearance with traffic to depart. They noted 1 ac taking-off ahead with an ATR72 cleared to enter the RW after the previous departing ac; the ATR72 flight was given take-off clearance as they were passing approximately 500ft. They were given landing clearance at approximately height 100ft when minimum horizontal separation from the ATR72 was approximately 4000ft. He assessed the risk as medium. It was a day VMC incident and they were visual with the departing traffic at all times and were satisfied with the distance from the departing traffic. However, should they have elected to go-around there would have been a risk of collision. He opined that ATC should allow more separation between arriving and departing traffic.

THE ATR72 PILOT reports, from his point of view, it was an uneventful departure from Gatwick, IFR and in communication with Gatwick Tower on 124·225MHz, squawking an assigned code with Modes S and C. They were cleared to line-up and then depart from RW26L on a SAM 2M SID and they complied with all ATC instructions promptly and efficiently.

THE GATWICK AIR CONTROLLER reports he had lined-up an A320 when the B737 was on approach. He asked the ATR72 crew if they could accept an immediate departure behind the A320 and they replied that they could. He told the vacating A319 flight to expedite vacating and then told the ATR72 flight to line-up after the departing A320 and to be ready for an immediate departure and he also told the B737 crew to expect late landing clearance. The A320 departed and the ATR72 flight was given take-off clearance when the B737 was at 2nm. The ATR72 was airborne as the B737 was flying over the start of the RW starter extension.

ATSI reports that an Airprox was reported in the Gatwick ATZ (Class D airspace), which comprises a circle radius 2·5nm centred on the longest notified RW (08R/26L) up to 2000ft above aerodrome level, between a landing B737 and a departing ATR72 at 1104:10UTC.

The B737 was operating IFR from Palma de Mallorca to Gatwick and was in receipt of an Aerodrome Control Service from the Gatwick AIR controller on frequency 124·225MHz.

The ATR72 was operating IFR departing from Gatwick to Guernsey and was in receipt of an Aerodrome Control Service from the Gatwick AIR controller on frequency 124·225MHz.

AIRPROX REPORT No 2012092

CAA ATSI had access to recordings of RT from Gatwick Tower together with area radar recordings, and recordings from the Gatwick ATM and Air Surface Movement Guidance and Control System (ASMGCS). ATSI also had access to written reports from both pilots and the Gatwick AIR controller.

The Gatwick METARs were: EGKK 021050Z 19011KT 160V220 9999 SCT023 17/11 Q1016= and EGKK 021120Z 19011KT 150V220 9999 SCT021 17/11 Q1016=

RW26L was in use at Gatwick. There were 2 ac on final approach - an A319 followed by the B737 6nm behind. An A320 and the ATR72 were at the holding point for departure.

At 1101:20 UTC the Gatwick AIR controller gave the A320 flight a conditional line-up clearance on RW26L against the landing A319.

At 1101:30 the B737 flight checked in with Gatwick AIR at a range of 7nm from touchdown and was instructed to continue approach. The crew of the ATR72 was then asked if they could accept an immediate departure behind the A320, to which they replied that they could. The departing A320 flight was instructed to be ready immediate, which was acknowledged by the crew.

The ATSU advised that the controller initially judged that the 6nm gap between the landing A319 and the B737 was sufficient to allow the departure of both the A320 and the ATR72. The controller's plan was based on the expectation that the landing A319 would vacate at the Rapid Exit Taxiway at Echo. When the A319 landed it went past the turn off for Echo and although the controller instructed the crew of the A319 to expedite vacating, the gap that the controller had anticipated having was eroded by approximately 15sec as the A319 continued down the RW.

At 1102:30 the ATR72 crew was instructed to line up after the departing A320.

At 1102:50 the A320 flight was cleared for take-off. The B737 was at 4nm from touchdown and was instructed to expect a late landing clearance.

At 1103:30 the ATR72 flight was cleared for take-off. The B737 flight, which was at 2nm from touchdown descending through altitude 600ft, was instructed to continue approach and given a wind check.

CAP493, the Manual of Air Traffic Services Part 1, Section 2, Chapter 1, Paragraph 15.2.2 states:

'Unless specific procedures have been approved by the CAA, a landing aircraft shall not be permitted to cross the beginning of the runway on its final approach until a preceding aircraft, departing from the same runway, is airborne.'

The B737 crossed the beginning of the RW before the ATR72 became airborne at 1104:10. The B737 crew was given landing clearance just after it crossed the beginning of the RW, and landed safely.

[UKAB Note (1): The Unit report states that when the ATR72 became airborne separation was eroded to 1148m and this reduced to 940m when the B737 touched down, distances taken from the ASMGCS.]

The written report from the pilot of the B737 stated that it was day VMC and that the crew were visual with the departing ATR72 and satisfied with the distance from the departing traffic. The pilot of the B737 expressed concern that there was a risk of collision in the event of a go-around.

The written report from the pilot of the ATR72 indicated that from their point of view it was an uneventful departure from London Gatwick.

The controller made the decision to depart the A320 and the ATR72 ahead of the B737. The controller was aware that the gap was always going to be quite tight to depart both the A320 and the ATR72 – both departing flights were told to be ready immediate and the landing B737 was instructed to expect a late landing clearance. Having formulated a plan the controller did not adjust the assessment of the gap when the A319 took longer than expected to vacate the RW.

Once the ATR72 had commenced its take-off roll the controller's options became limited to either:

a) continuing with the plan in the hope that the ATR72 became airborne in sufficient time to issue landing clearance to the B737, or

b) issuing go-around instructions to the B737 that would ensure a conflict as the B737 carried out a go-around on top of the ATR72.

The controller chose to continue with the initial plan and gave late landing clearance to the B737 after it crossed the beginning of the runway.

The pilot of a B737 that was landing at Gatwick became concerned about the potential for confliction with the departing ATR72 ahead had it become necessary for the B737 to conduct a go-around.

The controller did not reassess the gap available to depart the A320 and the ATR72 when the landing A319 took longer than expected to vacate the RW.

The remaining gap available to the AIR controller was insufficient to allow the A320 and the ATR72 to depart with appropriate spacing from the landing B737. As a result the B737 was given late landing clearance, after it had crossed the beginning of the RW.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

A CAT pilot Member remarked that owing to the high-intensity single-RW operations in use at Gatwick, there was very little margin available when a situation doesn't go according to a plan. The option to go-around was always available to ATC and aircrew if they were not happy with the scenario - a not uncommon occurrence. The difficult part was to identify early in a dynamic scenario the situations where the margin would be likely to be eroded to the point that a go-around was necessary. The AIR controller had safety/separation criteria to meet, to ensure the landing B737 would be afforded adequate separation against the departing ATR72. Controller Members agreed that the AIR controller had persevered with his plan when he should have taken positive steps at an early stage to alter it when the landing A320 did not vacate the RW as anticipated and this had caused the Airprox. As soon as the A320 had passed the RET, AIR should have reassessed the plan to take into account the reduced gap available. His options were to have cancelled the line-up of the ATR72 to allow the B737 to land or to have sent the B737 around early with the RW occupied. For their part, the B737 crew was advised to expect a late landing clearance and a CAT pilot Member briefed the Board that this warning would prompt the crew to be prepared for a go-around. Since a late landing clearance is not an uncommon event, the B737 crew would not routinely have gone around on receipt of that warning. However, by continuing the approach any subsequent go-around would occur when the ac was closer to the RW and the departing ATR72, and the crew retained the responsibility to assess continually the unfolding situation and make their own decision to go-around if they judged it appropriate. In this occurrence the crew was clearly aware of the potential hazards associated with a very late go-around and the Board judged that by the time the B737 was over the beginning of the RW at 100ft the controller was correct to issue a landing clearance, assessing that the safest course of action with the ATR72 just airborne was for the B737 to land. If the B737 crew had elected to go-around at a very late stage the AIR controller would have given the affected flights early diverging turns whilst applying reduced separation in the vicinity of the aerodrome.

Looking at risk, some Members thought that this had been a benign encounter where normal safety standards and parameters pertained (Risk E). This view was not shared by the majority. The AIR controller had not complied with the normal procedures, passing landing clearance after the B737 crossed the beginning of the RW. However, since the RW was clear by the time the B737 was issued its landing clearance, and the B737 crew were able to accept the late clearance, the Board was content that any risk of collision had been removed, a Risk C.

AIRPROX REPORT No 2012092

PART C: ASSESSMENT OF CAUSE AND RISK

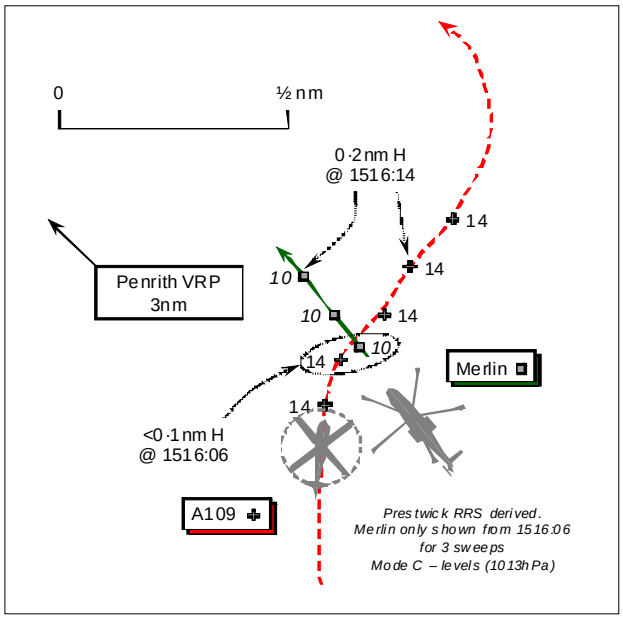
Cause: The AIR controller did not adjust his plan when a landing ac did not vacate the RW as anticipated.

Degree of Risk: C.

Contributory Factors: The B737 crew continued their approach, retaining their option to go-around at any stage.

AIRPROX REPORT NO 2012093

Date/Time:	26 Jun 2012 1516Z	
Position:	5438N 00241W (3nm SE of Penrith VRP)	
Airspace:	LFA17/London FIR (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Merlin	A109SP
Operator:	HQ JHC	Civ Comm
Alt/FL:	1700ft↑	1500ft↓
	QNH (1018hPa)	QNH (1016hPa)
Weather:	VMC NK	VMC CLBC
Visibility:	15km	5000m
Reported Separation:		
	300ft V/300m H	500ft V/1km H
Recorded Separation:		
	400ft V @ <0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AGUSTA WESTLAND EH-101 MERLIN HC3 PILOT reports he was operating on an evasion training (ET) sortie in the Appleby Valley in the vicinity of Penrith. The helicopter was crewed with two pilots, a pilot instructor in the cockpit jump seat and two crewmen in the cabin. Prior to the arrival of the participating Hawk ac they were conducting a cloud base check to assess the suitability of the weather conditions in the area for the planned ET. They assessed the main cloud base to be 2300ft amsl, and the visibility 'good', but in a band some 2-300ft below the main cloud base the visibility was severely reduced.

The ET element of the sortie was cancelled as the Hawk was unable to get into the area and the in-flight conditions were assessed to be marginal for ET. As per the TAC Climb SOP, the crew cleared the arcs above the helicopter before a climb was commenced. Heading 315° at 80kt, passing about 1000ft agl/1600ft amsl in the climb, the No1 crewman called 'break right, descend'. As the PF in the RH seat complied, other members of the crew saw an A109 helicopter about 300ft above and 300m away, heading directly towards them from their 10 o'clock. Having descended clear of the A109, they departed the area 'maintaining eyes' on the other helicopter. He assessed the Risk as 'high'.

Whilst maintaining a 'listening watch' with Carlisle APPROACH on 123·600MHz, they were not in receipt of an ATS. Because of their range and heights from Carlisle, only intermittent ATC transmissions were received and cockpit instruction was ongoing at the time; the UK LFS Common frequency was also being monitored. A squawk of A7000 was selected with Modes C and S on; TCAS is not fitted. The helicopter has an olive green colour scheme; the nav lights, upper and lower HISLs were on.

THE AGUSTA A109SP (A109) PILOT reports that he was inbound to a private helicopter landing site (HLS) just SE of Penrith before continuing on to Carlisle Airport. He was in receipt of a BS from Carlisle APPROACH on 123·600MHz and a squawk of A4677 was selected with Modes C and S on; TCAS I is fitted.

About 3nm SE of Penrith VRP, heading 010° at 100kt, as he was descending through 1500ft QNH approaching the HLS to land, he noticed a contact displayed on TCAS below him; a TA was enunciated. Simultaneously, his ground operator called on the RT to advise that another helicopter was below him. He turned R as the Merlin flew 500ft beneath his helicopter and then moved out of his sight to his L. He continued to the R and descended, before making a L turn to approach the HLS; the Merlin then turned R and flew back to where he first spotted it, before turning R and flying back towards his HLS at about 250ft agl. At this point he was on long finals to the HLS from the N, the Merlin flew almost directly over the HLS, then turned R – E'ly - and flew off towards Appleby. He landed

his A109, disembarked his passengers and then flew to Carlisle. He assessed the Risk as 'none'. His helicopter is coloured brown and grey; the two anti-collision beacons and the HISLs were on.

ATSI reports that the Airprox occurred 3nm SE of Penrith, within Class G Airspace. The Merlin was operating VFR in an area to the S of Penrith and was listening out on the Carlisle APP frequency on 123.6MHz, but not in receipt of a service. Carlisle ATC was not aware that the Merlin was operating in the area. The A109 was inbound VFR to a private HLS near Penrith to drop off a passenger before setting course for Carlisle. The Carlisle controller was providing approach control services, without the aid of surveillance equipment.

The Carlisle 1450Z METAR: 08002KT 9999 SCT023 17/15 Q1016=

At 1512:56, the A109 pilot contacted Carlisle APPROACH and reported from Manchester descending to drop one passenger at Penrith HLS, then inbound to Carlisle, passing 3500ft QNH, squawking A4677 and requesting a BS. The Carlisle controller agreed a BS and passed the QNH (1016hPa), with a request that the pilot report approaching the HLS, which was acknowledged by the A109 pilot. At 1513:22, the radar recording shows the A109 7nm SE of Penrith, tracking N and passing FL34 in the descent. The Merlin is shown converging in the A109's 2 o'clock position at a range of 3.8nm and passing FL19 in the climb.

At 1514:19, radar shows the two ac converging at a range of 1.9nm. The Merlin was descending passing FL11 and the A109 was descending through FL26. The two ac continued to converge on their respective tracks towards Penrith VRP. [The Merlin then fades on the recording and is not shown again until 1516:06], moments before the respective tracks cross, when the A109 had turned R onto a NE'ly track, at FL14 – about 1490ft QNH (1016hPa), with the Merlin shown in the A109's 12 o'clock at less than 0.1nm crossing from R – L at FL10 – about 1090ft QNH (1016hPa). The next sweep of the radar shows the two ac have passed maintaining their respective levels. The Merlin later fades from radar and the A109 becomes intermittent. The relative proximity of the two helicopters is not shown as the A109 approaches the HLS.

At 1519:41, a third helicopter called Carlisle – an AS365 - departing the Penrith area for a position in the Newcastle area. At 1520:22, the A109 reported airborne from Penrith inbound to Carlisle and visual with the AS365 helicopter. The A109 pilot asked the Carlisle controller if there had been a Merlin helicopter on frequency in the Penrith area; the controller responded 'negative'. The A109 continued inbound to Carlisle and landed without further incident.

The A109 pilot was in receipt of a BS from the Carlisle controller who was not aware of the Merlin helicopter and was not therefore able to provide any general information or warning to the A109 pilot. Although the Merlin helicopter pilot's written report indicated he was listening out on the Carlisle Approach frequency, it was not clear if the Merlin pilot was aware of the RT calls made by the A109 pilot approaching Penrith.

CAP774, UK Flight Information Services, Chapter 2, Page 1, Paragraph 1, 3 and 5, state:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.'

Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ), and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot's situational awareness. This will not normally be updated by the controller/FISO unless the situation has changed markedly, or the pilot requests an update. A controller with access to surveillance-derived information shall avoid the routine provision of traffic information on specific aircraft, and a pilot who considers that he requires such a regular flow of specific traffic information shall request a Traffic Service. However, if a controller/FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

CAP774, UK Flight Information Services, Chapter 1, Page 1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment…'

The Airprox occurred in Class G airspace when the Merlin crew, listening out on the Carlisle APPROACH frequency, became concerned about the relative position and proximity of the A109, which was making an approach to a private HLS near Penrith. The Carlisle controller was not aware of the Merlin helicopter and was unable to provide any generic information or warning to the A109 pilot under the BS.

HQ JHC comments that this Airprox appears to have arisen because the track of the Merlin whilst climbing from low level after the crew had conducted a thorough lookout, has aligned with the A109's track descending from a higher altitude possibly with poorer visibility. The poorer visibility reported by the Merlin in the 200-300 ft block below the cloud base, despite the thorough lookout would have made it very difficult to spot the A109 as it was descending from altitude. Additionally, it is clear that the fitting of a collision warning system (CWS), which is being actively pursued by this HQ, could have significantly helped to prevent this incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings and reports from the appropriate ATC and operating authorities.

The Merlin PIC reported he was operating autonomously and not in receipt of any ATS, whilst listening-out on the same Carlisle APP frequency as that used by the A109 pilot. A helicopter pilot Member opined that there was little to be gained from not 'checking-in' with APP and merely listening-out on the frequency; it was evident that the Merlin crew's passive 'modus operandi' had not enabled them to detect the presence of the A109 helicopter from listening to any of the transmissions between the A109 pilot and Carlisle APP. The latter was providing a BS to the A109 pilot as he approached his HLS and a Member postulated that the Merlin crew had most probably not received any of these transmissions because of terrain masking at low altitude. A helicopter pilot Member contended that although the Merlin was not inbound to Carlisle, if the crew had been able to contact Carlisle on the RT, an informative call announcing that they were operating in the vicinity would have been good airmanship. Potentially, such a call might have been heard directly by the A109 pilot or engendered generic TI from Carlisle APP to the A109 pilot about the Merlin and vice versa, thereby assisting both pilots when operating under VFR with their responsibilities to 'see and avoid' other ac in Class G airspace. Without any radar Carlisle APP was not aware of the Merlin at all, moreover, pilot Members were keen to point out that it was more important to maintain an effective look-out scan - many ac could potentially be operating in the area without any RT communication with Carlisle ATC and the same terrain masking issue might similarly have prevented the reception of generic TI from the controller to the Merlin crew.

Although the Merlin pilot reported that his crew had cleared the arcs above their helicopter, they did not see the A109 in the reported good visibility before the climb was commenced. The Merlin crew was executing a 'tactical climb', which a military helicopter pilot Member stressed was quite a dynamic manoeuvre, when the No1 crewman spotted the A109 and called to the Merlin PF to break R and descend. Whilst the A109 was evidently 'there to be seen', the latter's pilot had reported independently that the visibility was 5000m and in accord with the Merlin pilot's account that the visibility was severely reduced just below the main cloud base. The Board noted the lack of any CWS in the Merlin to supplement the crew's lookout and the Members agreed that part of the Cause was a late sighting by the Merlin crew.

Conversely, the A109 pilot had the benefit of a TCAS 1 fitted to his helicopter and a TA had forewarned him of the presence of another ac in the vicinity as he was descending, just before the pilot also received a call on the RT from his ground operator to advise that the Merlin was beneath him. The intermittent nature of the recorded radar data did not clearly illustrate the Merlin's position or level moments before the two ac flew into close quarters; it was feasible that the A109 was behind and to port of the Merlin in a slow overtake given the reported speeds of the two ac, but from the final geometry it seems that the descending A109 pilot was required to 'give way' to the Merlin below and to his R. The A109 pilot reports he had turned R as the Merlin flew 500ft beneath his helicopter just before it disappeared from view to port and the Board concluded that this late sighting was also part of the Cause.

The Merlin pilot's reported avoiding action descent is not apparent on the available recorded radar data and so it might have occurred before 1516:06, when the Merlin is shown in close proximity to the A109 suggesting to the Board a slightly greater first sighting distance than the Merlin pilot's reported 300m range. The radar recording evinces 400ft vertical separation from the ac's respective unverified Mode C, as the Merlin maintained 1000ft (1013hPa) and underflew the A109 that was maintaining 1400ft (1013hPa) at this point, exactly between the Merlin pilot's report of 300ft and the 500ft stated in the A109 pilot's account. This convinced the Board that despite the late sightings, the Merlin pilot's swift response to his crewman's warning before they had closed to 0·1nm, coupled with the A109 pilot's sighting of the Merlin below following the TCAS TA, had removed any Risk of a collision in the circumstances conscientiously reported here.

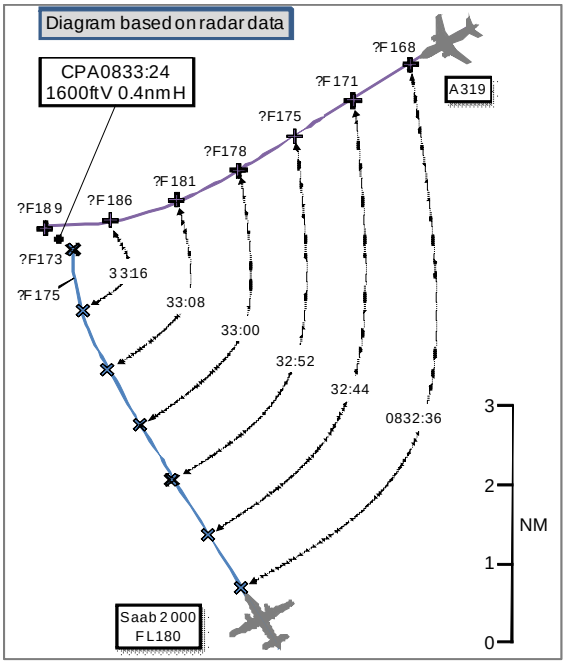
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the Merlin crew and the A109 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012094

Date/Time:	3 Jul 2012 0833Z	
Position:	5552N 00405W	(12nm E Glasgow)
Airspace:	Scottish TCA	(Class: A)
	Reporting Ac	*Reporting Ac*
Type:	Saab 2000	A319
Operator:	CAT	CAT
Alt/FL:	FL180	FL170
Weather:	VMC CLAC	VMC NK
Visibility:	>10km	10km
Reported Separation:	0ft V/0.5nm H	0ft V/500ft H
Recorded Separation:	0ft V/2.4nm H 1600ft V/0.4nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 2000 PILOT reports operating a scheduled passenger flight under IFR in VMC, level in the cruise at FL180, heading 355° at 360kts, with a RCS from ScATCC [from the Talla SC]. He was flying a white and blue ac with external lights and strobes selected on. The SSR transponder was selected on with Modes A, C and S selected. TCAS was also fitted. Climbing traffic appeared on the TCAS display [the subject A319] at a range of 5-10nm in the 1 o'clock position and 1200ft below. The traffic continued to climb towards him, becoming proximate when less than 1000ft below his level. ATC then transmitted 'avoiding action, turn left, he thought, onto 090°'. As the autopilot was disengaged and a R turn onto 090° started, a TCAS TA 'traffic traffic' warning was issued, immediately followed by RAs 'monitor vertical speed' and then 'descend descend', which were followed. The conflicting ac was observed directly in front of him, turning R and climbing. The RA ceased and the ac was recovered to the assigned FL and heading.

He assessed the risk of collision as 'Medium'.

THE A319 PILOT reports operating a scheduled passenger flight under IFR [with a RCS from the ScATCC Galloway SC], on the initial climb passing FL170, heading 240° at 290kts, and cleared to FL250. During the climb he observed a TCAS TA warning and became visual with the conflicting traffic. ATC issued an avoiding turn R on to heading 300° which was followed by TCAS RAs of 'adjust vertical speed' and 'monitor vertical speed' with a demanded climb of 3000fpm for a short while. This was followed by a vertical speed demand of zero as he passed clear of the conflict.

He reported the severity of risk to the ac as 'Nil'.

THE GALLOWAY CONTROLLER reports that he was working Galloway combined with a planner available. He stated that traffic was moderate, occasionally busy, but not unmanageable; that there were departures from Glasgow and Edinburgh, all requiring vectoring and stepped climbs, and that Edinburgh outbound traffic was requiring higher levels as there were several diversions from the N due to poor weather at Aberdeen. He co-ordinated the Saab 2000 at FL180 with the Talla SC, from the original planned level of FL240, routeing to FOYLE from MARGO direction. He took this flight in to consideration for several departures that would be crossing the aircraft's track. The A319 was transferred from Edinburgh on a heading, climbing to FL110 as per co-ordination. He knew prior to the A319 coming on frequency that the Saab 2000 was factor traffic but couldn't explain why he

gave the A319 a straight climb to FL250. He stated that he did not know why he had forgotten about the conflict. As the ac converged, STCA activated white with the A319 passing about FL160. He immediately tried to stop the A319 at FL170 but Mode C indicated this was not going to be achievable so he issued an avoiding action turn [R] on to 290°, further increasing to 300° with TI. The A319 pilot advised that he had a TCAS RA and was visual with traffic; in the background he heard the autopilot disconnect alarm on his RT. He advised the pilot he was under his own control. He also heard the Talla SC issuing avoiding action to the Saab 2000 and let him know that the A319 was taking TCAS avoiding action. The STCA turned red for several sweeps as the A319 increased climb rate to pass above the Saab 2000. Once clear of conflict, a revised heading was given and the A319 transferred to DCS. He advised the pilot that he would be filing on the incident. The pilot responded that there was no problem. The Galloway SC stated that he couldn't think of 'any good reason' as to why he didn't take account of the Saab 2000 when climbing the A319, having already identified that there was a possible confliction. He also reported that he had no distractions, that it was 'known traffic' and he had already assessed in my mind that there would be a possible conflict, that workload was busy but not excessive, that he was not fatigued and that he had recency on the sector.

THE TALLA CONTROLLER reports working as a combined T & P on the Talla sector with light to moderate traffic. He had taken over the sector approximately 10min before the incident. During the handover, the outgoing controller had said that he had coordinated the Saab 2000 with the Galloway controller at FL180. The outgoing controller said that 'he should point out the Saab 2000 to Galloway again when it was further N, just to confirm whether Galloway wished to work it or not'. When the Saab 2000 was in the vicinity of Lowther Hill he re-coordinated the Saab 2000 with the Galloway controller, specifying that it was locked on a radar heading and asked whether he wished to work it. The Galloway controller declined but said that he would climb his traffic with regard to the Saab 2000. His attention was then taken up by other traffic in his sector. A few minutes later, just after responding to traffic checking in on his frequency S of MARGO, he heard the Galloway controller giving an avoiding action R turn. He immediately looked up and saw that the STCA had activated between the A319 and his traffic, the Saab 2000, and, given that he had heard the Galloway controller turn his traffic R, he too gave the Saab 2000 an avoiding action R turn with TI onto, he believed, 090°. He did not receive a response so reiterated the avoiding action but he though this transmission might have been 'stepped on' by the Saab 2000 querying the direction of the avoiding action turn. The Galloway controller told him that the A319 had received a TCAS climb instruction, shortly after which the Saab 2000 said that he had received a TCAS descent, which he acknowledged. Once vertical separation had been re-established, he advised the Saab 2000 to resume FL180 and proceed to FOYLE.

ATSI reports that an Airprox was reported 40nm S of GRICE when a Saab Scania AB 2000 (Saab 2000) came into proximity with an Airbus Industrie A319 (A319) at FL180. ATSI had access to both pilot reports, controller reports from the Galloway (GAL) and Talla (TLA) sectors and the ANSP's unit investigation.

The Saab 2000 had departed Leeds-Bradford and was IFR, inbound Inverness, in receipt of a RCS from the Prestwick Centre (PC) TLA sector on 126.300MHz. (Mode A code 5403). The A319 had departed Edinburgh for an IFR flight to London Heathrow and was in receipt of a RCS from the PC GAL sector on 124.825MHz. (Mode A code 5415).

The GAL controller described traffic levels as moderate and later stated that the sector was running smoothly at a level that required constant attention but was still easily manageable as a one-man operation. There were no operational or personal distractions. The controller was current on the sector and recalled being very comfortable with the session.

The Saab 2000 had been co-ordinated to transit the GAL sector, maintaining FL180 on a heading of 335°, and remaining in contact with the TLA sector controller.

At 0826:52 Edinburgh APP telephoned the GAL controller and requested co-ordination on the A319, which had just departed, against other traffic. The A319 was co-ordinated into the GAL sector climbing to FL110.

At 0829:34 the GAL controller called the PC West Coast sector and requested a higher level for an ac that had just departed Glasgow. FL250 was agreed and the call ended with the GAL controller affirming, "*Roger flight level 250"*. As the GAL controller's call to West Coast terminated the A319 called on the GAL frequency climbing to FL110. The GAL controller responded immediately by instructing the A319 to continue on its heading and climb FL250. At this time the A319 was climbing through FL105, 30nm NNE of the Saab 2000.

Low-level STCA activated at 0832:34 between the Saab 2000 and A319. Four seconds later the GAL controller issued avoiding action, "[A319 C/S] *stop the climb flight level 170 avoiding action turn right heading 290 degrees.*" The A319 crew did not respond to this instruction and the ATSI recording indicated simultaneous transmissions. The first instruction was followed-up by the GAL controller with, "*avoiding action turn right now heading three zero zero degrees traffic in your left one o'clock range five miles a thousand feet above."* The A319 pilot acknowledged the heading, reported visual with the Saab 2000 and informed the controller that a TCAS RA had been received.

The TLA controller issued an avoiding action turn to the Saab 2000 pilot at 0832:43, "[Saab 2000 C/S] *avoiding action turn right now immediately heading zero nine zero degrees traffic right er half past one range of five miles right to left*". The instruction was repeated three times (there were several simultaneous transmissions) before the Saab 2000 pilot reported that a TCAS RA was being responded to.

Separation was lost at 0832:52 as the A319 climbed through FL175 in the Saab 2000 pilot's half-past-one position at a range of 4.6nm. Minimum distance between the two aircraft occurred at 0833:08 as the A319 climbed through FL181, 2.3nm from the Saab 2000 (see Figure 1 below). Separation was restored at 0833:20 as the Saab 2000 pilot descended through FL175 with the A319 crossing right to left through its 12 o'clock climbing through FL188.

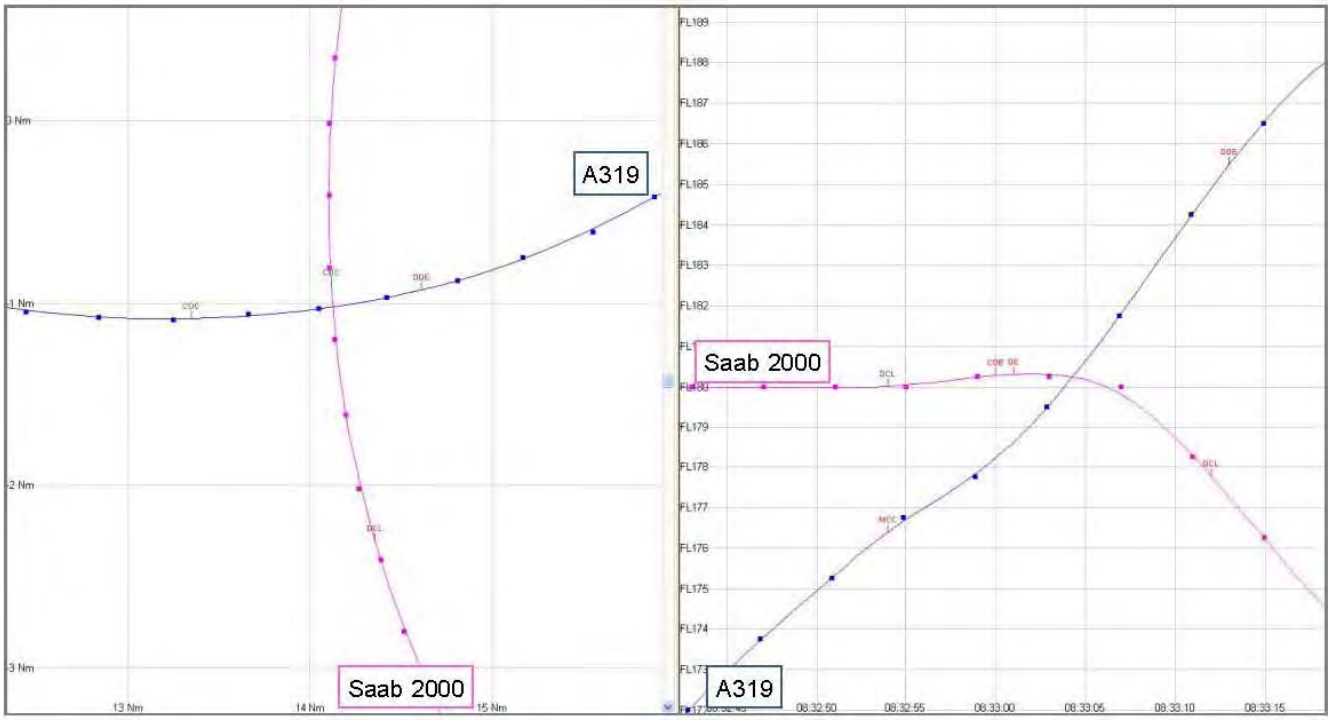
Figure 1: 0833:08 UTC (Prestwick Multi Radar Tracking)

The Airprox occurred 13nm E of Glasgow at FL180 when the GAL controller climbed an A319 through the level of a Saab 2000 without ensuring standard separation would be maintained.

[UKAB Note(1): The radar data that the diagram is based on shows that when range separation of 5nm was lost shortly after 08:32:48, altitude separation was reducing through approximately 650ft, as the A319 climbed through FL173 in the Saab 2000's R 2o'clock position. Minimum vertical separation occurred shortly before 0833:07 when the two ac were co-altitude at a range of approximately 2.4nm. Separation was restored at about 0833:18 as the Saab 2000 descended through FL177 with the A319 crossing R to L through its 12o'clock, climbing through FL187. At this point the range separation was 0.9nm. The minimum slant range occurred some 6sec later, at 0833:24, when the two ac were separated by 0.5nm.]

[UKAB Note(2): A comprehensive HF report was submitted as part of the ANSP's unit investigation and accepted by ATSI. The report covered the Galloway controller HF aspects of the incident in detail, using the Endsley (1999) Taxonomy of SA Errors. The report remained inconclusive in that no positive cause could be identified as to why the controller did not carry out his planned actions.]

[UKAB Note(3): The ANSP helpfully provided a TCAS review of this Airprox using the Eurocontrol Automatic Safety Monitoring Tool (ASMT) to analyse TCAS RA messages downlinked via Mode S (TAs are not downlinked) and the InCAS simulation tool. As TCAS interrogates once every second and the radar recordings used for the simulation give data updates rates of up to 8sec intervals, interpolation is necessary. Hence, there can be variations between the InCAS simulation and what actually occurred in the cockpit. The InCAS simulation here used interpolated single source radar data from Glasgow. The main elements of this simulation are summarised herein.



Encounter Diagram (Note that the square markers on the above image show the positions recorded by the Glasgow radar, while the solid lines show the InCAS-interpolated tracks)

Eurocontrol's Automatic Safety Monitoring Tool (ASMT) recorded several RAs relating to this encounter via Mode S downlink. [A319 C/S] received (in the following order) a Maintain Crossing Climb (MCC), a Keep Vertical Speed and an Adjust Vertical Speed. [Saab 2000 C/S] received an unknown type of RA, followed by Crossing Descend (CDE), Descend (DE) and finally an Adjust Vertical Speed.

The encounter was modelled in InCAS and equivalent RAs were produced with a maximum of two seconds difference between modelled RA time and actual RA time, indicating that the simulation is a reasonable representation of the actual encounter. The Mode S downlink received by the ASMT contains several pieces of information about an RA, from which the type of RA may be deduced. In some cases, these data do not translate directly into a specific RA type and the result is an 'unknown' RA. The data received relating to this unknown RA are consistent with a Don't Climb RA (DCL, enunciated 'Adjust vertical speed, adjust') as seen in simulation. The simulated time of the DCL advisory is within four seconds of the downlinked time of the unknown RA (which itself is only known with a 5 second confidence).

The InCAS modelled TAs were both issued at 08:32:35. From the NODE recordings, STCA activated at 08:32:34 with a low severity alert becoming high severity by 08:32:46. In the simulation, the Maintain Crossing Climb (MCC) and Don't Climb (DCL) RAs were issued at the same time. Shortly after the simulated time of the DCL, the Mode C of [Saab 2000 C/S] increased from reporting 18,000ft to 18,025ft for two radar cycles as shown.

Separation minima were as follows:

Minimum Lateral Separation

Min. Latsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
08:33:22	0.47	1541

Minimum Vertical Separation

Min. Vertsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
08:33:04	2.55	18

Closest Point of Approach (CPA)

CPA Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
08:33:21	0.48	1505

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs and video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board initially considered the pilots' actions, given the adjacency of the sector controllers issuing avoiding action and the generation of TCAS RAs. It was agreed that avoiding action was issued just before each ac's TCAS alerted but in the light of multiple and potentially blocked and misheard transmissions, it was not possible to determine what was heard on each flight deck. Notwithstanding a potential degree of confusion, each pilot could be seen to implement a degree of avoiding action in response to their respective sector controller's transmissions after reacting correctly to their TCAS RA alerts. These combined actions ensured that separation minima were re-established in a timely fashion. The ANSP Advisor commented that, due to the airspace structure in the area, it was common for ac transits of the Galloway sector to take only a few minutes and that ac were therefore not routinely handed over to the sector controller in order to avoid RT congestion. He also noted that STCA was the primary safety trigger in this incident and that TCAS resolved the conflict.

Board Members also discussed ac handling techniques in these circumstances, specifically with regard to manual or autopilot (using autopilot heading selector) manoeuvering in azimuth. It was noted that there is no regulation covering the use or deselection of autopilot in response to an avoiding action turn. Civilian CAT pilot Members were of the opinion that prompt autopilot handling should suffice for most avoiding action instructions but that the SA of the crew played a critical role in the decision; manual handling should be used if the situation was urgent or there was doubt as to the extent to which separation minima had been breached. Civilian ATC Members commented that with older RT equipment it was possible for the controller to detect the interference of simultaneous transmissions, and hence mitigate the consequent risk, and that this was normally not the case with replacement RT equipment. A Member commented on increasing use of the word 'Blocked' by pilots who perceived that RT transmissions had not been received due to simultaneous transmission, iaw current CAP413 phraseology.

The Board considered the actions of the Galloway Controller and concurred that, as he had agreed coordination with the Talla controller, it was his responsibility to achieve deconfliction between the A319 and the Saab 2000. Members noted the contents of the HF assessment with interest. It was felt however that the Board did not have sufficient competence in HF to validate its conclusions. Regrettably, the Board concluded that it was not possible to establish a definitive reason as to why the Galloway controller did not account for the Saab 2000 when clearing the A319 to FL250, but that this was the Cause of the Airprox.

On the question of risk, the Board considered the degree to which safety had been compromised. It was agreed that separation had deteriorated to such an extent that it was the activation of STCA that provided the trigger to the subsequent controller issued avoiding action and TI. Subsequent to the STCA, it was not possible to establish the chronology of events with regard to pilot-flown avoiding action and TCAS RA compliance with absolute certainty but Members were satisfied that, whilst the degree of risk was probably marginally increased by the initial RT confusion, overall, effective and timely actions had been taken to prevent the risk of ac collision.

PART C: ASSESSMENT OF CAUSE AND RISK

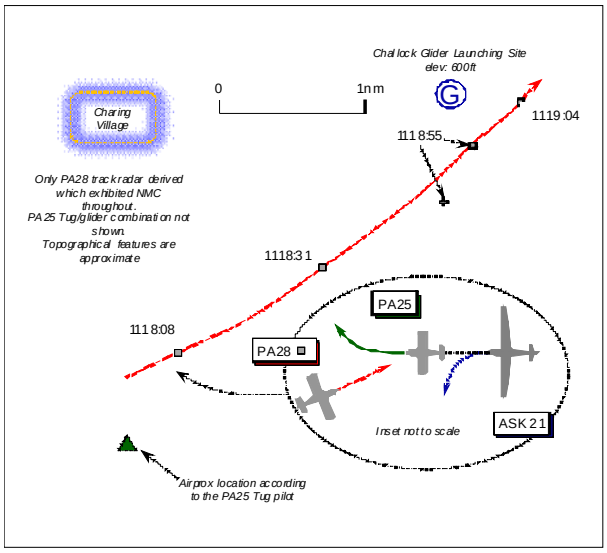
Cause: The controller cleared the A319 to climb into conflict with the Saab 2000.

Degree of Risk: C.

AIRPROX REPORT No 2012095

AIRPROX REPORT NO 2012095

Date/Time:	5 July 2012 1118Z	
Position:	5110N 00048E (2nm S Charing Village)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA25	PA28
Operator:	Civ Club	Civ Pte
Alt/FL:	1400ft↑	2200ft
	QFE	QNH (1010hPa)
Weather:	VMC CLBC	VMC CAVOK
Visibility:	20km	15-20km
Reported Separation:		
	100ft V/100m H	Not seen
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER PA25 PAWNEE TUG PILOT (PA25) reports he was airborne from Challock Glider Launching Site conducting an aerotow to 1500ft [about 2100ft amsl] in VMC and about 2nm S of Charing Village when the pilot of the ASK21 glider saw a white and red PA28 converging on the tug/glider combination from their L. His tug/glider combination was on a W'ly heading, climbing through 1400ft Challock QFE [about 2000ft amsl] at 70kt; the PA28 was on a NE heading flying level. The glider pilot, considered there to be a real risk of collision between the PA28 and the tug and/or glider, so released the tow at 1400ft QFE. Immediately he - the tug pilot - initiated a descending R turn, which is the post-release SOP, at which point he saw the PA28 pass over his aeroplane with an estimated vertical separation of less than 100ft and about 100m horizontal separation. He had not seen the PA28 earlier as it was in the blind spot of his Pawnee's windshield/door frame and assessed the Risk as 'high'.

He opined that GA ac regularly fly either over Challock below a height of 2000ft or very close to its boundary. His PA25 is coloured white/green; the HISL was on. SSR is not fitted.

THE ASK21 GLIDER PILOT reports he was being towed by the PA25, heading W at 70kt, near the top of the launch (normally 1500ft (QFE) about 300-400ft below cloud, when he became aware of a low-wing ac in his 10-11 o'clock on a converging course with the tug/glider combination about 100ft above them. He considered that if the aerotow was continued there was a serious risk of a collision either with the PA25, glider, or both. Consequently, to avoid the PA28 he released the tow at 1400ft (QFE), turned L (normal procedure) and descended as the PA25 tug immediately turned R in a descending turn. He would normally have executed a climbing turn to the L, but considered that a climb might put him in conflict with the other ac if it took avoiding action by turning R. He assessed the Risk as 'high'. RT is not fitted to the glider, which is coloured white with a red nose.

THE PIPER PA28 PILOT reports he had departed from Headcorn bound for Manston, VFR, accompanied by another qualified pilot in the RH seat. His aeroplane is coloured white with red trim and the HISL was on. He was flying in VMC with no cloud in CAVOK conditions.

Upon departure, once clear of the Headcorn Parachute Dropping Zone, he changed frequency to Manston APPROACH on 132.450MHz and levelled at 2200ft (1010hPa), heading 064° at 90kt. He contacted Manston, reported his altitude as 2200ft [Manston QNH (1010hPa)] and requested a BS that was provided. A squawk was allocated and selected with Mode C. As there was no request to recycle the transponder he assumed Mode C was operational and all was well. [No Mode C was apparent throughout the period of the Airprox.] He landed at Manston after joining R base for RW10. He cannot describe the Airprox as he was unaware it had taken place - the tug/glider combination was not seen.

He has a PPL and has just recently given up an IMC and night rating with about 500hr experience. He uses a popular tablet computer and in-flight GPS navigation tool together with his normal chart. His colleague uses a GPS unit and normal chart. Neither of them saw the tug ac or glider and there was apparently no radio communication by the other pilot with Headcorn or Manston. If an Airprox had occurred the PA28 pilot would have expected an immediate RT call to have been made to the appropriate ATC unit. Under the circumstances, he is unaware of how he should have known about the proximity of the other ac. Since there is no A/G Station at Challock and the strip lies in a SW/NE direction he flew fairly close to their zone (sic) as he tends to treat these airstrips as a SVFR in order to maintain maximum O/H space between their take-off and landing traffic. Because of the prevailing wind condition from the E, he expected all glider tug ac to be well to the N and E of Challock. However, the tug and glider pilots' reports indicate they were almost directly in the climb out path from Headcorn for eastbound traffic and very close to the Parachute dropping zone, but nevertheless the PA28 pilots did not see the tug/glider combination. He would very much like to cooperate in this matter to find out how this situation arose and more importantly, how it could have been avoided. He cannot add anything further, except to say that his colleague thought it was an uneventful and comfortable flight. That an incident resulted when under Manston's radar surveillance frankly astounds them and gives them grave cause for concern. The PA28 pilot enclosed a map of his planned route, which he followed rigorously and a photo of his ac.

UKAB Note (1): The UK AIP at ENR 5.5 promulgates Challock glider launching site as active from Sunrise to Sunset, where aerotows and winching launching to 2000ft above the site elevation of 600ft amsl take place.

ATSI reports that the PA28 pilot was routeing VFR from Headcorn to Manston and was establishing communications with Manston APPROACH on 132.450MHz as he passed abeam Challock glider launching site. At 1116:00 UTC the LAC Radar recordings show the PA28 displaying the general conspicuity squawk of A7000 departing the vicinity of Headcorn aerodrome with no associated Mode C level information.

At 1117:32 the PA28 is 2nm SW of Challock glider launching site where VFR charts show the maximum altitude of the winch launch as 2600ft amsl. Between 1118 and 1119 as the PA28 continued towards Challock there are spurious primary returns to the N of the PA28; however, these are too random in nature to provide conclusive evidence of the presence of another ac.

The PA28 pilot called Manston APPROACH at 1118:20, an SSR code of A4257 was assigned, the pilot's message passed and a BS agreed. The Manston QNH was confirmed as 1010hPa. The PA28 pilot was requested to report next when Manston aerodrome was in sight. At 1118:52, the PA28's Mode A code changed from A7000 to 4257. The PA28 was 21.3nm SSW of Manston and 0.3nm S of the plotted position notified for Challock.

[UKAB Note (2): The PA28 passed about 0·3nm abeam Challock at 1119:00.]

The PA28 pilot was requested to report his level at 1119:20 and this was given as 2200ft Manston QNH (1010hPa), when the PA28 was 0.6nm ENE of Challock. As the PA28 flew away from Challock to the NE no other radar returns were observed in the PA28's vicinity.

All three ac were operating in uncontrolled Class G airspace where the responsibility for the avoidance of other ac rests ultimately with the pilots. At no time during review of the recorded area radar was a Mode C level displayed against the PA28. Therefore the ac's altitude could not be verified. ATSI was unable to identify the reporting PA25 or ASK21 from the available surveillance recording; therefore, the reported distance between the ac involved cannot be verified.

When the PA28 was in the vicinity of Challock the pilot reported the ac's altitude as 2200ft. As the notified maximum altitude for winch launching at Challock is 2600ft amsl, the PA28 flew through airspace within which it could reasonably be expected that gliders might be launching, together with aerotow ac.

Under a BS there is no requirement for the controller to monitor the flight and, given that the PA28 pilot was requested to report Manston A/D in sight, perhaps as an aide memoir to the controller, no increased vigilance would likely be given to the PA28 after details had been exchanged.

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PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a transcript of the relevant RT Manston frequency, radar video recordings and a report from the appropriate ATC authority.

It was plain to the Board that the only pilot who had identified the developing confliction and was able to take avoiding action was the ASK21 glider pilot, who saw the PA28 in his 10-11 o'clock on a converging course about 100ft above the combination and elected to release the tow. Members concluded that this was a late sighting by the ASK21 pilot and part of the Cause. It was unfortunate, however, that the ASK21 was not fitted with RT, which prevented the pilot from warning the PA25 pilot. As it was, the tug pilot perceived that the glider pilot's cable release to be entirely normal at the top of climb, until he spotted the PA28 overflying his ac, less than 100ft above his aeroplane about 100m away. A glider pilot Member explained that the long nose of the PA25 can be detrimental to forward lookout and it is necessary to weave the ac to view the planned course ahead; nevertheless, the Board agreed that this was effectively, a non-sighting by the PA25 pilot and the second part of the Cause. However, the PA25 pilot as the PIC of the tug/glider combination could reasonably have expected other pilots operating VFR in Class G airspace to give way to his tug towing the glider in accordance with the Rules of the Air. However, 'the Rules' can only work if ac are seen in good time, which relies on an effective lookout scan routine so that pilots can fulfil their responsibilities to 'see and avoid' other ac. The PA28 pilot reports that neither he nor his colleague saw the PA25 towing the ASK21 and remained unaware of the proximity of the tug/glider combination throughout, leading Members to agree that this non-sighting by the PA28 pilot was the final part of the Cause. The Board concluded, therefore, that this Airprox was the result of a non-sighting by the PA28 pilot, effectively a non-sighting by the PA25 pilot and a late sighting by the ASK21 pilot.

Although the Airprox was not illustrated on the radar recording, with neither the PA25 nor the ASK21 glider shown at all, the PA28's track to Manston was clearly evident. After departing from Headcorn, the PA28 is shown tracking NE'ly through the vicinity of the reported Airprox location just before 1118:08. This was shortly before the PA28 pilot called Manston APPROACH for the first time at 1118:20, after which the SSR code of A4257 was assigned and displayed, albeit without Mode C so the PA28's altitude could not be confirmed independently. Members postulated that the PA28 pilot could have been dialling up the Manston frequency as the conflict developed, become distracted by the RT exchange and then subsequently heads-in selecting the assigned SSR code. Hence, over the period of the Airprox, the PA28 pilot's attention could feasibly have been diverted away from his lookout – a salutary lesson to keep at least one set of eyes looking out of the cockpit maintaining an effective scan for other ac. Plainly the PA25 pilot would have no idea that the PA28 was inbound to Manston and would not be in communication with Manston ATC whilst conducting aerotows at Challock. Consequently, the chances of a call from the PA25 on the frequency advising of the Airprox were negligible. Moreover, controller Members were keen to point out that under the BS agreed with Manston APPROACH, irrespective of whether a radar was available to the controller or not, no radar service was implied at all by the issue of a squawk and the pilot remained solely responsible for collision avoidance. Whilst under a BS a controller might offer a warning if he has good reason to believe another ac might be in close proximity; here the APPROACH controller had no knowledge of the tug/glider combination whatsoever.

The radar recording shows that the PA28 passed about 0·3nm abeam Challock at 1119:00. Given the aids to pilot navigation utilised by the PA28 pilot and his pilot colleague, Members were surprised that neither of them had identified that they were passing so close to a promulgated and active glider launching site at a reported altitude of 2200ft Manston QNH (1010hPa) and thus below the notified maximum altitude where winch cables may be encountered up to 2600ft amsl. The associated dangers from the winch cable were self-evident! However, the Board's assessment here was confined to the Risk of collision with the tug and ASK21 glider combination. Whilst the ASK21 pilot did not become aware of the PA28 until a late stage, he was nonetheless able to take effective action to release the tow and turn L. Members concluded that the glider pilot's ability to manoeuvre out of the way was limited and safety had indeed been compromised. However, none of the pilots of the powered ac were aware of the proximity of the other ac before the PA28 overflew the PA25 about 100ft above it. Chance had played a hand here, leading the Board to conclude that an actual Risk of collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the PA28 pilot, effectively a non-sighting by the PA25 pilot and a late sighting by the ASK21 pilot.

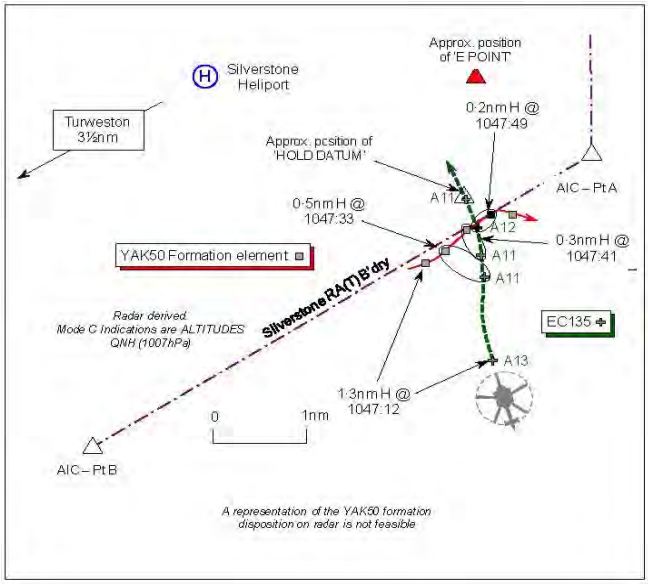
Degree of Risk: A.

AIRPROX REPORT No 2012096

AIRPROX REPORT NO 2012096

Date/Time: 7 Jul 2012 1047Z (Saturday)
Position: 5202N 00056W (3½nm SE of Silverstone Heliport - elev: 502ft)
Airspace: Silverstone RA(T) (Class: G)

	Reporting Ac	*Reported Ac*
Type:	EC135 T2+	YAK50 x6
Operator:	Civ Comm	Civ Pte
Alt/FL:	1500ft	1600-2000ft
	QNH (1007hPa)	QNH
Weather:	VMC CLOC	VMC Hvy showers
Visibility:	8km	10nm (o/s showers)
Reported Separation:		
	Nil V/30m H	Not seen
Recorded Separation:		
	Not feasible	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EUROCOPTER EC135 T2+ PILOT reports he was inbound to Silverstone, VFR and under a BS, he thought, from Silverstone CIRCUIT on 132·650MHz. A squawk of A7000 was selected with Modes C and S on; TCAS 1 is fitted.

Approaching 'East Point' [the specified joining datum for RW21] heading 350° at 130kt, level at 1500ft QNH (1007hPa), with a Restricted Area (Temporary) [RA(T)] 'join' approved, he was looking for the display team, when he spotted the formation of 6 YAK ac in his 10 o'clock – 1nm away, low, moving ahead at 500ft agl inside the RA(T). The formation leader pulled up in front of him in a rolling manoeuvre from L – R passing 200m away; ac2 and ac3 then rolled around his flight path ahead, whilst ac4 and ac5 rolled around his ac from L – R; the minimum separation was 30m against ac5 and ac6. Avoiding action was 'impossible' as he didn't know what they were going to do next; he assessed the Risk as 'high'. A TA was not enunciated by the ac's TCAS 1, which he believed was because of the speed [rate] of change. He reports that when discussed with the YAK formation leader 2hr later, none of the YAK pilots had seen his helicopter.

All the ac's lighting, including the landing lights, spot lights and HISLs were on; the helicopter has a black/silver/ cream livery.

THE YAK50 PILOT reports he was leading a formation of 6 multicoloured YAK50 ac for an aerobatic display at the Silverstone motor racing circuit, scheduled to start at 1100UTC [some 12min after the Airprox occurred] and which formed part of the lunchtime entertainment for the Formula 1 Grand Prix event. They were not in receipt of an ATS; SSR Mode A/C is fitted but was selected 'off'. Mode S is not fitted.

The display team is composed of individuals and aeroplanes based at different locations, so they briefed for an airborne join-up of the 6ac at Little Horwood disused A/D [9nm SE of Silverstone circuit] at 1045UTC.

On arrival at Little Horwood, the weather was poor, with heavy showers, poor visibility and a low cloud base. Following a successful join-up of the 6ac, in order to operate in better weather conditions outside of heavy showers, they moved to the NW of Little Horwood in the direction of Silverstone. However, the weather was such that the only feasible location for them to have a brief practice of formation loops and ¼ clover manoeuvres was some 5nm SE of Silverstone, where it was relatively clear. He led the team through two looping figures and then two combinations of a ¼ Clover L, followed by a ¼ Clover R. (A ¼ Clover equates to a loop with a ¼ roll flown in the loop resulting in a 90° heading change.) Before entering any such manoeuvre he checked for other traffic as they were operating in uncontrolled Class G airspace and it was 'see and avoid' - no traffic was seen. The practice

commenced at about 1050UTC, concluded at approximately 1053UTC and was undertaken on a discreet radio frequency. Practice display heights varied from 600ft agl to 2000ft agl.

Positioning the formation into a holding pattern 3nm SE of Silverstone at 2500ft agl, he called Silverstone ATC on 121·075MHz. He established contact with Silverstone CIRCUIT and requested clearance for their display at 1100UTC; however, he was asked by ATC to 'standby' until remaining inbound traffic was on the ground.

He understands that this Airprox occurred in the vicinity of EAST POINT - the entry point into the RA(T) for RW21. He had attempted to obtain a briefing from Silverstone ATC prior to the flight and had eventually spoken by telephone to ATC. He was not informed or briefed as to the entry points for the RA(T), which were not evident from the AIC/NOTAM. As such, if he did lead the formation into the vicinity of 'EAST POINT', that was inadvertent and unintended.

At approx 1058UTC, he was cleared inbound to display in the NE corner of the cct, flew their 15min display sequence and then departed the area. After the display he landed at Wycombe Air Park and about 1hr later, in a telephone call, was informed by Silverstone ATC that an Airprox was being filed by the pilot of an inbound EC135 helicopter. Contacting the helicopter pilot by telephone to ascertain the circumstances of the Airprox, they had a positive conversation during which he apologised to the helicopter pilot for any inconvenience. As leader of the display team, he was unaware of the presence of the EC135 helicopter and not aware of any Airprox until he was advised subsequently by Silverstone ATC and the telephone discussion with the EC135 pilot. Manoeuvring a large formation is not straightforward; he thought, the general 'see and avoid' principles successfully resulted in the EC135 avoiding his formation in open airspace.

The YAK50 team display was affected by the very poor weather that day and they had an operational requirement for a brief practice before displaying at Silverstone; permission to enter the RA(T) had been issued for their display [but not beforehand for the display practice]. He apologises that the display practice brought his formation into close proximity with the EC135 and has expressed that view directly to the EC135 pilot.

THE SILVERSTONE CIRCUIT (AERODROME) CONTROLLER reports that he was acting as the Silverstone Circuit Controller when the EC135 pilot advised him that he wished to file a report about the YAK50 aerobatic team who were practising their display in the vicinity of East Point. The EC135 pilot stated that the formation was operating above 500ft and he considered it an unsafe situation. At the time, the YAK50 aerobatic team were not on any Silverstone frequency but were scheduled to commence their display at 1100UTC.

THE SILVERSTONE ATC MANAGER reports that prior to the Airprox a controller had briefed the YAK50 aerobatic team leader about the contact frequency, that they should remain clear of their 'larger than normal airspace' until the RA(T) was clear of other traffic and then the YAK50 aerobatic team would be cleared to commence their display. The Controller reported that the EC135 pilot had reported an Airprox with the 6ac YAK50 formation at East Point.

ATSI reports that the Airprox was reported to have occurred in the RA(T) established in Class G airspace for the Silverstone Grand Prix between an EC135 helicopter and a formation of 6 YAK50 ac. The RA(T) was notified by NOTAM and Aeronautical Information Circular (AIC - M034/2012) as being active between 0700 and 1800 on the 7th July 2012 from the surface up to 2500ft amsl and is illustrated at Figure 1. According to the AIC no aircraft were to fly in the RA(T) established for Silverstone unless the pilot informed the ATSU immediately before entering the area of the ac's position, level and track, flew in accordance with ATC instructions and maintained a continuous listening watch on 121.075MHz.

AIRPROX REPORT No 2012096

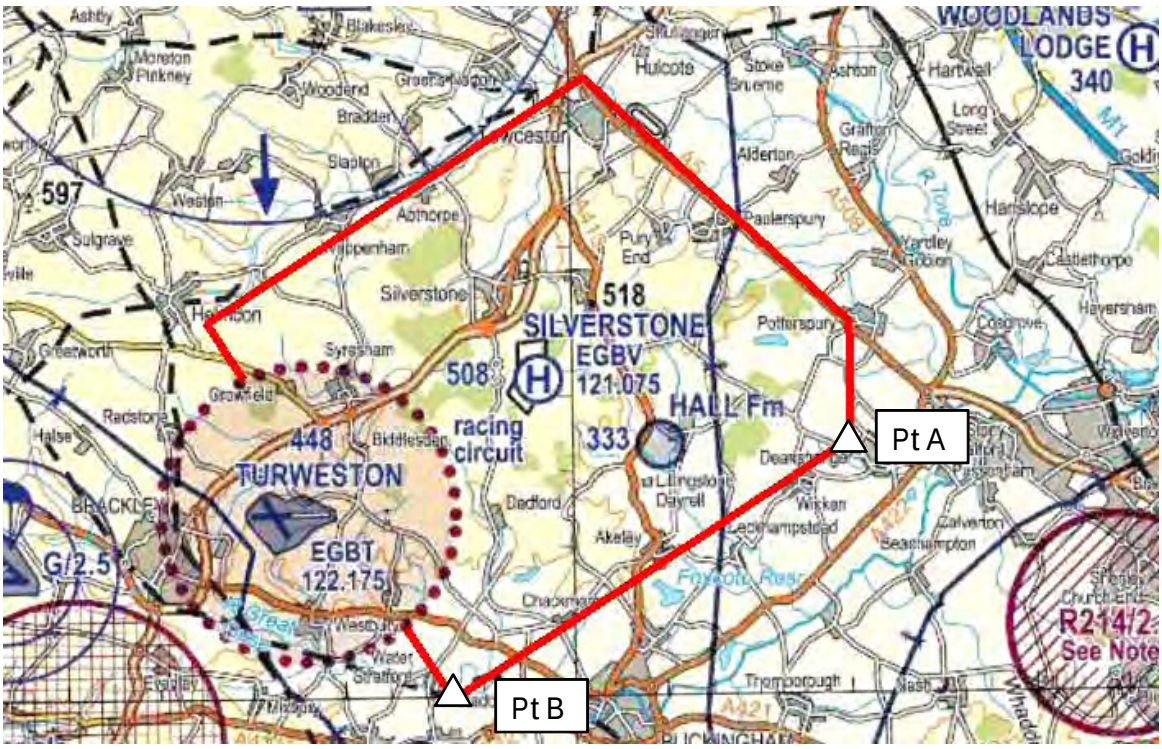


Figure 1

The EC135 was operating on a VFR flight from Marlow to Silverstone and was in receipt of an Aerodrome Control Service from Silverstone Circuit on 132.650MHz.

The formation of YAK50s was operating on a VFR flight prior to performing an aerobatic display at the Silverstone Motor Circuit, which was scheduled to commence at 1100UTC. They had departed from several different airfields and had briefed for an airborne join-up in the vicinity of Little Horwood disused A/D. They were not in communication with Silverstone. The Silverstone Circuit controller was providing an Aerodrome Control Service without the aid of surveillance equipment.

The Cranfield METARs are:

1050Z: 19009KT 130V200 9999 –SHRA FEW009 SCT020CB 17/13 Q1007=

1150Z: 11008KT 9999 VCSH FEW010 FEW020CB 18/15 Q1007=

According to the written report from the Silverstone ATC manager, prior to the Airprox the lead pilot of the YAK50 formation had received a briefing to remain clear of Silverstone's airspace until the airspace was clear of other traffic and the YAK50 formation was cleared to display.

At 1040:22, the radar recording indicates a group of primary returns 7.9nm to the SE of Silverstone, in the vicinity of Little Horwood. The group of primary returns slowly manoeuvred to the NW until at 1046:01, they were 3.1nm to the SE of Silverstone while the EC135 was 7nm SSE of Silverstone, tracking N.

At 1046:29, the group of primary returns were inside the RA(T), manoeuvring near the boundary.

[UKAB Note (1): Analysis of the Clee Hill radar recording shows a sequence of single primary returns that in all probability is an element of the YAK50 formation (no other primary returns are shown that might be the formation ac), positioned to the S of the plotted Silverstone RA(T) boundary line between Pts A – B, tracking broadly NE'ly. (The plotted boundary line co-ordinates have been corrected for the correspondence error between the OSGB36 and WGS84 datums.) It is not feasible to identify if this single primary return is the entire formation or an individual element; at 1047:12 it is in the EC135's 11:30 position at a range of 1·3nm. The EC135 shows a track alteration R and then L (which might be the result of track jitter) before closing to a range of 0·5nm from the YAK50 element

at 1047:33, which is still S of the RA(T) boundary. The next sweep shows the YAK50 element has closed to a range of 0·3nm, in the EC135 pilot's 11:30 position, the latter maintaining 1100ft QNH (1007hPa). The YAK50 formation element crosses ahead of the EC135 from L – R, in between sweeps and at 1047:49, is shown in the EC135's 2 o'clock at the minimum recorded horizontal separation of 0·2nm right on the plotted RA(T) boundary, as the helicopter indicates 1200ft ALT, moments before entering the RA(T). It is not possible to determine the minimum separation between the EC135 and the individual formation elements.]

Figure 2 shows the position of the primary returns relative to the southern boundary of the Silverstone RA(T) (in red) at the times indicated.

Figure 2

The written report from the EC135 pilot states that he saw the YAK50 formation inside the RA(T) at 500ft agl. The leader pulled up in front of the EC135 in a rolling manoeuvre, ac 2 and 3 rolled around the flight path of the EC135 and ac 4 and 5 rolled around the EC135. The pilot was unable to take avoiding action due to the unpredictability of the YAK50s flight.

The written report from the leader of the YAK50 formation stated that the weather was poor in the vicinity of Little Horwood so the formation manoeuvred to the NW in order to perform a brief practice of formation loops and quarter clovers in better weather conditions. The formation operated approximately 5nm to the SE of Silverstone between 600ft and 2000ft agl on a discrete frequency. The lead pilot of the YAK50 formation was not aware of the presence of the EC135 until informed by Silverstone ATC by telephone after the incident.

The written report from the Silverstone Circuit controller states that the pilot of the EC135 informed him that he wished to file a report on the YAK50 formation, but that the formation were not, at that time, on the Silverstone frequency.

Analysis

It is difficult to assess the exact position of the YAK50 formation at the time of the Airprox due to the manoeuvres undertaken and the erratic display of the primary returns. Prior to the Airprox the primary returns appear to have been inside the RA(T) without permission from Silverstone; however, at the time of the Airprox, the primary returns appear to have been [on or] just S of the boundary of the RA(T). In uncontrolled Class G airspace, the principles of see and avoid apply and pilots are ultimately responsible for their own collision avoidance.

The YAK50 formation were not in contact with the Silverstone CIRCUIT controller at the time of the Airprox; therefore, the Silverstone CIRCUIT controller was unaware of the potential for a confliction and unable to pass information to the EC135 pilot regarding the position, level or track of the YAK50 formation.

Conclusions

The Airprox occurred in the vicinity of the Silverstone RA(T) boundary at 1047:41, when a conflict arose between the EC135 and a formation of YAK50s, which was practising manoeuvres prior to a display at Silverstone and were not in contact with ATC.

As all the ac involved were in Class G airspace, the respective pilots were ultimately responsible for collision avoidance. The Silverstone CIRCUIT controller was unable to provide assistance in order to prevent the Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The RA(T) for Silverstone, promulgated by AIC and NOTAM, was established to afford increased protection for the extensive passenger-carrying helicopter traffic and unusual aviation activity supporting this event including, ironically, the YAK50 formation display. The promulgated restrictions to allow entry into the RA(T) required pilots to maintain a continuous listening watch on the notified Silverstone frequency, to inform ATC immediately before entering the area of their ac's position, level and track and to fly in accordance with the instructions issued by Silverstone ATC - broadly similar to that for flight in an ATZ provisioned with ATC. Helicopter pilot Members familiar with the event stressed that this is very busy airspace during the period and the helicopter procedures specify visual entry points and holds to enable ATC to cope with the high levels of VFR traffic encountered. The ATC Manager's report explained that the YAK formation leader had also been given a brief by ATC beforehand, but the exact content of that brief could not be established independently because of a fault with the ATC landline recorders at the time; an unsatisfactory state of affairs and contrary to the licence issued by the CAA for the event the Board's ATSI Advisor explained. The YAK50 pilot reports that he was not informed of the entry points for the RA(T), which were not evident from the NOTAM. Helicopter pilot Members were concerned that some of the detail, such as routeings and entry/holding points etc, was not included in the AIC. This suggested to Members that if the AIC had included more comprehensive information it might have alerted the formation leader to the increased potential for encountering helicopter traffic in the vicinity of the Airprox location. The Board concluded that added detail, indicating where the event traffic might be concentrated, could be helpful to other non-participating aviators who might be planning to fly in the vicinity, but outside the RA(T). It was agreed, therefore, that a Safety Recommendation was warranted: the Silverstone operator is recommended to review the content of the AIC, in concert with CAA AUS, to provide additional guidance to pilots flying in the vicinity of the RA(T) and to review the briefing requirements for display crews.

Plainly the EC135 pilot was in two-way RT and had obtained his joining instructions from Silverstone whilst inbound to the RA(T), whereas the YAK50 formation were conducting their formation practice autonomously and not in communication with Silverstone ATC at this point. Although the EC135 pilot reports he was looking for the display team, the ATSI report reveals he had not been passed any TI by the Silverstone controller who was unaware that the YAK50 formation leader was conducting his display practice adjacent to the boundary to the RA(T) and at one point actually inside the RA(T) the radar recording reveals. The Board accepted that this was an inadvertent and unintended infringement of the RA(T), but if the YAK50 formation leader had realised where he was and had been in contact with Silverstone, advising them what he was doing, the controller would have been able to pass a comprehensive warning to the EC135 pilot and other inbound pilots.

The EC135 pilot had seen the YAK50 formation from a range of 1nm and identified that it was crossing ahead from L- R. Members considered that this was a reasonable sighting range but evidently the formation manoeuvre took

the EC135 pilot by surprise and he was unable to avoid the 6 YAK50s as they performed their combination of aerobatic manoeuvres around his helicopter; pilot Members agreed that it would have been impossible to anticipate the flight path of the 6 YAK50 aeroplanes beforehand.

A GA pilot Member was concerned that although this was a pre-planned practice in Class G airspace by the display team, no notification had been given at all to other aviators or to Silverstone ATC that they would conduct their practice there, which in the Member's view was most unwise. The YAK50 pilot reports that having initially planned his formation join-up at Little Horwood they found the weather unsuitable for the display practice. This had evidently forced him to move his formation closer to Silverstone where it was relatively clear he reports, before he commenced his practice routine involving formation loops and ¼ clover manoeuvres some 5nm SE of Silverstone. However, it was evident he had been closer to the RA(T) than the leader had realised and he had flown into the RA(T) whilst executing his practice just before the Airprox, which occurred on the boundary of the Silverstone RA(T). The YAK50 formation leader was responsible for clearing the airspace in which he intended to manoeuvre his formation; however, it was evident from the leader's candid account that he had not seen the EC135 helicopter at all, either before he initiated the display sequence or during the manoeuvre itself and he was thus unaware of the danger posed by the helicopter approaching from the S. Although lookout was the formation leader's prime responsibility, Members were equally concerned that none of the other five YAK50 pilots were aware of the helicopter. The Board agreed, unanimously, that this Airprox was the result of a non-sighting by the YAK50 formation on the boundary of the Silverstone RA(T).

Although the six YAK50 ac comprising the formation were not shown individually on the radar data, the recording showed at least one element crossing ahead of the EC135, but it is not possible to determine independently the minimum separation between the EC135 and the individual formation elements. Nevertheless there was no reason to doubt the veracity of the minimum separation reported by the EC135 pilot, who was the only one cognisant of the danger posed by the six YAK50 ac, but who was unable to take any effective avoiding action as the formation ac manoeuvred around his helicopter. With the formation pilots themselves unaware of the EC135 helicopter at close quarters during their high-energy aerobatics, the Board agreed that an actual Risk of collision had existed in the circumstances conscientiously reported here.

The Board recognised the difficulty of gathering six individual YAK50 pilots together to practise their routine and clearly this was an essential element in ensuring the safe execution of the formation display. However, an experienced pilot Member – himself a former display pilot – was concerned that the formation leader had found himself cornered into a difficult situation when confronted with poor weather. Moreover, the formation leader should have been aware that he was in close proximity to the RA(T) and the potential for concentration of event traffic here or other non-participating traffic skirting the Area. The display practice was itself an unusual activity and it had already been mentioned that it would have been helpful to advise others of the formations intentions. Pilot Members were concerned that planning and supervision might have been factors here and suggested that a review of the display team's procedures would be appropriate. After weighing all these factors carefully the Board concurred and a second Safety Recommendation was agreed that: the YAK50 formation display team is recommended to review its operating procedures.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the YAK50 formation on the boundary of the Silverstone RA(T).

Degree of Risk: A.

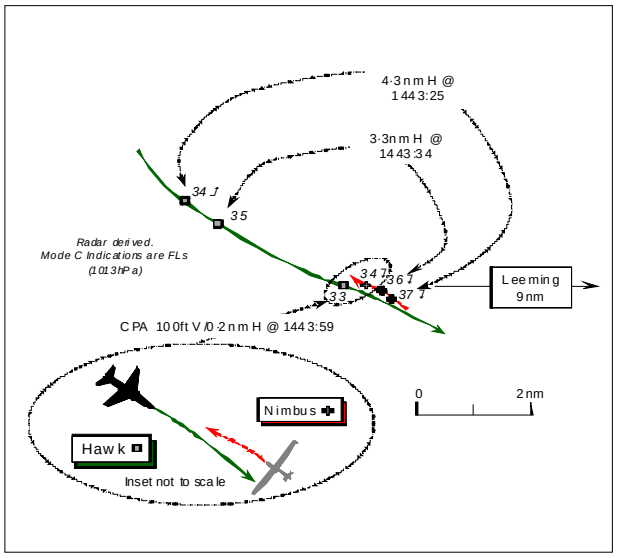
Recommendation: 1. The Silverstone operator is recommended to review the AIC, in concert with CAA AUS, to provide additional guidance to pilots flying in the vicinity of the RA(T) and to review the briefing requirements for display crews.

2. The YAK50 formation display team is recommended to review its operating procedures.

AIRPROX REPORT No 2012098

AIRPROX REPORT NO 2012098

Date/Time:	12 July 2012 1444Z	
Position:	5417N 00147W (9nm W of Leeming)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T1	Nimbus 3T
Operator:	HQ Air (Ops)	Civ Club
Alt/FL:	3000ft	3200ft
	QFE (1005hPa)	(NK)
Weather:	VMC CAVOK	VMC
Visibility:	40km	40nm+
Reported Separation:		
	10ft V/100ft H	30-40ft V/<100yd H
Recorded Separation:		
	100ft V/0·2nm abeam	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe HAWK T1A PILOT reports he had just established communications with Leeming APP on 386·575MHz during a recovery to Leeming from the NW. Flying straight and level at 3000ft on Leeming QFE (1005hPa) in VMC, they requested and were given a BS by APP. A squawk of A7000 was selected with Mode C on. Immediately afterwards the controller advised of a contact in their 12 o'clock; it was passed as 'slow moving with no height'. Shortly afterwards, approaching a position about 9nm W of Leeming heading 110° at 350kt, as they concentrated their lookout forward in an effort to acquire the reported contact, a white high performance glider was seen 200m away slightly high and to the L, flying straight and level. Avoiding action was taken by bunting and rolling R as the white glider passed <100ft laterally to port and about 10ft vertically above his ac with a 'very high' Risk of collision. An Airprox was reported to Leeming APP on the RT and their recovery was continued. His ac is coloured black; the nose light and HISLs – set to white - were all on.

THE NIMBUS 3T GLIDER PILOT reports he was airborne from Sutton Bank on a cross country flight, with Leyburn [about 2nm NW of the Airprox location] as his next turning point (TP). He was listening out on the gliding frequency of 130·4MHz, but was not in receipt of an ATS; elementary surveillance Mode S is fitted and a squawk of A7000 was selected with Mode C.

Between Middleham and Leyburn, [heading NW'ly] at 70kt, cruising at 3200ft [pressure setting not known] he was approaching the TP, with about 3km to run when suddenly a black Hawk ac was seen less than 1nm away that appeared to be coming towards him on his LH side. The Hawk was turning to avoid his Nimbus, and passed about 30-40ft below his glider, less than 100yd to port with a 'high' Risk of collision. He did not have time to take avoiding action. His glider is coloured white.

THE LEEMING APPROACH CONTROLLER (APP) reports he was screening a U/T controller with one Hawk on a visual recovery to the A/D under a BS. As weather conditions were good, he had received multiple reports of glider activity within 20nm of the A/D and 2 strong primary contacts were observed manoeuvring W of the A/D at ranges of 8 and 6 miles.

As the Hawk was heading towards one of the contacts and no height information was available, both returns were called to the crew. As the Hawk passed the primary contacts, the pilot advised that the return was a glider and reported an Airprox. The Hawk pilot reported on the RT passing the glider with 50yd to spare and subsequently carried out a normal recovery to Leeming.

BM SAFETY MANAGEMENT reports that the SSR data utilised by Leeming ATC is provided from the SSR head at Linton-on-Ouse. Unfortunately, the SSR data link between the 2 stations was un-serviceable on this day, consequently, Leeming were providing an ATS using only primary surveillance radar (PSR) data. The Unit has

confirmed that this un-serviceability was notified to Leeming-based squadrons through their respective operations sections and included on the Automatic Terminal Information System (ATIS) broadcast. APP was manned by a trainee and mentor, who described their workload and task complexity as low; the Hawk was the only ac on freq.

The Hawk crew free-called APP at 1442:08, the flight was placed under a BS and the current ATIS code confirmed. At 1443:25, APP passed TI to the Hawk crew on the Nimbus, stating, "*traffic believed to be you has traffic, 12 o'clock, 4 miles, opposite direction, no height information*", which was acknowledged. Although the SSR data was not available to Leeming ATC, the Nimbus was equipped with a Mode S transponder. At this point, the Nimbus was 4.8nm ESE of the Hawk, slightly L of the 12 o'clock, tracking NW'ly, indicating 3700ft Mode C (1013hPa); the Hawk was tracking SE'ly, indicating 3500ft Mode C (1013hPa).

At 1443:34, APP provided further TI to the Hawk crew stating, "*traffic believed to be you has traffic, 12 o'clock, 7 miles, opposite direction, no height information*", which was acknowledged. The LATCC (Mil) radar recording does not display this radar contact.

At 1443:42, the Hawk turned L about 20°, which served to decrease the lateral separation between their projected track and that of the Nimbus. Prior to the turn, lateral separation at the CPA would have been approximately 0.9nm. Furthermore, this turn was associated with an indicated descent to 3300ft, descending further to 3100 ft at 1443:54. However, immediately prior to the CPA at 1443:58, the radar recording shows that the Hawk had climbed back to 3300ft. After the CPA, whilst the pilot's reported roll to the R was not visible on the radar replay, the Hawk's descent was shown.

The CPA with the Nimbus occurred at 1443:59 as the Hawk passed 0.2nm down the Nimbus' portside indicating 3300ft; the Nimbus was indicating 3400ft.

Whilst the Hawk pilot was in receipt of a BS, APP discharged their Duty of Care and provided them with accurate TI on the glider. Based upon the Hawk pilot's report, this TI cued them to concentrate their lookout forward, allowing them to visually acquire the Nimbus and avoid it, albeit with significantly reduced safety margins.

During the investigation of this Airprox it was discovered that whilst CAP 413 Chapter 10 Para 3.3 provides guidance on the use of ATIS, there is no military regulation that is equivalent to CAP493 Section 3 Chapter 1 Para 11 detailing the operational requirements for ATIS.

BM SM has requested the MAA to consider whether to include regulation equivalent to that contained in CAP493 Section 3 Chapter 1 Para 11, within the Military Regulatory Publication set.

HQ AIR (OPS) comments that the Hawk is relatively easy to see in a head-to-head approach due to its nose light. However, experience shows that gliders are notoriously difficult to see either from head-on or directly line astern. It is fortunate that APP gained a primary radar return and the controller had the good judgement to pass a warning to the crew, who were able to focus their lookout and gain visual in time to carry out an avoidance manoeuvre. The Hawk T Mk1 is not currently fitted with a CWS (although this is being considered by HQ Air) and so was unable to detect the presence of the glider (using Mode C/S) by on-board electronic means.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, radar video recordings, reports from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

The Hawk pilot had only requested a BS but it was clear that the mentor and trainee manning APP had detected the presence of gliders in the vicinity, recognised that a close quarters situation might develop with the Hawk and wisely passed a warning to the crew about the Nimbus glider. The BM SM report had observed that APP had discharged their responsibilities under a 'Duty of Care' by providing accurate TI on the glider; the Board recognised this was good 'controllership' and commended the controllers for their appreciation of the developing situation, as the warning was passed even before the Hawk was positively identified. Nevertheless, it was apparent that APP was unable to include any level information from the Nimbus' Mode C within this warning. The Board was dismayed that although the glider was fitted with Mode S/C [one of only two Airprox ever assessed by the Board which evinced such fitment to a glider] the unserviceable data-link between the remote SSR head at Linton-on-

Ouse and Leeming ATC had denied the controllers the Nimbus' Mode C data. The radar recording shows that the glider was descending a mere 300ft above the climbing Hawk when the TI was transmitted; if the glider's Mode C level had been included with the warning passed to the Hawk crew it would have reinforced the potential for a close quarters situation with the reported traffic. Having painted as full a picture as was available to APP at the time, the controller's warning was incomplete but it did alert the Hawk crew to the impending danger and focussed their lookout; unfortunately they were unable to spot the Nimbus glider until two ac had flown into close quarters. The HQ Air (Ops) Member's view was that having received TI, a bold pre-emptive turn by the Hawk pilot might have avoided the difficult head-on aspect of the encounter; although the Member acknowledged the limitations of passing accurate azimuth information, an indication that the contact was slightly L of the nose might have persuaded the pilot against the slight L turn shown on the radar recording and instead instilled in the PIC the need for more robust action. As it was, this slight L turn seemed to the Board to have the unfortunate result of taking the Hawk closer to the reported traffic. The Board was keenly aware of the poor visual conspicuity of gliders and here the Nimbus glider would have been very difficult to see head-on, with its small frontal area and virtually no crossing motion to draw attention to it. Nevertheless, the Board concluded that part of the Cause was a late sighting of the Nimbus glider by the Hawk crew.

The Nimbus pilot reports that he had first seen the Hawk about 1nm away, when it was turning to avoid his glider, which suggested that either the Hawk crew had initiated their avoiding action slightly earlier than reported or the glider pilot had first seen the Hawk somewhat closer. A glider pilot Member agreed with the HQ Air (Ops) comment that the Hawk nose light was a very effective aid to conspicuity when seen head-on and this should have allowed the Nimbus glider pilot to spot the small jet more easily. However, if the Nimbus pilot had sighted the Hawk at 1nm, a pilot Member suggested that he might have assisted his own glider's conspicuity to the Hawk pilot by manoeuvring and thereby presenting a greater surface area. The glider pilot Member stressed the speed differential and relative manoeuvrability of the glider compared to the jet and with a combined closing speed of 420kt the Nimbus pilot was certainly at a disadvantage when trying to get out of the way of the Hawk. Furthermore, the glider pilot reports himself that he did not have time to take any action. The Board concluded therefore that the Nimbus pilot was unable to affect the outcome and this was effectively, a non-sighting on his part, which Members agreed was the other part of the Cause.

Although the Hawk pilot had seen the glider at a late stage, he managed to take effective avoiding action by bunting and rolling R, passing the glider with <100ft horizontal separation and about 10ft vertically below it he reports. For his part, the Nimbus glider pilot assessed the Hawk passed by 30-40ft below and <100yd away. However, the radar recording suggested that the separation was slightly more at 100ft vertically, as both ac passed 0·2nm abeam each other. Nonetheless, the Members agreed unanimously that at these small distances the safety of the ac involved had been compromised.

Following their assessment of this Airprox, the HQ Air (Trg) Member briefed the Board that much work has been done to improve liaison between the operators from Sutton Bank, Leeming and Linton-on-Ouse, which may reduce such occurrences in future by increasing mutual awareness of each other's operations. Furthermore, the fitment of Power FLARM to Leeming-based Hawk T Mk1s is under consideration by HQ 1 Group.

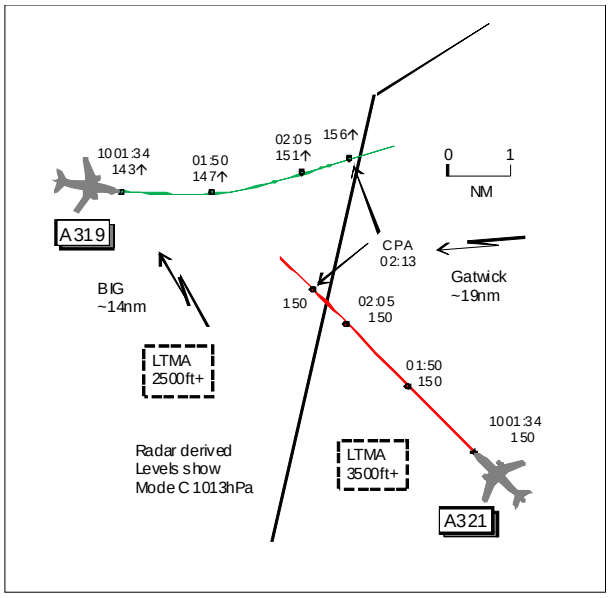
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the Nimbus pilot and a late sighting by the Hawk crew.

Degree of Risk: B.

AIRPROX REPORT NO 2012099

Date/Time:	8 Jul 2012 1002Z	(Sunday)
Position:	5110N 00019E	(19nm E Gatwick)
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A319	A321
Operator:	CAT	CAT
Alt/FL:	FL150↑	↓
Weather:	IMC KLWD	NR
Visibility:	NR	NR
Reported Separation:		
	Nil V/2·7nm H	NR
Recorded Separation:		
	600ft V/2·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports outbound from Gatwick, IFR and in communication with London, squawking an assigned code with Modes S and C. Proceeding on a DVR8M SID after the wraparound turn they were given heading 095° and climb to FL170 by London [LTC BIG] on 120·525MHz. They were subsequently handed over to London [AC S15] on frequency 134·9Mhz and after their initial call passing FL150 at 250kt in IMC they were given an "immediate" turn instruction to the L. Simultaneously a TCAS TA was received indicating traffic in their 2 o'clock range 7nm about 1200ft above. The PF selected V/S +1500 in initial reaction to the TA and after read-back the controller verified that this was avoiding action. This was not read back but the situation was apparent at this stage. They just broke into VMC and the Capt (PNF) visually sighted the conflicting ac in their 2 o'clock slightly above. The Capt instructed the PF to expedite climb, as this was visually observed to be the best avoiding action, while continuing the instructed L turn. Minimum separation was observed while the ac were at the same level, the other traffic in their 3 o'clock range 2·7nm indicated on TCAS; no RA was generated. When climbing clear and past the conflicting traffic, this was verified with ATC and a subsequent en-route clearance was obtained. He assessed the risk as medium. Later he verified the conflicting traffic was not on the same frequency and that ATC would file a report as well.

THE A321 PILOT reports, 2 months post incident, that the crew did not remember any inconvenience during their approach apart from receiving a TCAS TA.

THE LTC BIG RADAR CONTROLLER reports when first on the Sector, receiving several late calls from crews advising they were unable to hold at BIG owing to Wx, which led to last minute coordinations and higher workload and the decision was made to split the Coordinator position. This period then calmed down but as the FPSs were starting to build the SE Coordinator position was shut and the decision was made to split off TIMBA/LOW. At the time of the incident the Sector was split. In the moments immediately prior to the incident the E Coordinator had called across to ask what the Wx was like at BIG as a LAM inbound, a B737, was unable to hold at LAM in spite of the fact that several ac were already holding at the time. The controller checked the Wx on CDIS and stated that the situation was no better at BIG. The B737 flight confirmed that they would be able to hold at BIG and it was therefore coordinated into the Sector at FL130 and the TIMBA controller was advised accordingly. As the B737 approached DET the crew then stated that they would be unable to hold at BIG and requested to now route to TIGER to hold. There were various transmissions regarding Wx from the B737 crew during which the controller was also dealing with various other flights on frequency also wishing to avoid Wx. At some point the A321 flight called on frequency, which was acknowledged with, "Roger". However, the controller was focussed on trying to come up with a solution to the B737, which seemed unable to hold as anticipated; this ac had caused the controller to be distracted. Heathrow Approach was informed that the B737 was holding at DET awaiting their onward clearance. The B737 flight was instructed to hold at DET, RH on inbound radial 312°, to allow the BIG controller

to climb Heathrow departures, which were generally being vectored from EPM on a SE'ly heading, and Gatwick departures as well. The TIMBA controller amended the Gatwick Standing Agreement for traffic inbound TANET to FL140 and advised the BIG controller accordingly to ensure separation against the B737. The A319 was a DET departure from Gatwick which was climbed initially to altitude 6000ft before the flight was instructed to fly heading 095° and climb FL120. This was to position the A319 to enable it to climb above the B737 and the A319 was then given further climb to FL170 and, once above the B737, the flight was transferred to LAC S15. The controller had completely forgotten about the A321 inbound to Heathrow on a BIG3B arrival descending to FL150. The Coordinator came over and pointed to the A321 just as STCA flashed white (low severity alert), which is when the controller realised in shock, the error. The controller was not sure if the Coordinator was pointing out the loss of separation or whether it was relating to its hold at BIG, given the B737 holding at DET. At this time the A319 was at FL146 in the A321's 11 o'clock range 2-3nm, the A321 level at FL150. Immediately the A321 flight was given an avoiding action turn onto heading 270° but there was no response. An avoiding action turn onto 070° was then given to the A319 crew, forgetting the flight had already been transferred to S15. The A321 flight was then given TI, the crew stating they could see the traffic on TCAS.

THE LAC S15T (DVR) CONTROLLER reports the A319 was transferred to him heading 095° climbing FL170 when positioned just W of TIGER in S17 airspace. The A321 flight was working LTC inbound to TIGER then BIG at FL150 and when the A319 flight called on frequency there was barely 5nm separation. He gave the A319 flight an avoiding action turn onto 060° and passed TI and although the crew did not respond they took the turn and expedited, later informing him that this was owing to a TCAS TA. The A319 crew reported 2·5nm separation and visual with the A321.

ATSI reports that the Airprox occurred at 1002:12UTC, 19nm E of Gatwick, within the Class A CAS of LTMA-1, between an A319 and an A321.

The A319 flight, operating IFR, had departed from Gatwick on a flight to Athens and been handed over from LTC BIG Sector to LAC S15 (DVR) Sector and was in receipt of a RCS. The A321 flight, operating IFR, was inbound to London Heathrow from Rome and was in receipt of a RCS from LTC BIG Sector. A third ac, a B737 flight, inbound to London Heathrow, had been cleared to the BIG hold and became a significant distraction in the events prior to the occurrence.

Prior to the incident the number of ac movement strips started to increase and a decision was made to split off the TIMBA/SE LOW Sectors. The BIG controller workload was assessed as medium to heavy, with added complexity due to the requirement for holding and Wx avoidance. The BIG controller took over the operational position 41min prior to the occurrence, working on the second morning shift and having recently returned to work following a short period of absence. The controller was regarded as very experienced and was an OJTI and UCE.

CAA ATSI had access to: RT and area radar recording; written reports from both pilots, together with written reports from the LTC BIG controller, S Coordinator, Group Supervisor S, LAC S15/16 (DVR) Tactical controller and Planner.

The METAR for Gatwick was: - EGKK 080950Z 29008KT 5000 SHRA BKN007 BKN010 OVC033TCU 16/14 Q1004=

The Gatwick TAF was: - EGKK 081001Z 0810/0912 29005KT 8000 FEW008 BKN020 TEMPO 0810/0812 4000 SHRA BKN007 BECMG 0811/0813 9999 TEMPO 0812/0824 7000 SHRA PROB30 TEMPO 0812/0820 3000 +SHRATSGS SCT007 BKN014CB BECMG 0900/0903 6000 BKN008 BECMG 0909/0912 9999 FEW008 SCT020=

At 0946 the TIMBA sector was split from BIG and the Coordinator role reduced to 1 position (previously 2). Due to the weather, the B737 had been unable to hold at LAM and was coordinated into the BIG sector at FL130 on the stack swapping STAR BIG1E. The BIG controller's strip presentation consisted of 2 strip bays BIG and Detling (DET). The B737 and A321 both inbound to BIG, were displayed in the BIG bay. The outbound A319 was displayed in the DET bay.

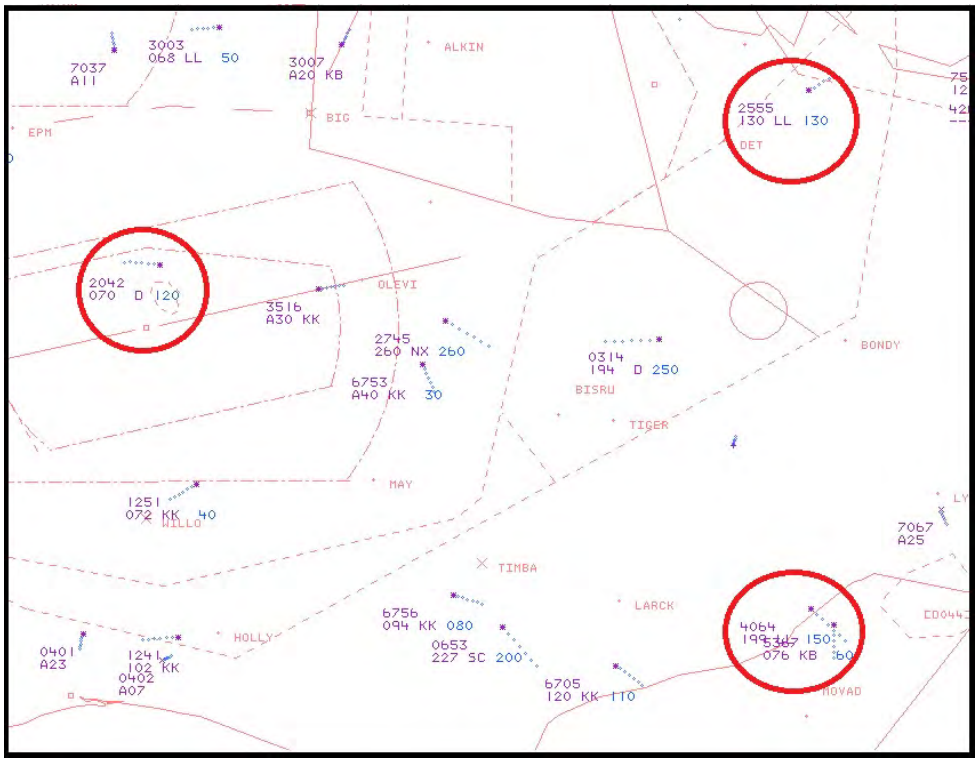
At 0954:21, the B737 flight, squawking 2555, contacted BIG Sector reporting a heading of 220° at a speed of 280kt. The BIG controller reported that delays were less than 10min and advised the B737 flight to expect to hold at BIG.

After departing Gatwick RW26, the A319 flight squawking 2042, contacted the BIG Sector and reported passing an altitude of 3000ft climbing to an altitude of 4000ft on the DVR8M SID, which requires a R turn from RW26. The BIG controller instructed the A319 flight to climb to altitude 6000ft.

At 0957:01 the B737 flight was cleared to route direct to DET and at 0957:43 the A319 flight was instructed to fly heading 095° and climb to FL120.

At 0958:13, the B737 crew reported a build up overhead BIG and requested a hold at TIGER if available. The BIG controller instructed the B737 flight to standby.

At 0958:33, the A321 flight squawking 4064, contacted the BIG Sector and reported descending to FL150. The BIG controller acknowledged, *"(A321 c/s) Roger."* The relative positions of the 3 ac are shown in print 1 below.



Print 1 – 0958:33

The controller's written report indicated a plan to hold the B737 at DET in a RH pattern, whilst positioning the A319 to enable a climb above the B737. At 0959:02, the following RT exchange occurred between the BIG controller and B737 pilot:

Controller *"(B737 c/s) can you hold in your present position."*

B737: *"(B737 c/s) holding er present position overhead er Detling left turn thank you."*

Controller *"(B737 c/s) affirm left turns overhead Detling."*

B737:*"Thanks ????? ?????."*

Controller *"(B737 c/s) make it a right turn please at Detling right turns at Detling."*

B737:*"(B737 c/s) roger and turning right for righthand holding pattern overhead Detling."*

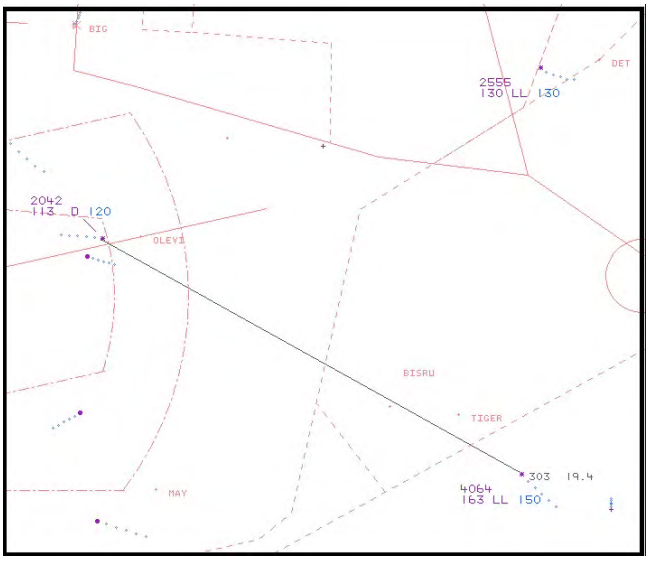
Controller:*"And (B737 c/s) your inbound axis is three one two degrees."*

B737:*"(B737 c/s) Detling inbound course say again."*

Controller:*"Three one two degrees."*

B737:*"Three one two inbound thank you."*

At 1000:23, 2min after the A321 flight had checked in on frequency, the A319 flight was instructed, *"(A319 c/s) climb Flight Level one seven zero expedite through Flight Level one four zero."* The A319 pilot replied, *"Climb Flight Level one seven zero wilco (A319 c/s)."* Print 2 below shows the B737 turning R at DET and the A319 on a track to route S of B737. The A321 is shown 19·4nm SE of the A319 and the BIG controller's written report indicated that the controller had forgotten about the A321.



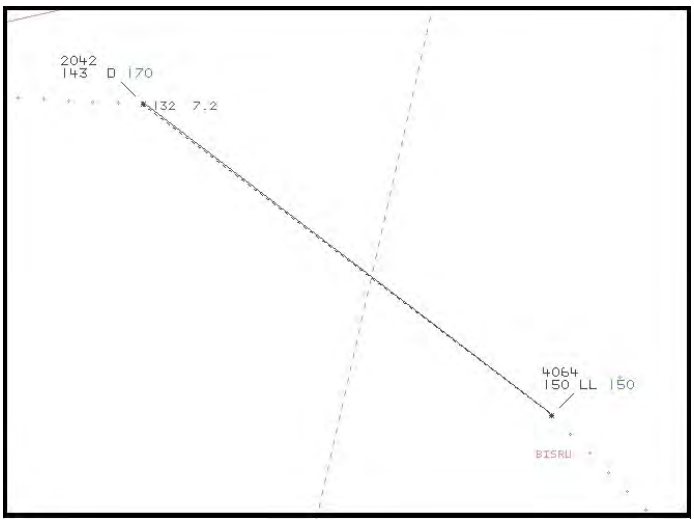
Print 2 – 1000:23

At 1001:03, the A319's rate of climb had increased to 2800fpm and as the A319 passed FL128, the A319 was transferred to London on frequency 134·9MHz (DVR S15). This was correctly acknowledged by the A319 pilot, who then contacted the DVR Sector Controller.

At 1001:31, the A319 flight on first contact with DVR Sector was instructed, *"(A319 c/s) turn left immediately heading zero seven five,"* which was acknowledged.

Meanwhile the LTC S Coordinator, having just completed coordination, pointed out to the BIG controller that the A321 needed immediate descent. The BIG controller realised that the A321 was in conflict with the A319 and at 1001:31, the BIG controller gave avoiding action to the A321, *"er avoiding action (A321 c/s) turn left immediately heading two seven zero degrees."* There was no reply from the A321 crew.

At 1001:33, the STCA activated as the range between the 2 ac reached 7·2nm as shown in print 3 below.

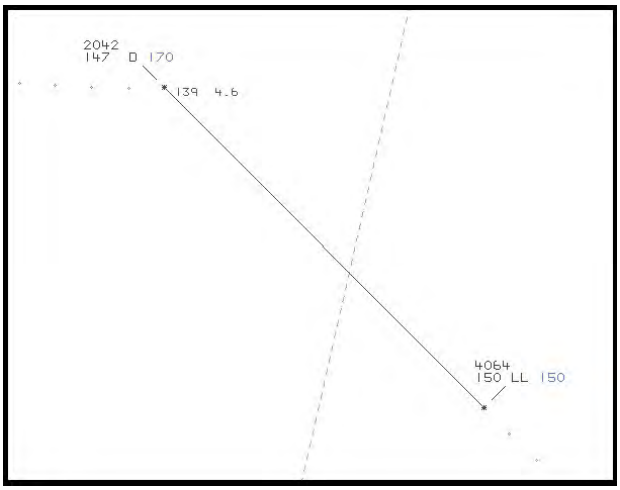


Print 3 – 1001:34

At 1001:38, the DVR controller updated the A319, *"(A319 c/s) it's avoiding action further left heading zero six zero degrees traffic in your three o'clock range five miles Flight Level one five zero.*" There was no response from the A319.

At 1001:41, the BIG controller, having not received a response from the A321, then gave avoiding action to the A319, *"(A319 c/s) avoiding action turn left now heading zero eight zero degrees."* The BIG controller's written report indicated that the controller had forgotten that the A319 had already been transferred.

At 1001:52 the BIG controller passed TI, *"(A321 c/s) traffic in your twelve o'clock range of three miles climbing through your level."* The A321 pilot responded, *"Yes er we saw also TCAS also we saw contact."* The BIG controller replied *"Roger.*" Print 4 below shows the distance between the ac as 4·6nm.

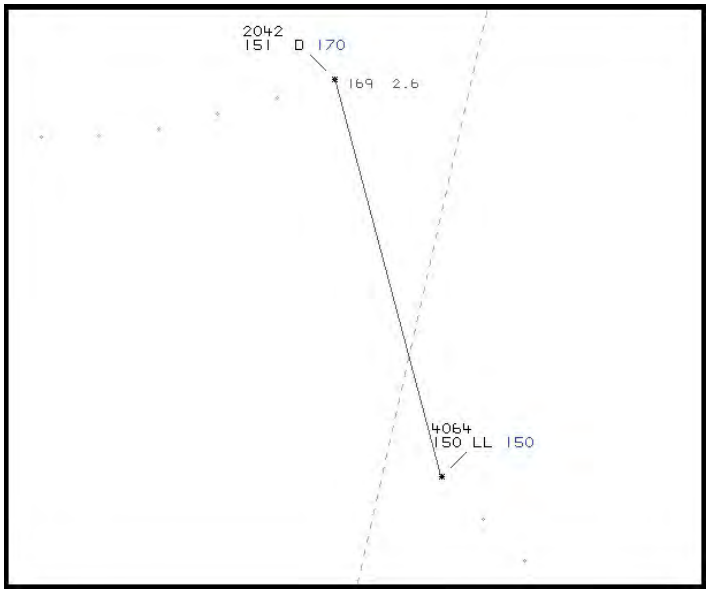


Print 4 – 1001:50

The DVR Sector contacted the BIG Sector to advise that they had given avoiding action to the A319.

At 1002:05, print 5 below, shows separation as 2·6nm with a vertical distance of 100ft. The A319, turning L reported, *"(A319 c/s) is expediting climb traffic just in sight passing behind"* and shortly after reported clear of the traffic.

AIRPROX REPORT No 2012099



Print 5 – 1002:05

[UKAB Note (1): CPA occurs at 1002:13, the A319 climbing through FL156 and passing 2·3nm NNE of the A321 which is maintaining FL150 with tracks diverging.]

The A321 flight reported unable to hold at BIG due to Wx, and the BIG controller provided vectors on a W'ly heading. At 1004:45 the A321 flight was given descent to FL090 and this was immediately corrected to stop descent at FL140. At 1005:22, the A321 flight was given descent to FL110 and instructed to resume own navigation to hold at OCK.

The Wx conditions and complexity of the workload caused the controller to become agitated in the period leading up to the incident. After the sector was split, the BIG controller became absorbed and focused on the problem associated with holding the B737 at DET and the plan to climb the A319. The RT exchange with the B737 flight regarding holding and the direction of hold was distracting and occurred just prior to the controller forgetting about the A321. Having resolved the separation problem between the B737 and A319, it is likely that in order to reduce the workload, the BIG controller was keen to transfer the A319, passing FL128, at an early stage and the controller did so without properly checking the strip presentation, which would have shown the A321 at FL150. The A321 crew's first RT contact was acknowledged with, *"Roger"*. It is likely that the controller was fully absorbed at this point and ignored, or did not recognise the significance of the A321. The prompt provided by the LTC S Coodinator, caused the BIG controller to belatedly recognise the conflict and to take avoiding action. When the A321 flight was given avoiding action, the range between the 2 ac was 7·5nm. However the A321 crew did not respond to the avoiding action and there was no re-transmission of the avoiding action. Shortly afterwards the controller gave the A321 flight TI and the A321 crew reported visual with the A319 and on TCAS.

The Airprox occurred when the BIG controller climbed the A319 into confliction with the A321. The BIG controller had forgotten about the presence of the A321, whilst being distracted by the hold swapping of the B737 and then focusing on the interaction between B737 and A319. Contributory to the incident was the on-going complexity of the traffic situation, resulting from the prevailing Wx conditions.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Some Members wondered why there could be a situation in which one flight reports unable to hold at a specific location whilst others were able to hold without reporting any difficulty. CAT pilot Members commented that each crew had to make its own decision on the suitability of the conditions, which could vary with altitude; the decision could also be made on crew interpretation of the ac's Wx radar, which can be variable in performance and differ

between ac types. In this incident, the B737 crew had requested to route from LAM to BIG but then asked to hold at TIGER. Although stack swaps were not unusual, controller Members thought that the late change of hold request to TIGER had placed an additional strain on the BIG controller who made a snap decision to hold the B737 at DET, which was unusual. It was during this part of the scenario that the A321 flight had called on frequency and the transmission was acknowledged with, *"(A321 c/s) roger"*, the controller focussing on the B737 and not assimilating the importance of the A321. Once LTC BIG had established the B737's hold location and axis, the controller was content that the A319 could be climbed on its track through the B737's level. However, in resolving the Wx related re-routeing, the LTC BIG controller did not take the A321 into account when clearing the A319 to climb and this had caused the Airprox.

Members were disappointed that when the confliction became apparent to the LTC BIG controller, the A321 crew did not respond to timely avoiding action. In the heat of the moment LTC BIG then tried to give the A319 flight an avoiding action L turn away from the A321 but had forgotten that the A319 flight had already been transferred to LAC S15. LTC BIG then passed TI to the A321 crew who reported TCAS and visual contact. Meanwhile the S15T controller had given the A319 crew a L turn, in response to their initial call, which was upgraded to avoiding action with TI as the A321 converged. The A319 crew were aware of the A321's presence when a TCAS TA was received simultaneously with the S15T turn away. The PF then reduced their ROC in reaction to the TA and it was then that the PNF visually acquired the A321 and told the PF to increase their ROC as he perceived this to the best resolution. Neither crew received a TCAS RA during the incident, the radar recording showing the A319 turning L and climbing through the A321's level, the tracks already diverging, at the CPA. In the end, the Board was content that the actions taken by the S15T and A319 crew were enough to remove any risk of collision

PART C: ASSESSMENT OF CAUSE AND RISK

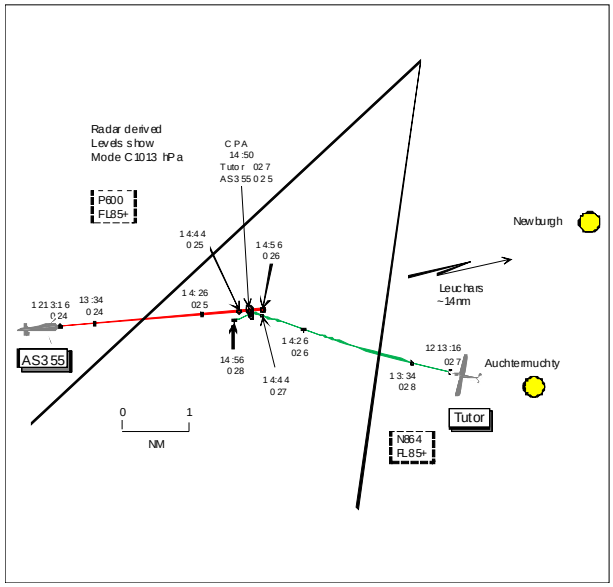
Cause: In resolving a complex Wx-related re-routeing, the LTC BIG controller did not take the A321 into account when clearing the A319 to climb.

Degree of Risk: C.

AIRPROX REPORT No 2012100

AIRPROX REPORT NO 2012100

Date/Time:	12 Jul 2012 1215Z	
Position:	5618N 00322W (17nm WSW Leuchars - elev 38ft)	
Airspace:	SFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tutor T Mk1	AS355
Operator:	HQ Air (Trg)	Civ Comm
Alt/FL:	2500ft	2500ft
	RPS (1004mb)	QNH
Weather:	VMC CLBC	VMC CLNC
Visibility:	10km	10km
Reported Separation:		
	150ft V/200m	Not seen
Recorded Separation:		
	200ft V/<0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUTOR T MK1 PILOT reports flying a solo student medium level Navex, VFR and in receipt of a TS from Leuchars on 255·4MHz, squawking with Modes S and C; TAS was fitted. The visibility was 10km flying 2500ft below cloud in VMC and the ac was coloured white with nav, landing and strobe lights all switched on. Near to Auchtermuchty, heading 290° level at 2500ft RPS 1004hPa and 120kt, a contact appeared on his TAS, displayed as 'other traffic' at a range of 4nm. He was visual with a light fixed-wing ac flying in the same direction. A few moments later he received a TA and while looking for the traffic he climbed 100ft. Leuchars ATC then told him about traffic tracking W to E at 2500ft which is when he saw a dark-coloured helicopter about 300m away heading in his direction at a similar level. He was forced to take avoiding action, a steep L turn, estimating it passed 150ft vertically below and 200m horizontally clear to his R. He assessed the risk as medium. Without the TA from his TAS he thought he may have had insufficient time to take avoiding action.

THE AS355 PILOT reports en-route to Gleneagles Hotel via St Andrews, VFR and in receipt of a BS from Leuchars on 126·5MHz, squawking an assigned code with Mode C. The visibility was 10km in VMC and the helicopter was coloured blue with nav and strobe lights switched on. He was unaware of being involved in an Airprox until contacted post flight. At the reported position, 14nm W of Leuchars, he was heading 085° at 110kt and level at 2500ft amsl. He contacted Leuchars when SSW abeam Perth and entered the assigned transponder code and was asked to report abeam Newburgh. As he was unfamiliar with the position requested he was checking for it on his chart and thought the Airprox occurred at this time. He did not see the reporting Tutor.

THE LEUCHARS RADAR CONTROLLER reports instructing a controller under training on the Departures/Zone position. The trainee was working hard with a number of tracks on both VHF and UHF including the Tutor, on a Navex to the SW of Leuchars heading W under a TS. At 1212 the AS355 flight called requesting a BS and the trainee correctly allocated the Leuchars conspicuity squawk 0220 and requested its position, heading and level. The AS355 pilot stated he was en-route from Auchterader to St Andrews at 2400ft. Thirty seconds later the AS355 pilot reported S abeam Perth [20nm W Leuchars] and was advised that the helicopter was not showing on radar. At this point the pilot asked for a MATZ crossing and, as it was still not showing on radar, he was asked to report S abeam Newburgh [12nm WSW Leuchars] for both the MATZ crossing and its proximity to the Tutor. Approximately 2min later a primary only contact appeared on radar 1nm W of the Tutor, which was at 2800ft, and the Tutor pilot was given TI. The Tutor pilot acknowledged the call, reporting 'visual' with the other ac. The trainee continued to provide a service to several other flights and some 3min later the Tutor pilot requested to be given more notice of conflicting traffic. After landing the Tutor's Command advised that an incident report was likely to be raised.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a Tutor in receipt of a TS from Leuchars Deps and an AS355 operating VFR, in receipt of a BS from Leuchars Zone.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The Leuchars Flying Order Book (FOB) states that outside 10nm from the airfield, between 230° to 280°, surveillance based ATS are automatically reduced due to poor radar performance. As a result of its inclusion within the FOB, at the time of this incident, Leuchars-based crews were not reminded of the standing reduction to ATS.

Deps and Zone were operating as a bandboxed position, manned by a trainee and a mentor; the mentor has described the trainee's workload as high to medium, with 4 ac on freq. The incident sequence commenced at 1211:43 as the AS355 pilot called Zone on VHF, "*5 miles to the east of Auchterader and er heading due East at 2400 feet 1-0-1-0*", requesting a BS. At this point, the Tutor, operating on UHF, was approximately 12nm ESE of the AS355, tracking WNW'ly, indicating 2700ft. A BS was agreed and the AS355 pilot was instructed to squawk 0220; however, the AS355 was within the area of known poor radar performance and, at 1212:44, Zone informed them that they were not, "*observed on radar*." To facilitate Zone's planning, they instructed the AS355 pilot at 1213:17 to, "*report south abeam Newburgh*" and although the pilot was initially unfamiliar with this location, the AS355 pilot confirmed at 1213:34 that they had, "*found it on the map, I'll report passing*." At this point, the area radar recording shows the Tutor 4·9nm ESE of the AS355, tracking WNW'ly indicating 2800ft; the AS355 is tracking E'ly, indicating 2400ft.

At 1214:26, Deps passed TI to the Tutor on the AS355 as, "…*traffic west, 1 mile, tracking east, at err 2500 feet*" which was acknowledged. Immediately thereafter an unrelated flight called Zone on VHF such that no warning of traffic could be passed to the AS355 pilot. At 1214:46, the Tutor pilot reported visual with the AS355; at this point approximately 0·25nm lateral separation existed between the ac. The CPA occurred at 1214:50 with <0·1nm lateral separation and 200ft vertical. At the next sweep of the radar at 1214:56, it is apparent that the Tutor has turned L which accords with the pilot's report.

From an ATM perspective the mentor's comments on their DASOR are critical and highlight that the AS355 did not paint on their surveillance display, in either primary or secondary, until immediately prior to the TI being passed. On this basis, whilst in hindsight Deps may have been able to provide an earlier generic warning of the AS355's presence to the Tutor pilot, it is unlikely that this would have affected the outcome of the incident. The known area of poor radar performance to the SW of Leuchars compromised the ATM safety barrier, leaving the Tutor's TAS and 'see and avoid' as the remaining safety barriers. In this instance, as identified by the UFSO, TAS provided essential and timely notification of traffic to the Tutor pilot, enabling them to take the necessary action to avoid confliction; albeit with reduced safety margins.

HQ AIR (TRG) comments that whilst an earlier TI call based on the position call of the AS355 might have been useful in other circumstances, the Tutor pilot was already aware of traffic from his TAS and was looking out. It appears that the TI provided did re-cue the pilot's lookout so it cannot be discounted that an earlier general call might have served the same purpose. It is not clear whether the pilot climbed deliberately or inadvertently away from the displayed traffic; in either case the effect was to reduce the risk and represents an effective use of the TAS data, the most assured element of which is the elevation readout.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was clear that although both pilots were in receipt of an ATS from Leuchars, in Class G airspace they were ultimately responsible for collision avoidance through see and avoid. With the AS355 and Tutor on different frequencies, both pilots were denied SA on each other's presence from RT exchanges with Leuchars. As the incident occurred in an area of poor radar performance, Members wondered if early generic TI would have been advantageous to both pilots. Leuchars was aware of the AS355's position from its pilot's reports and that it was routeing towards the Tutor, which was displayed on radar, tracking in the opposite direction. However the AS355 was only under a BS and the controller was establishing a geographical landmark for the helicopter pilot to report

passing as an 'aide memoir' to issue its pilot with a MATZ crossing clearance. The Tutor was under a TS routeing W'bound towards the AS355, which was not showing on radar, and the controller appeared to be waiting for the AS355 to appear on radar before giving the Tutor pilot TI. That said, the Tutor pilot was aware of the approaching AS355 from his TAS and was looking out as a TA was generated. This occurred as Leuchars Zone/Deps saw the AS355 appear on radar and then passed TI to the Tutor pilot at range 1nm. The Tutor pilot saw the helicopter about 300m ahead, a late sighting, and executed a steep L turn away. Members wondered why the Tutor pilot, armed with accurate relative height data from his TAS, had not taken earlier deconfliction action in the vertical plane by climbing/descending instead of continuing on track at approximately the same level as the conflicting AS355. The AS355 pilot had established the location of Newburgh well over 1min before the CPA but did not see the approaching Tutor at all. The ac had approached each other on a constant relative bearing with both ac presenting a small target aspect to both pilots, making visual acquisition more difficult. However, despite the Tutor passing unsighted to the AS355 pilot, the robust actions taken by the Tutor pilot were enough to allow the Board to conclude that any risk of collision had been removed.

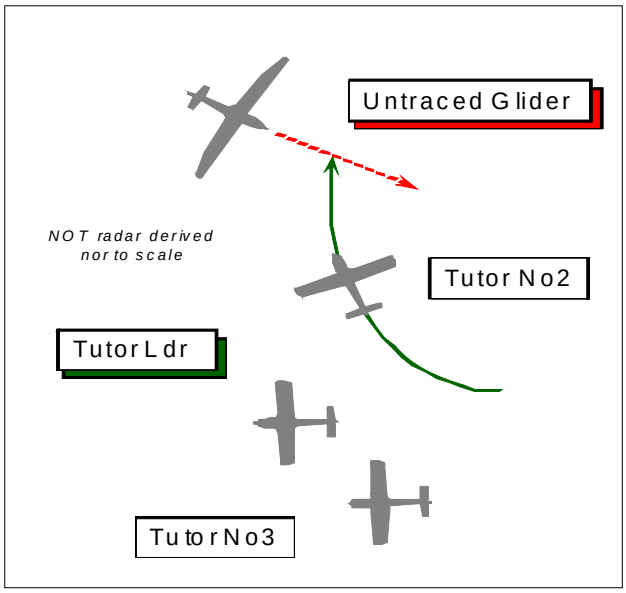
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the AS355 pilot and a late sighting by the Tutor pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012101

Date/Time:	12 Jul 2012 1355Z	
Position:	5226N 00020W (2nm W Sawtry)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tutor T Mk1 x3	Untraced Glider
Operator:	HQ Air (Trg)	NK
Alt/FL:	2000ft+	NK
	RPS (1008hPa)	(NK)
Weather:	NK CLBC	NK
Visibility:	40km	NK
Reported Separation:		
	50ft V/20yd H	NK
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB TUTOR TMk1 PILOT (TUTOR LDR) reports he was flying dual, as the leader of a 3ac Tutor formation – Nos 2 & 3 were solo students - whilst in receipt of a TS from Cambridge RADAR on 123·6MHz. An elementary surveillance Mode S transponder is fitted, but was selected 'off', he thought, during the period of the Airprox; TAS is also fitted.

Westbound some 2nm W of Sawtry [about 3½nm SW of Peterborough/Conington], flying above 2000ft RPS (1008hPa) some 2000ft clear below cloud, as he cleared the area visually he instructed the No 2, who was on the R, to break as part of the exercise. Immediately after the No2 broke to the R, onto a heading of about 350°, he observed a white high-wing glider flying straight and level, crossing obliquely in front of the No2 Grob from L – R and so instructed the No2 pilot to climb to avoid it. The No2 Tutor passed above the glider by an estimated 50ft, with lateral separation of about 20yd; he assessed the Risk as 'medium – high'. The glider pilot made no attempt to avoid the No2 Tutor, suggesting that he had probably not seen the No2 Tutor. Although the No2 Tutor is fitted with a transponder, SSR was selected to 'standby' as SOP for formation flying. He informed Cambridge RADAR over the RT of his intention to file an Airprox.

The formation ac are coloured white; the red HISLs and landing lights were all on.

THE CAMBRIDGE RADAR CONTROLLER (RADAR) reports that when the Tutor formation departed from Wyton a TS was requested by the leader, which was provided but with reduced information due to poor radar performance. A squawk of A6172 was allocated and the Tutor formation was manoeuvring under VFR in the vicinity of Sawtry: two contacts were observed, one 2nm NE and one 2nm S of the formation - TI was passed. Later at 1410, the Tutor leader reported an Airprox with a glider that occurred 15min earlier in the vicinity of Sawtry.

UKAB Note (1): LATCC (Mil) RAC report that after viewing numerous radar recordings they were able to identity the lead Grob Tutor from the ac's Mode S transponder, but none of the other formation elements are evident. There are numerous single 'pop-up' primary radar contacts that appear momentarily during the sortie, but the glider cannot be positively identified on radar. Consequently, the RAC have been unable to trace the reported glider whose identity remains unknown.

Recorded radar does not show the No2 Tutor breaking away at any point but a formation re-join might have occurred at 1358:15, 1¼nm SSE of Sawtry when the lead Grob is shown level westbound indicating 3300ft Mode C (1013hPa). Later, at 1400:00, the lead Grob is shown westbound passing S abeam the reported Airprox location at 3200ft Mode C (1013hPa), with a primary contact to the N which then fades. Consequently, the Airprox is not evident on recorded radar data at the reported location/time.

AIRPROX REPORT No 2012101

ATSI reports that the Tutor formation of three ac was operating on a VFR flight that had departed from Wyton and was in receipt of a TS from Cambridge RADAR on 123.600MHz. The glider could not be identified. ATSI had access to RT recordings from Cambridge RADAR, area radar recordings and written reports from the pilot of the Tutor Leader and the Cambridge RADAR controller.

The Cambridge METARs:

1350Z 20008KT 150V240 9999 SCT048 19/09 Q1011=
1420Z 20008KT 140V270 9999 SCT048 19/08 Q1011=

At 1351:09 the Tutor Leader is shown on radar shortly after departure from Wyton, 1.6nm W of the A/D. At 1352:40, the Tutor Leader contacted Cambridge RADAR requesting a TS, informing the controller that the formation would be operating between 2000 - 7000ft to the W of Wyton for 30min. A squawk of A6172 was allocated and a reduced TS, due to radar performance, was agreed. At 1353:32, the Tutor formation was tracking NW. At 1356:10, the Tutor Leader was informed of unknown traffic 1nm S of the formation, tracking N. At 1357:10, the Tutor Leader informed Cambridge RADAR that he was visual with the traffic. At 1358:20, the Tutor Leader was informed of unknown traffic 2nm NE of the formation and further traffic to the W.

At 1410:40 the Tutor Leader was informed by the Cambridge Radar controller that there was, "*unknown traffic southwest of you range 3 miles manoeuvring no height possible glider".* The Tutor Leader replied that he was looking and added, "*..be advised I'll be..submitting an Airprox for about 15 minutes ago when we came very close to one".*

The written report from the Tutor Leader stated that, just before the Airprox, the No 2 Tutor broke R and immediately after the break, the Tutor Leader observed a glider directly in front of the No 2 Tutor. The Tutor Leader instructed the No 2 Tutor pilot to climb and the No 2 Tutor passed above the glider by an estimated 50ft.

Between 1355 and 1410:40, the Cambridge RADAR controller issued appropriate and timely traffic information to a number of aircraft on frequency including information on primary returns that were believed to be gliders.

At 1356:58 a primary contact can briefly be seen [on the area radar recording] 1.2nm to the N of the Lead Tutor. Between 1357:15 and 1357:56 an intermittent and erratic primary contact can be seen in the vicinity of the Tutor Leader – at first on the Tutor Leader's left hand side at a range of 0.6nm and then, after the Tutor Leader completes a right hand turn, on the right hand side of the Tutor Leader at a range of 0.7nm. A third primary contact can be seen at 1408:05, opposite direction to the Tutor Leader at a range of 0.4nm. It is possible that one of these primary contacts correlates with the glider reported by the Tutor Leader, but it is also possible that one or all of the contacts are associated with one of the other Tutors in the formation.

Cambridge ATC advise that their primary radar is often suppressed to a greater or lesser degree in order to filter out clutter which can be quite extensive. Radar services in the NW of the area are sometimes limited due to poor cover. The traffic information that was passed to Tutor Leader on other aircraft was based on secondary radar information – it is unclear whether the primary contacts referred to above were visible to the Cambridge RADAR controller. The Tutor Leader reported the Airprox 15min after it happened, as a result it is difficult to assess whether any of the primary contacts seen are related to the Airprox. The Airprox was reported as being with Tutor 2 which was not displaying a squawk – there is no positive indication on radar of the position of Tutor 2 and it is possible that the primary returns seen in the vicinity of Tutor Leader in fact belong to Tutor 2.

Although the Cambridge RADAR controller did not pass traffic information on the primary returns in the vicinity of the Tutor Leader at the time of the Airprox, appropriate, relevant traffic information was previously passed to the Tutor Leader and other aircraft on the frequency. It is likely that the Cambridge RADAR controller either did not notice the primary returns in sufficient time to pass TI or the returns were not visible on the display due to the limitations of the Cambridge SRE.

The Airprox occurred in Class G airspace. Although Controllers providing a TS are required to pass TI and update it if it constitutes a definite hazard, workload and RT loading may reduce the ability of the controller to pass TI. Ultimately, the responsibility for traffic avoidance rests with the pilot.

The Airprox occurred in Class G airspace when the No 2 Tutor came into conflict with an untraced glider.

Due to the lack of precise information regarding timing and the unknown identity of the primary returns involved it is not possible to determine the exact geometry of the encounter.

HQ AIR (TRG) comments that several factors indicated an increased risk of encountering glider traffic, such as the TI regarding gliders in the vicinity, and the 'Reduced Traffic Service' being provided, but continuing the sortie in these circumstances was not unreasonable. Whilst the Tutor formation had employed every means at their disposal, including TAS, they were still reliant on 'see-and-avoid' to avoid an apparently non-transponding and hard-to-see glider. Air Command and Defence in general, are increasingly adopting systems like TCAS, TAS and FLARM to enhance 'see and avoid', and FLARM is under consideration for the Tutor fleet; the glider may or may not have been FLARM-equipped. Even with such equipment fitted, the likelihood remains of encountering traffic that is not detectable and which may not be easy to spot visually, as well as such equipment not being compatible with formation flying. Mandated compatible electronic conspicuity is supported by military operators in principle, but the current CAA stance, based on the impracticality of such a policy, is recognised. The controller's job was made more difficult by the need for the formation wingmen to operate their transponders in standby, which is due to the nuisance effects on the leader's TAS and the controller's display. Fundamentally, the incident highlights the need to maintain a routine lookout to clear the flight path even with TAS fitted, particularly when required to focus elsewhere, such as on a formation leader.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Tutor formation leader, transcripts of the relevant RT frequencies, radar video recordings, a report from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

It was unfortunate that it had not been possible to identify the pilot of the glider involved; the paucity of radar data had not helped here. However, the Board concluded there was sufficient information available to the Members on which to base an assessment of the Cause and Risk. A GA glider pilot Member observed that the lead Tutor pilot had reported seeing a high-wing glider; however, there are not many high-wing gliders flying in the UK and a mid-wing configuration was more common. Moreover, it may be that the reported glider pilot was on a cross-country task and could have been based a long distance from the Airprox location, adding to the difficulty of identification.

The HQ Air (Trg) Member explained to the Board the complexities of lookout when formation flying and the inherent responsibility of the formation leader to clear his whole formation's flight path. Here, the HQ Air (Ops) Member stressed the leader was teaching a formation 'emergency' break procedure and it was the formation leader's responsibility to clear the airspace into which the No2 would fly before he ordered the No2 Student to 'break'. Up until this point the No2 student pilot would have been concentrating on his formation position and would not have been able to clear his intended flightpath himself, before the leader called for the 'break'. The Tutor leader's frank account shows that he had not seen the glider before he instructed the student to break; it was not until after the No2 was turning away to the N that the leader saw the glider and instructed the student pilot to climb above it.

Although the Tutor leader had wisely supplemented his lookout with a radar service from Cambridge RADAR, the ATSI report shows that the controller had not been able to forewarn the formation of the presence of the glider beforehand under the reduced TS that obtained. Members were well aware of the difficulties of detecting gliders visually as well as on radar and the HQ Air (Trg) Member had commented that gliders are rarely equipped with transponders, which would have aided the glider's conspicuity to the Tutor's TAS and to RADAR; in the Command's view, the Risk of airborne conflict in this scenario could only be mitigated further by the mandatory fitment and operation of some form of electronic conspicuity. A GA Member stressed that this Airprox occurred in the 'see and avoid' environment of Class G airspace where collision avoidance is predicated on the pilot seeing other ac in sufficient time to avoid them safely. There are a number of technical and interoperability issues currently associated with electronic conspicuity and, in the GA Member's view, mandating the fitment of such electronic equipment is not helpful or desirable. Nevertheless, the HQ Air (Trg) Member reinforced the Command's view, that an electronic means of enhancing ac conspicuity with, for example an SSR transponder, would assist pilots flying ac equipped with TCAS I/II and assist controllers in detecting gliders.

AIRPROX REPORT No 2012101

An Advisor pointed out that this Airprox occurred at the periphery of Cambridge ATC's radar coverage and the reduction in the number of LARS Units is significant. The MAA Advisor pointed out that as airborne collision is one of the top five Risks, the limitations of reduced radar coverage and the availability of a radar service must be taken into account by the responsible Duty Holder. Allied to this topic, the USAFE-UK Advisor pointed out that although Lakenheath ATC is not a notified LARS Unit an informal arrangement does exist for the provision of a radar service to Wyton-based Tutor aircrew who might usefully utilise that radar unit as an alternate source for the provision of a radar service, whenever Lakenheath ATC's traffic loading permits. The Board concluded, however, that in the circumstances RADAR could not have been expected to detect the glider and agreed that this Airprox had resulted because the Tutor leader instructed the No2 to break into conflict with the untraced glider, which he had not seen.

Turning to the assessment of Risk, a GA Member opined that if the No2 Tutor had passed as close to the unknown glider as the formation leader had reported - 50ft vertically and 20yd horizontally, then the glider pilot would almost certainly have heard the aeroplane as it overflew his glider, prompting the glider pilot to look for the No2 Tutor and file an Airprox Report. It was stressed that modern high-performance gliders can reach wingspans of 30m – broadly equivalent to that of a B737 (28·3m to 34·3m span depending on the variant) - so unless the observer is familiar with the type and size of the glider, judging separation when suddenly confronted with such a large ac can be difficult. However, there was no reason to doubt the veracity of the Tutor leader's report and Members agreed that at close quarters, with only the Tutor formation leader apparently aware of the conflict, this was a Risk bearing Airprox. On the basis of the lead Tutor pilot's report alone, therefore, the Board concluded that an actual Risk of collision had existed in the circumstances conscientiously reported here.

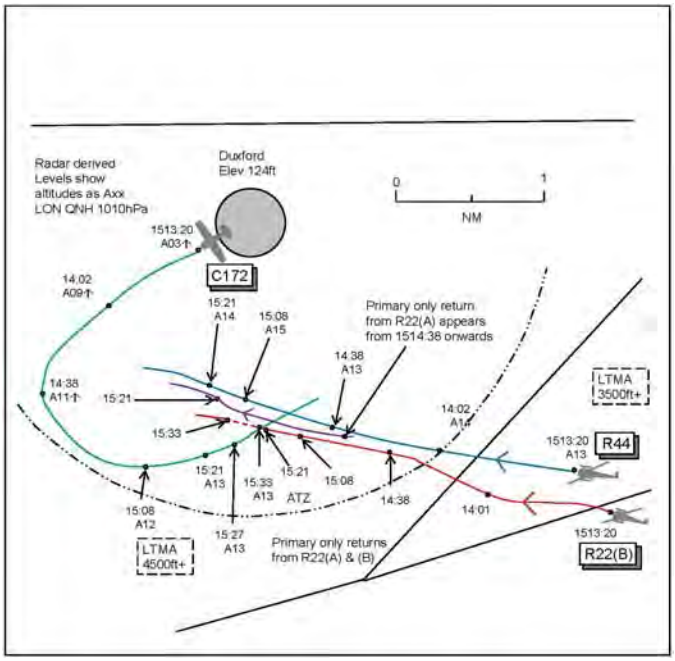
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tutor leader instructed the No2 to break into conflict with the untraced glider, which he had not seen.

Degree of Risk: A.

AIRPROX REPORT NO 2012102

Date/Time:	18 Jul 2012 1515Z	
Position:	5204N 00008E (1·5nm S Duxford - elev 124ft)	
Airspace:	ATZ/R112	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C172	R44+2xR22s
Operator:	Civ Trg	Civ Trg
Alt/FL:	1300ft QNH (1008hPa)	1400ft QNH
Weather:	VMC CLBC	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:	200ft V/0·3m H	R44 1km H R22(A) 1km H R22(B) Not seen
Recorded Separation:	<0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C172 PILOT reports flying a dual training sortie from Duxford, VFR and in communication with Duxford Information on 122·075MHz, squawking with Modes S and C. The visibility was >10km flying 200ft below cloud in VMC and the ac was coloured white/blue with anti-collision beacon on. The training detail was differences training for Variable Pitch (VP) propeller and managing a fuel injection engine during circuit procedures. The flight was conducted inside R112 [Olympic Restricted Airspace] utilising Duxford's exemption/permission. After taking-off from RW24 and whilst on the climb-out to cct altitude the FISO reported, "traffic 3 helicopters S to N approaching from the S towards the windsock". Other information was transmitted which was not clearly heard but the student thought the FISO said, "altitude 400ft". They continued the climb on a track of 240° and levelled out on this track at 1100ft for about 30sec whilst VP propeller procedures were carried out. The ac accelerated to 90kt and they then turned crosswind. The helicopters were not seen from this position which was about 1nm further SW than would be the case had a normal cct been flown i.e. turning crosswind in the climb passing altitude 700-800ft. At this point he thought the helicopters had probably already passed through the downwind track. They turned downwind heading 060° at cct altitude and saw 2 helicopters, which had just crossed the downwind track about 1nm ahead of them at the same altitude or slightly lower. They immediately climbed to about 1300ft, their altitude being restricted by some low cloud in the downwind area; VMC was maintained. They continued to look for the third helicopter which took some little time to acquire and it was sighted close-by, <0·5nm ahead and slightly below crossing from R to L i.e. roughly S to N. The helicopter was moving away from their track and no further avoiding action was needed; the helicopter did not change course or speed. The CPA was estimated as 200ft vertically and about 0·3nm horizontally. If they had not climbed there would have been no vertical separation between their ac and the third helicopter. The information provided by the FISO was very material in preventing a more serious situation. He assessed the risk as 'B' but if they had not seen the third helicopter then a risk rating of 'A' would have been more appropriate. During the 15min before until 5min after the Airprox he had not heard any call from traffic other than a locally-based ac on the ground. He believed the helicopter traffic did not make any call to Duxford.

THE R44 LEAD HELICOPTER PILOT reports flying with a student and leading 2 other helicopters enroute to Leicester, VFR and in receipt of a BS from Atlas Control on 118·275MHz, squawking an assigned code with Modes S and C. The visibility was 10km flying >500ft below cloud in VMC and the ac was coloured black/gold with landing and anti-collision lights switched on. Having cleared Stansted CTR they transferred back to Atlas Control for a few minutes before he requested to change frequency to speak to Duxford to transit through the Duxford O/H. Atlas replied, "negative" and said they would call ahead and to cross through and stay on their frequency with their

squawk. Transiting through the Duxford ATZ the first R22 was in their 7 o'clock at <0·5km and the second R22 was their 8 o'clock range at approximately 1km. Heading NW'ly at 1400ft QNH and 90kt a Cessna was first observed head to head 2nm away at about the same level before it then moved R towards the R22's in formation and clearing to their port from their 12 o'clock to 9 o'clock position by an adequate distance (1000m). He assessed the risk as none. Previously he had asked the other helicopter pilots to put on their landing lights for higher visibility in formation. Once the Cessna was seen he contacted Atlas and asked if they knew it was there, in the ATZ, and the controller replied that he had spoken to Duxford and there shouldn't be any traffic. The controller said he would contact Duxford again but no sooner had that happened they were clear of R112 and they were cleared to leave the Atlas frequency.

THE SECOND HELICOPTER [R22(A)] PILOT reports flying solo, in formation with the R44 transiting through the Duxford ATZ and listening out with Atlas Control; Mode A was switched off at Atlas Control's request. He saw a Cessna flying head to head at 1 o'clock range 2nm at about the same level which moved from R to L and it then cleared to his port about 1km away. He assessed the risk as low. Atlas Control had informed the formation that they had contacted Duxford and there was no known traffic to effect.

THE THIRD HELICOPTER [R22(B)] PILOT reports following the R44 and R22(A) in formation and listening out with Atlas Control; Mode A was switched off. He heard the R44 pilot report sighting traffic in the Duxford ATZ but did not see the ac himself.

ATSI reports that the Airprox occurred at 1515:21UTC 1·2nm S of Duxford Aerodrome, within the Olympic Restricted Airspace Area EG R112, and inside the Duxford ATZ. The Duxford ATZ comprises a circle radius 2nm, centred on the midpoint of RW06/24 and extending to a height of 2000ft above aerodrome level (elevation 125ft).

The C172 flight was operating VFR from Duxford in the LH visual cct for RW24 and in receipt of a BS from the Duxford FISO. The pilot reports operating within R112 in accordance with the Duxford permission conditions.

The formation of 3 helicopters comprised 2xR22 and an R44, which were operating VFR on a flight from a private site near Manston en-route to Leicester Airport. The formation were in receipt of a BS from ATLAS Control on frequency 119·375MHz.

EG R112 was promulgated as being active from 2300 UTC on 13th July 2012 until 2300 UTC on 15th August 2012. Flights from, into or within R112 were prohibited, except for those specified ac adhering to the operating regulations. The ANO regulations applied. EG R112 was designed to create a 'known traffic environment' and for security reasons ATLAS Control was required to retain communication with ac under their control.

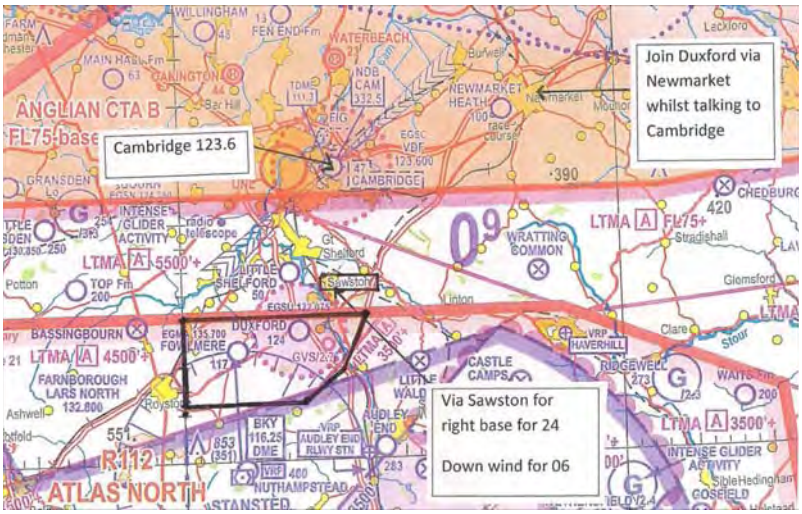
Duxford provided the follow guidance for visiting pilots:

'The airfield lies just inside the northern boundary of the restricted zone R112. Permission has been granted for aircraft and pilots to fly from and to IWM Duxford through a small defined part of R112 as described below (the "Permission"). This is suitable for flights from and to airfields outside R112.

Pilots wishing to transit R112 (other than the small part covered by Duxford airfield's permission) must arrive and depart using the flight planning system and Atlas Control, as widely promulgated elsewhere.

Permission to Fly Within Restricted Zone R112 Duxford Airfield.

The Permission covers flight inside, entry to and exit from the area shown edged in black in the diagram below.'



The Duxford ATSU indicated that in addition to their published operational telephone number, which appeared in Olympic guidance material, Duxford had provided ATLAS control with an 'out of hours' (office and mobile) contact telephone number, which was added by ATLAS to their direct dial system.

On 11th July 2012, 2 days before the introduction of R112, Duxford ATSU had provided by email, an unpublished operational telephone (hotline), which afforded priority access to the duty FISO. It was not clear if this was received by ATLAS control prior to the commencement of EG R112.

CAA ATSI had access to area radar recording, written reports from the C172 pilot and the 3 helicopter pilots, together with a written report from the ATSU. Although not a requirement, Duxford normally record their RT but on this occasion, there was a technical fault and no RT recording was available.

The Stansted METAR was provided:

EGSS 181450Z 22015KT 9999 BKN014 OVC020 18/15 Q1010= and EGSS 181520Z 22014KT 9999 SCT012 BKN017CB 19/16 Q1010=

At 1451:00, the helicopter formation was 18nm SE of Stansted in receipt of a BS from ATLAS Control, squawking 1515.

At 1500:40, the formation was transferred to LTC Essex Radar for transit through the Stansted CTR and the squawk changed to 0201.

At 1510:20, the formation was transferred back to ATLAS Control as they crossed the N boundary of the Stansted CTR, 6·5nm SE of Duxford. Radar showed that the formation had retained the Stansted squawk 0201.

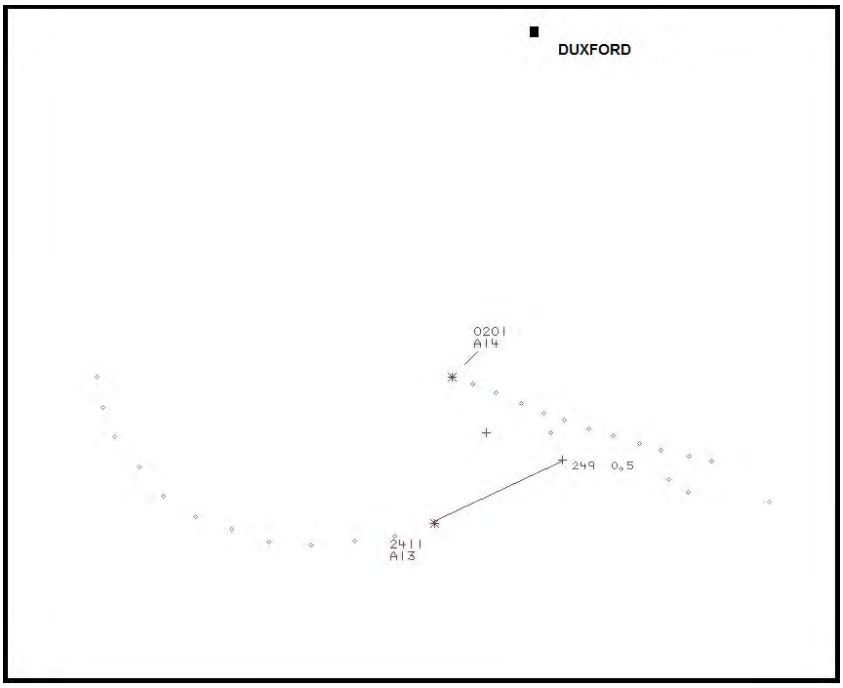
The formation, on contacting ATLAS, requested a QSY to Duxford in order to transit their O/H. ATLAS Control agreed to telephone Duxford on behalf of the formation and contacted Duxford using the 'out of hours' number, instead of the operational number for the control tower. The Duxford representative acknowledged the details and responded that this was, "OK alright." The flight details were then relayed to the duty FISO. However, unknown to the ATLAS controller, the representative was not in a position to properly communicate relevant information regarding activity within the cct and ATZ.

At 1514:02, the radar shows the C172 airborne from Duxford RW24, passing 900ft and commencing a L turn into the cct. The formation leader [R44] is entering the ATZ from the SE at 1300ft, with a single helicopter [R22(B)] shown in trail as a primary only contact.

At 1515 the ATSU reported that the helicopters were sighted 1·5nm SE of the airfield estimated to be at 1600ft. TI was passed to the C172. The FISO made blind calls to the helicopters without receiving a response. The FISO was unable to contact ATLAS Control on their dedicated telephone line.

At 1515:08, the C172 turned downwind at altitude 1200ft; the pilot's written report indicated that he acquired 2 helicopters visually and looked for the third.

At 1515:21, the radar recording shows the primary contact of the third helicopter [R22(B)] crossing the C172 from R to L at a range of 0·5nm as shown in radar print 1 below. The pilot reported sighting the third helicopter slightly below.



Radar print 1 - 1515:21

The ATSU reported that when ATLAS Control were subsequently contacted, they had indicated that they were not responsible for monitoring the position of aircraft on a BS and that such ac should have contacted Duxford for a crossing clearance.

Immediately after this incident, Duxford ATSU instructed FISO staff not to approve a crossing of the ATZ below 2000ft.

As a result of this incident, the CAA recognised that in the event of transit ac having to cross an embedded ATZ and remaining on the ATLAS frequency, pilots would not be able to comply with RoA Rule 45. In addition FISOs are not able to approve or refuse a crossing of the ATZ. This had not previously been identified as an issue. CAA AATSD therefore sought to reach agreement for a refinement to the ATLAS crossing procedures. As a result it was agreed that pilots should be encouraged to use these airfields as reporting points, but ac would be routed around the ATZ. Duxford ATSU reported that there were no further occurrences or similar incidents.

As the formation approached Duxford, the ATLAS controller kept the ac on his frequency and contacted Duxford in order to advise them of the crossing traffic. Unfortunately, ATLAS Control contacted Duxford using the 'out of hours' telephone number for an airport representative, rather than using the direct FISO operational telephone number. This resulted in a misunderstanding and the full implication of the circumstances of the situation was not fully appreciated by either ATLAS or Duxford.

Duxford ATSU reported that their operational telephone number was promulgated and also appeared in Olympic airspace guidance. Duxford had also provided details of an unpublished telephone number in order to give a higher priority to operational calls. Unfortunately this was notified only 2 days before the start of EG R112 and was not fully implemented for some time after the occurrence. It was not clear why ATLAS control used the 'out of hours' telephone number instead of the promulgated operational line, but was most likely due to a misunderstanding or administrative error. The security arrangements for flights within EG R112, required ATLAS controllers to retain ac on their frequency. The implications of allowing a transit ac across an embedded ATZ had

not been fully appreciated in the planning stage. This resulted in a situation when pilots were unable to comply with RoA Rule 45 (4) and (6), which state:

'If the aerodrome has a flight information service unit the commander shall obtain information from the flight information service unit to enable the flight to be conducted safely within the zone.'

'The commander of an aircraft flying within the aerodrome traffic zone of an aerodrome shall:

(a) cause a continuous watch to be maintained on the appropriate radio frequency notified for communications at the aerodrome; or

(b) if this is not possible, cause a watch to be kept for such instructions as may be issued by visual means; and

(c) if the aircraft is fitted with means of communication by radio with the ground, communicate his position and height to the air traffic control unit, the flight information service unit or the air/ground communication service at the aerodrome (as the case may be) on entering the zone and immediately prior to leaving it.

It is very likely that had ATLAS communicated directly with the duty FISO, on the operational or additional priority number, it would have become apparent that the Duxford cct was active and that the helicopters should either have called Duxford AFIS or routed around the ATZ.

The Airprox occurred when, due to an oversight in the planning phase of EG R112, the significance of allowing ac to transit through embedded ATZs, without allowing the commander to properly obtain information in accordance with Rule 45, was not fully recognised. This resulted in the helicopters being retained on the ATLAS Control frequency whilst they crossed the Duxford ATZ and active circuit pattern.

The following factors were considered to have been contributory:

The incident occurred 5 days after the commencement of the Olympic airspace EG R112 operations and coordination between ATLAS and Duxford had not been fully tested operationally.

The ATLAS controller believed that he had used the correct telephone number to contact Duxford and that the Duxford representative had properly agreed for the transit of the ATZ.

The direct dial operational number used by ATLAS to contact the duty FISO at Duxford had been incorrectly programmed. This caused a misunderstanding and neither side fully recognised the implication of the developing situation.

Subsequent procedures were refined to ensure that transit ac were routed around embedded ATZs.

BM SAFETY MANAGEMENT reports this Airprox occurred between a C172 operating VFR within the visual cct at Duxford and a mixed formation of 1 R44 (lead ac) and 2 R22s operating VFR in 'loose' echelon port, in receipt of a BS from ATLAS Control TAC 1.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The investigation of this incident highlighted a number of ATM and aircrew related issues; however, this report will focus solely on the RAF ATM aspects, with ATSI investigating the civil issues.

Duxford were operating on RW24 with unlimited visibility in nil Wx and SCT cloud at 1800ft. TAC 1 reported their workload as medium to low with 5 ac (3 speaking units) on frequency and low task difficulty.

The incident sequence commenced at 1510:26 as the R44 pilot made initial contact with TAC 1 and was, "*identified 1300 feet London Q-N-H 1-0-1-0, Basic Service*." This was read back by the R44 pilot who added, "*quick question, Q-S-Y to Duxford 1-2-2-0-7-5 just to let them know we're going through their overhead*?" TAC 1 replied, "*(Formation c/s) I'll give them a bell for you*." At this point, the R44 was 6·1nm SE of Duxford, tracking NW'ly, indicating 1300ft. A PSR-only contact is visible on the radar replay throughout the incident sequence, 0·5nm in trail to the R44 and this is believed to be the second R22 [R22(B)]; the PSR-only contact that is believed to be the

first R22 [R22(A)] disappears from radar at 1512:26 and had been 0·2nm in trail to the R44. The C172 was 0·8nm NE of Duxford, tracking SW'ly, descending through 200ft.

At 1511:29, Duxford answered a landline call from TAC 1 saying, "*Good afternoon,* [Christian name and surname of person answering]". TAC 1 continued, "*I've got an A-T-Z crosser, south-east to north-west, through your overhead at 1400 on the London Q-N-H 1-0-1-0*." The individual at Duxford replied, "*okay, are they not going to call us*?" TAC 1 stated, "*I can send them to you if you wanna work them*" to which the individual at Duxford replied, "*no that's fine, so three helicopters at 1400 feet*" which was confirmed by TAC 1. The individual at Duxford then asked, "*due with me what time*?" to which TAC 1 replied, "*they're currently 2 miles south, well south-east of the overhead*." The landline conversation was terminated at 1512:05. At this point, the R44 was 4·6nm SE Duxford, tracking N'ly, indicating 1400ft; the C172 was not displayed on radar, having faded at 1511:34.

Rules of the Air Regulations 2007, Rule 45 para 4 states:-

'If the aerodrome has a flight information service unit the (aircraft) commander shall obtain information from the flight information service unit to enable the flight to be conducted safely within the zone'.

Para 6a states:-

'The commander of an aircraft flying within the aerodrome traffic zone of an aerodrome shall cause a continuous watch to be maintained on the appropriate radio frequency notified for communications at the aerodrome and… if the aircraft is fitted with means of communication by radio with the ground, communicate his position and height to the…flight information service unit…at the aerodrome on entering the zone and immediately prior to leaving it'.

MAA RA 3009, supported by MMATM Chapter 9 Para 13 states that during console-to-console communication, the 'console number or control position' should be stated at the start of any landline liaison. MAA RA 3010 (1), supported by MMATM Chapter 10 Para 1 states that Traffic Information is passed between ATS personnel; Para 6 states that 'Coordination is defined as the act of negotiation between two or more parties each vested with the authority to make executive decisions appropriate to the task being discharged'.

Subsequent investigation has determined that TAC 1 made the landline call to Duxford via a 'Direct Access' button that had been programmed with a number provided by Duxford. However, the phone attached to this extension number at Duxford was located in a 'management and administration' office, not within the VCR. Based upon the report of the C172 pilot, the Duxford FISO advised them of "3 helicopters, south to north, approaching from the south towards the windsock". The pilot also acknowledged that other information related to these helicopters was transmitted by the FISO but 'was not clearly heard' with their student believing that the FISO had said "altitude about 400ft". It is reasonable to argue that this broadcast made by the FISO was as a result of the information passed by TAC 1, through the 3rd party individual at Duxford who answered the landline call.

Following the landline conversation, at 1512:10, TAC 1 informed the R44 pilot that the formation could, "*route via the Duxford overhead at 1400 feet*" which was acknowledged. There were no further transmissions on TAC 1's freq until 1515:20. It has not been possible to determine what other activities TAC 1 may have undertaken during this time. Nor has it been possible to determine where the other ac on their frequency were operating or what type of ATS they were operating under, in order to determine whether an opportunity existed for them to pass a traffic warning to the mixed R44/R22 formation. However, in accordance with CAP 774, the pilots of the formation were wholly responsible for avoiding the C172 and TAC 1 was not 'required to monitor the flight'.

[UKAB Note (1): The Debden radar recording at 1513:20, shows the C172 re-appearing on radar 0·6nm SW of Duxford, climbing through altitude 300ft QNH 1010hPa; the R44 was 2·8nm SE of Duxford, tracking NW'ly, indicating 1300ft. At 1514:02, the R44 enters the Duxford ATZ, SE of the airfield, tracking WNW'ly, indicating 1400ft; the C172 was 2·4nm WNW of the R44, tracking SW'ly, climbing through 900ft. By 1514:38, the C172 can be observed commencing a L turn cross-wind, climbing through 1100ft; the R44 is 2nm E, tracking WNW'ly, indicating 1300ft with what is believed to be the trailing R22 [R22(B)] visible on radar 0·5nm ESE of the R44. At 1515:21, the C172 can be observed to have steadied on the downwind leg indicating 1300ft, 0·6nm SW of the R44 (indicating 1400ft) and 0·5nm SW of the R22(B) before it fades from radar.]

At 1515:20, the R44 pilot informed TAC 1 that, "*we're level with a Cessna in the circuit at Duxford*."

[UKAB Note (2): The CPA occurs between radar sweeps as the R22(B) is next seen at 1415:33, having crossed ahead of the C172, in its 8 o'clock range 0·2nm. It is estimated that CPA is at about 1415:27, with R22(B) in the C172's 11 o'clock range <0·2nm.]

The pilots of R44 and the R22 operating in the centre of the formation, R22(A), reported visually acquiring the C172 at a range of approximately 2nms; the pilot of the trailing R22 [R22(B)] did not visually acquire the C172. The C172 pilot reported visually acquiring the R44 and first R22 [R22(A)] at a range of approximately 1nm and the second R22 [R22(B)] at approximately 0·3nm, which would equate to around 1515:24.

The investigation of this incident has highlighted a number of opportunities where the incident chain could have been broken. Points worthy of note relating to the aircrew aspects of the incident are the C172 pilot's uncertainty over the information passed to them by the FISO, his subsequent turn downwind into confliction and the fulfilment of the Rule 45 responsibilities placed upon the commanders of the mixed R44/R22 formation; albeit that it is reasonable to argue that the formation leader may have felt that TAC 1 had fulfilled this requirement for them by liaising with Duxford. Focussing specifically on the RAF ATM aspects of this Airprox, there are 2 issues that require examination; the acceptance by TAC 1 of the identity of the individual answering their landline call at Duxford and their understanding of the requirements of Rule 45.

Whilst the references are taken slightly out of context, the implied understanding contained within MMATM Chapter 9 Para 13 and Chapter 10 Paras 1 and 6 are that controllers must be able to determine that the person to whom they are conversing are in a recognised 'control' position and have the authority to be able to agree a course of action. In this instance, TAC 1 appears to have assumed that the individual at Duxford who answered the landline had the authority to agree a course of action because they answered the landline. That said, based upon the content and conduct of that conversation, it is reasonable to argue that TAC 1 would have been reassured that the individual at Duxford was knowledgeable and empowered to agree a course of action. Moreover, at no stage did that individual attempt to point out to TAC 1 that he was not authorised to conduct the liaison. Finally, it has not been possible to determine TAC 1's prior experience during Op OLYMPIC of dealing with minor aerodromes that operate with FISOs, to determine whether they had been conditioned into accepting a less formal type of liaison. However, the outcome from the conversation is clear; TAC 1 believed that Duxford had cleared the mixed R44/R22 formation through their ATZ and were content for the formation to remain on TAC 1's frequency. It has not been possible to determine how a non-operational phone number at Duxford was matched to the ATLAS Control DA button and was not detected during the Op OLYMPIC work-up and testing phase.

Subsequent investigation has determined that the ATLAS training package did not stipulate that different liaison and agreements were required dependent upon whether an aerodrome had an ATC unit or a FIS unit. Furthermore, whilst training for military ATCOs covers the provisions of Rule 45, it simplifies it by not discriminating between units with ATC or FISO units, stressing that the ATZ cannot be entered without the express permission of the controlling authority. On that basis, it is not reasonable to expect TAC 1 to have understood the specifics of liaising with a FISO unit operating within an ATZ at an aerodrome. Moreover, the training and experience that TAC 1 will have received prior to operating at ATLAS Control would have mirrored the conduct of the liaison call made to Duxford, thereby reinforcing their expectation that their course of action was correct.

During the investigation of this Airprox event a specific focal point was the wording of Rules of the Air Regulations 2007, Rule 45, specifically Paras 4 and 6a. The wording of Para 6a is explicit in stating the requirement for ac commanders to maintain a watch on the FIS unit frequency; however, the wording of Para 4 could be open to interpretation, as it does not specify where ac commanders should obtain information from. In this instance, it could be argued that the ac commanders may have considered that TAC 1 had fulfilled the responsibility for them by liaising with Duxford.

This is a stereotypical example of an incident where a series of unrelated events breached existing safety barriers and conspired to cause an Airprox. BM SM contends that, whilst there were a number of opportunities for individuals involved in the final incident sequence to have broken the chain and prevented the Airprox, the root cause was the pairing of a non-operational number to the Duxford DA line at ATLAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of all ac, radar video recordings, reports from the ATSU involved and reports from the appropriate ATC authorities.

Although there were several procedural errors highlighted by both ATSI and BM Safety Management leading up to the Airprox, Members agreed with the ATSI viewpoint that the there was a systemic issue which had caused the Airprox. It was due to an oversight in the planning phase of the Olympic airspace restricted area R112 that the significance of allowing ac to transit embedded ATZs without allowing pilots to obtain information in accordance with Rule 45 was not assimilated. ATLAS TAC 1 had attempted to coordinate the helicopter formation through the ATZ with a representative at Duxford who was not in a position to communicate relevant information on the cct and ATZ activity. It was unfortunate that the ATLAS Direct Access telephone had been programmed to ring the Duxford out-of-hours telephone number; however, TAC 1 did not challenge the Duxford representative's authority before continuing with his 'coordination' dialogue and the Duxford representative did not point out his non-operational status. That said, the information given by TAC 1 was passed onto the FISO who relayed it to the C172 flight; however, TAC1 was not made aware the cct was active. Therefore the R44 pilot was unaware of the C172's presence and believed that the formation was clear through the Duxford ATZ when told to route through the O/H at 1400ft. This resulted in the R44 formation transiting the Duxford ATZ through the cct pattern and into conflict with the C172 which caused the Airprox. Members commended the prompt actions taken by CAA after this Airprox to refine the ATLAS procedures.

Although the C172 pilot did not assimilate the formation's altitude, he climbed after sighting 2 of the helicopters crossing 1nm ahead through the downwind leg, well clear, whilst attempting to visually acquire the third, R22(B). Eventually he saw R22(B) <0·5nm ahead crossing from R to L about 200ft below and diverging, with no need for further action, estimating 300m separation at the CPA. The R44 pilot was undoubtedly surprised to see the C172 and made comment to TAC 1 although from his and the R22(A) pilot's perspective, the C172 was always going to pass safely clear of their 2 helicopters, estimating 1000m separation. Although the R22(B) pilot heard the R44 pilot's remark about the C172 to TAC 1, he did not see the ac converging from his L. Military pilot Members thought that the R44 pilot should have informed R22(B) pilot flying in trail of the C172's relative position as flight leaders are expected to ensure all members of the formation acknowledge TI on potential threats/conflicting traffic. Whether inter-formation RT communication calls were briefed beforehand or the R44 pilot thought the C172 was flying far enough away from all of the helicopters elements was not known. However, given the combination of the uncoordinated actions taken by all parties involved and the geometry revealed by the recorded radar, the Board were able to conclude that any risk of collision had been effectively removed.

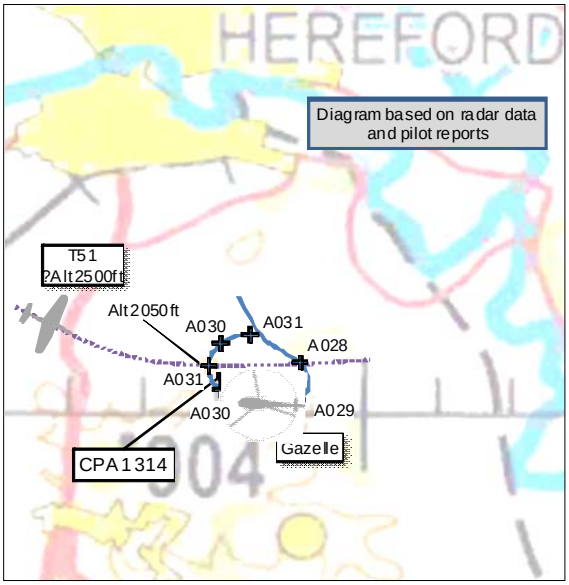
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the Duxford ATZ caused by an inappropriate procedure during the Olympic period.

Degree of Risk: C.

AIRPROX REPORT NO 2012103

Date/Time:	9 Jul 2012 1314Z	
Position:	5200N 00243W	(3nm S Hereford)
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Gazelle	Titan Mustang
Operator:	HQ AAC	Civ Pte
Alt/FL:	3300ft	↑1800ft↑
	(RPS NR)	(QFE)
Weather:	VMC CLBC	VMC CLBC
Visibility:	10km	>20nm
Reported Separation:		
	300ft V	1500ft V1800ft H
Recorded Separation:		
	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports established in the high hover at altitude 3300ft [RPS NR], 2nm NE of Hereford in a grey/green coloured helicopter with navigation lights and white strobes on. He was operating under VFR with a BS from London Information [124.750MHz], with a discrete squawk and Modes 3/A and C selected on. Mode S and an ACAS are not fitted. While in VMC, adjacent to cloud layers, heading 310° at 5kt, he saw a silver, low-wing, single-engine piston ac emerging from the cloud base in his 2 o'clock position, estimated at 200ft H and approximately 200-300ft V below him. He identified the ac as a P51 Mustang.

[UKAB Note(1): The subject ac was a Titan T51D Mustang, a ¾ scale homebuilt replica of the P51D Mustang long-range fighter].

He manoeuvred behind the Titan Mustang and saw it depart in his 10 o'clock position to the NW of Hereford at the same altitude. He heard the Titan pilot transmit on the London Information frequency that he was "close to the Gazelle" but he did not think the pilot was in receipt of a service at the time. The Gazelle pilot declared an Airprox to London Information and was given a phone number for the Swanwick Supervisors Office, whom he called after landing.

He assessed the risk of collision as 'Medium'.

THE TITAN MUSTANG PILOT reports carrying out a test flight of his homebuilt ac under VFR. He stated that it was one of many such flights during the development and test phase of his ac, and therefore that the details of the incident flight were from memory. The silver and olive drab coloured ac was not fitted with any external lights. The SSR transponder was 'normally on' with Modes 3/A and C. The ac is not fitted with Mode S or an ACAS. After departing from his home strip, 8.5nm WNW of Hereford, he took up a SE'ly heading and started a slow climb, at 120mph, to an intended altitude of 2500ft. He was not in receipt of an ATS but was 'monitoring' London Information [124.750MHz]. Passing altitude 1000ft in the climb he saw a Gazelle helicopter at a range of 3-4 miles, in the stationary hover approximately 4nm SW of Hereford. He stated that the Gazelle appeared to be just under the cloud base at a height in excess of 3000ft.

Because the Gazelle was stationary, and given the excellent view from its cockpit, he felt there was absolutely no danger [of collision]. He continued the climb and passed in front of the Gazelle at an altitude of approximately 1800ft. In the same period the horizontal separation went from 3 miles to approximately 1800ft, with a similar vertical separation.

About 15-20mins later he heard a call to London Information talking about a 'close call with a Mustang'. Although the reporting pilot said he had 'just managed to get behind the Mustang' he had difficulty believing that it was connected to the incident described, which had seemed to be a 'non-event' in his opinion.

He assessed there was no risk of collision.

THE LACC FISO reports that a Gazelle helicopter was under a BS from London Information when he and another unknown ac talked to each other over the RT. Shortly thereafter the Gazelle pilot requested to file an Airprox. The FISO passed a Swanwick telephone number and spoke to the pilot later that day. The pilot reported that he was hovering at 3200ft over Hereford town at 1318 when he noticed a silver P51 Mustang ac with yellow wing tips heading towards him. The Gazelle pilot positioned his ac to go behind the Mustang; he believed the Mustang was heading SE to NW and that the estimated miss distance was 200ft. The Gazelle pilot reported the Wx as cloudy with showers. The FISO believed the Mustang pilot was not in receipt of a BS with London Information but that he was maintaining a 'listening watch'. He also stated that London Information was busy dealing with departures from the Fairford Airshow.

ATSI states that an Airprox was reported by the pilot of a Gazelle helicopter when a Titan Mustang (T51) flew in proximity to him at approximately 3300ft in the vicinity of Hereford. The Gazelle pilot was in the hover at 3300ft on an operational flight and in receipt of a BS from London Information [124.750MHz], transponding Mode 3/A with a discrete squawk. The T51 was on a VFR development and test flight, operating from a home strip and monitoring London Information [124.750MHz].

ATSI had access to both pilot reports, including the T51 pilot's round-robin [planned] flight path diagram, recorded area radar and recording of the London Information frequency. Note: London Information provides a service without the aid of radar.

The Wx at Gloucestershire A/D, 20nm ESE of the Airprox location, was as follows:

METAR EGBJ 091320Z 21007KT 180V250 9999 FEW020 SCT034 18/12 Q1011=

Both pilots reported operating in VMC.

The Gazelle pilot called London Information at 1249 and a BS was established. He subsequently reported operating on RPS, although no pressure setting was given on the RTF. There was no further exchange between the Gazelle pilot and FISO until the Airprox was reported on the RTF at 1326.

The T51 pilot departed his home strip in a SE'ly direction, following a course which would take him midway between two known areas of intense aerial activity. The flight of the T51 was not recorded on area radar. The T51 pilot's Airprox report indicates that the ac was being flown at 1800ft on the QFE; its likely altitude, calculated from the available information, was approximately 2050ft. The elevation in the vicinity of the home strip being used is approximately 250ft.

The Gazelle pilot had been executing a RH turn of radius 0.2nm at a Mode C reported level of FL032 for about one minute when (at 1314:00) he made a short unintelligible transmission, followed by an unverified exchange between the Gazelle pilot and an unknown other pilot:

"[Gazelle C/S] *Roger saw it at last minute going approximately two to three hundred feet er in my 1 o'clock."*

"Er roger just confirm your er that was for the mustang?"

"Roger sir yer I turned away from you at the last minute er you just er came out I was just working a hole in the cloud."

At 1314:02 the Gazelle was orientated such that it was facing E. The Gazelle pilot continued the turn during the exchange, its level increasing to FL035 before descending again to FL032. At that time the Gazelle was 3nm S of Hereford (not 2nm NE as reported by the pilot).

The theoretical base of area radar coverage at the Airprox position is approximately FL020. The T51 pilot reported that his SSR transponder was 'normally on' but the ac was not seen on the radar recording. However, a transponding ac at the reported level in this location may not be detectable by the available area radar coverage.

ATSI reviewed the available meteorological pressure data and calculated the altitude of the Gazelle as being 3140ft (QNH 1011hPa). Therefore, the evidence presented indicates around 1000ft V distance between the two ac. However, the Gazelle pilot indicates 'working a hole in the cloud' and therefore it may be likely that, given the poor horizontal visual references, perception of vertical distance may have been reduced. The Gazelle pilot was unaware of the T51 ac's presence prior to its first being sighted and both of these factors may have influenced the Gazelle pilot's estimation of the vertical distance between the two ac.

The Gazelle pilot was in a R turn when he saw the T51 which, from RTF, he saw in his 1 o'clock position and which continued away in an E'ly direction.

The Airprox was reported when the Gazelle pilot, in the process of executing a RH turn through E, observed a T51 ac appear in his 1 o'clock position. The Gazelle pilot was unaware of the presence of the T51 prior to it being observed.

HQ JHC comments that the Gazelle was being were operated in accordance with Current Military Regulations and the Air Navigation Order 2009. The aircraft was being flown single pilot, carrying out a high workload task requiring the maintenance of a high hover with few references. The selection of a BS from ATC was appropriate for the task. Additionally given the theoretical radar coverage base as being FL020, little chance of timely TI from ATC would have been gained from having a TS. JHC HQ concurs with the likely reported vertical distance being smaller than actual due to the high workload and poor likely horizontal visual references from the Gazelle cockpit. Despite this it is disappointing that the T51, although maintaining a listening watch on London info (124.750MHz), having seen the Gazelle did not check in or use a blind call to alert the other aircraft of his position and intentions to pass underneath whilst climbing.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board initially considered Human Factors concerning the Gazelle pilot's workload, visual cues and late visual acquisition of the Titan Mustang. The Mil Helicopter Member observed that the Gazelle is a difficult helicopter in which to maintain a high hover and that the pilot's workload would have been increased further as he was likely instructing a crewman in his duties. Some Members opined that the difference in reported miss-distances may have been due to differing physiological factors experienced by each of the pilots; the combination of potentially poor horizontal range information and late visual acquisition may have lead the Gazelle pilot to underestimate the separation range. A civilian helicopter Member highlighted apparent discrepancies in the various reports concerning the orientation of the Gazelle and pointed out that at low airspeeds the airframe orientation was not necessarily directly related to the ground track direction obtained from radar recording. He opined that in this case, despite the ground track information obtained from radar, the Gazelle pilot would likely have been holding a constant heading into wind until he saw the Titan Mustang and rudder turned behind it.

Several Members commented on the requirements of the RoA, specifically Rule 8 (Avoiding Aerial Collisions), para 4, 'An aircraft which is obliged by this Section to give way to another aircraft shall avoid passing over or under the other aircraft, or crossing ahead of it, unless passing well clear of it.' Despite the fact that the Titan Mustang pilot passed under the Gazelle, all Members agreed that he had seen the Gazelle at range and had passed well clear, approximately 1000ft below. The CAA Flt Ops Advisor also reiterated the requirements of the RoA Rule 28 (Flight Outside Controlled Airspace), para 2, under which pilots are required to remain 1500m H and 1000ft V clear of cloud, in flight visibility of at least 5km, if above 3000ft amsl.

The subject of RT utilisation was also discussed with some Members opining that the Titan Mustang pilot would have been better advised to make an information call of his intentions when he saw the Gazelle or that the Gazelle pilot could have given periodic position calls, notwithstanding his high workload. Other Members disagreed and were of the opinion that multiple transmissions on an Information frequency by all pilots using it would render it unusable. However, Members agreed that both pilots were operating correctly under VFR in Class G airspace,

that they had both seen each other and that the Titan Mustang pilot passed sufficiently clear of the Gazelle, albeit surprising the Gazelle pilot in the process.

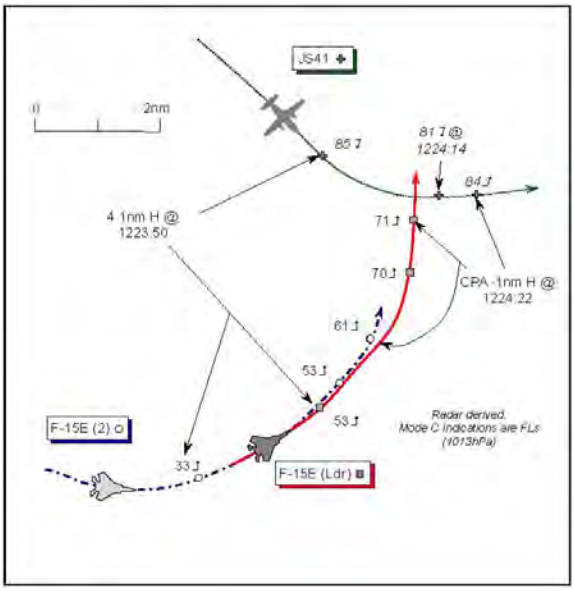
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Gazelle pilot was concerned by the apparent proximity of the Titan Mustang.

Degree of Risk: E.

AIRPROX REPORT NO 2012104

Date/Time:	19 Jul 2012 1224Z	
Position:	5401N 00020W (26nm N of Humberside Airport)	
Airspace:	AIAA/FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	JS41	F-15E x2
Operator:	CAT	Foreign Mil
Alt/FL:	FL80↓	FL66↑
	SAS	SAS
Weather:	IMC In Cloud	VMC CLOC
Visibility:	NR	unlimited
Reported Separation:	1000ft V/1nm H	1500ft V/1·3nm H
Recorded Separation:	1300ft V @ 1nm min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 (JS41) PILOT reports he was inbound to Humberside from Aberdeen under IFR at 240kt; the assigned squawk was selected with Mode C, Mode S and TCAS is fitted. They had been handed over by ScATCC (Mil) to Humberside RADAR on 119·125MHz, under a DS descending to FL55, heading 165° to OTTRINGHAM (OTR). About 28nm N of Humberside descending IMC in cloud, RADAR advised them of 2 military ac contacts at low-level in their 2 o'clock; the controller's intentions were to route the flight to the E and down the E Coast, giving further separation under radar vectors. The military traffic – the flight of 2 F-15E ac - could be seen on TCAS from a range of about 12nm and was being monitored by both himself and his 1st Officer. RADAR instructed them to stop decent at FL60 and turn L heading 090° to avoid the F-15s; these instructions were complied with but the F-15s were then seen on TCAS climbing 'sharply'. TCAS enunciated a TA 'TRAFFIC', followed by a CLIMB RA, which was complied with. RADAR was informed of the TCAS RA and the F-15s passed about 1nm astern; minimum vertical separation was 1000ft. TCAS then enunciated CLEAR OF CONFLICT, RADAR was informed and a radar vector issued for recovery to Humberside. He assessed the Risk as 'medium'.

The ac has a blue and white livery; the HISLs were on.

THE F-15E PILOT [F-15E (Ldr)], reports he was the leader of a flight of 2 F-15E ac operating in the Vale of York and LFA 11 for low-level training. Earlier, when he informed the ScATCC (Mil) controller his flight would be entering LFA11 N of Whitby and exiting at Driffield, the controller had advised that upon completion of the low-flying phase of the sortie, he should call Scottish MILITARY on the ICF 277·775MHz. At about 1223:15, he exited LFA 11 at 400kt with his wingman – F-15E (2) - 2nm in trail. Weather was prevalent from 2000ft agl to FL60; however, he found a hole in the weather and climbed up through it whilst contacting Scottish MILITARY on 277·775MHz requesting a climb to FL100. At the same time, flying about 500ft clear above cloud in a L turn, the flight obtained radar contact on another ac – the JS41 - on a bearing of 045° at a range of 2·5nm some 2500ft above his ac. Scottish Military instructed him to squawk A4611, but simultaneously with this transmission, he became visual with the traffic – a blue/white twin – and instructed his wingman to level off below FL70, whilst directing the flight to turn L 'towards the traffic to ensure deconfliction by ensuring 3/9 passage'. He elected to turn toward the JS41 and remain below it to ensure that the other ac's flight path would not be a 'factor' for his wingman who was exiting the LFS behind him. Recorded AI radar data showed that his ac [F-15E (Ldr)] passed 1·3nm behind and 1500ft below the JS41. No other 'callout' from Scottish Military was received by the flight until the JS41 was well past. He assessed the Risk as 'none'.

The ac has a dark grey paint scheme with red/green/white external lighting.

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THE HUMBERSIDE RADAR CONTROLLER reports that he was providing a DS to the inbound JS41 crew, descending through FL80. Traffic information had been given to the JS41 crew on two A7001 squawks observed some 10nm SE of the JS41 indicating 1500 – 2500ft ALT, when the lead ac appeared to commence a climb whilst paralleling the JS41, whose descent was restricted. The lead ac then turned L toward the JS41; avoiding action and further TI was issued to the JS41 crew, who acknowledged the avoiding action and then reported a TCAS RA. Minimum separation was 500ft vertically/1½nm horizontally.

THE ScATCC (MIL) PRIMARY TACTICAL SOUTH CONTROLLER (TAC SOUTH) reports that the flight of two F-15Es were operating low-level in the Vale of York when F-15E (Ldr) free-called on the ScATCC (Mil) Southern ICF. F-15E (Ldr) did not pass a position report other than the flight was exiting LFA11 requesting a TS in a block from the surface to FL240, for general handling in the Vale of York. F-15E (Ldr) was allocated a squawk of A4611 and the crew asked to report their level passing; he was then asked to confirm the squawk. The squawk was observed to come on and the wingman – F-15E (2) - also requested a squawk; A4612 was allocated, the ac identified and placed under a TS. The controller then noticed a Humberside squawk – the JS41 - about 3nm to the NE of the F-15E flight descending through 8000ft; this ac took, what appeared to be, an avoiding action turn to the E. Both F-15Es were now on a NW'ly heading, he thought. He did not deem it necessary to pass TI to the F-15E flight about the JS41 or stop the flight's climb, although they were climbing through the level of the JS41. The F-15E flight was on a heading which was taking them away from the JS41 that, in his view, 'was not a factor'.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a JS41 in receipt of a DS from Humberside APP and a flight of 2 F-15Es, in communication with Primary TAC South at ScATCC (Mil).

The incident sequence commenced at 1221:08, as an unrelated ScATCC (Mil) controller completed the handover of the JS41 to Humberside RADAR. The JS41 was 9.5nm NNE of F-15E (Ldr), tracking SSE'ly, descending through FL127; F-15E (Ldr) was tracking WNW'ly, indicating 2300ft, with F-15E (2) 2nm in trail, indicating 1900ft. Consequently, at this point, the F-15E flight was not conflicting with the JS41.

At 1223:41, the lead F-15E crew free called Primary TAC South, "*off low fly 11 in the climb 0-5-0* [FL] *for the block surface to 2-4-5* [unintelligible] *airspace*." At this point, the JS41 was 5.4nm N of F-15E (Ldr), tracking SE'ly, descending through FL88; F-15E (Ldr) was turning L NE'ly, climbing through FL41. Primary TAC South replied, "[F-15E (Ldr) C/S] *squawk 4-6-1-1 with ident and confirm your level passing*" but was asked to repeat the squawk and said, "[F-15E (Ldr) C/S] *squawk 4-6-1-1 with ident and do you require a squawk for number 2*?" At 1224:11, F-15E (Ldr) read back, "*4-6-1-1 with a flash, affirm*."

CAP 413 Chapter 3 Para 1.5.1 states that the initial call of a VFR flight to an ATS unit should state the ATS Unit's C/S, the ac's C/S and the type of ATS being requested and that the ATS unit will respond with 'Pass Your Message'. CAP 413 Chapter 3 Para 1.6.2 goes on to state that when ac commanders are 'instructed by the ATS unit to "Pass Your Message", the reply should contain the following information, whenever possible in the order specified: ac C/S or type, departure point and destination, present position, level and additional details or intentions.

At 1224:12, the JS41 entered a turn onto E and levelled at FL81 prior to commencing a climb at 1224:24; this accords with the pilot's report of their response to a TCAS CLIMB RA and the deconfliction advice offered by Humberside APP. At the same time, F-15E (Ldr)'s assigned squawk appeared on the surveillance display. At this point, F-15E (Ldr) was 1.6nm S of the JS41, levelling at FL70 and turning L onto a N'ly track.

[UKAB Note (1): The CPA occurred at 1224:22 as F-15E (Ldr) passed 1nm WSW of the JS41, tracking N, indicating FL71; the JS41 was maintaining an E'ly track now climbing through FL84 some 1300ft above F-15E (Ldr).]

At the time of the CPA, Primary TAC South was involved in an exchange of RT with F-15E (2) and identified F-15E (2) at 1224:39. F-15E (Ldr) was not formally identified, nor, as the controller reports, was TI passed to either element of the F-15E flight about the JS41.

Given the nature of the initial RT exchange between the pilot of F-15E (Ldr) and Primary TAC South, the controller had little information to cue them to the F15E flight's location, nor proximity to the JS41. Consequently, given the time between F-15E (Ldr)'s squawk being displayed and the CPA, Primary TAC South had no time in which to affect the outcome of the occurrence. Whilst the ScATCC (Mil) Unit investigation has identified that their

controller's initial response to the pilot of F-15E (Ldr) was not in accordance with CAP 413, it is likely that the flight leader's response to an instruction to 'pass your message' would have taken approximately 17secs. Even if the controller had been able to correlate a 'standard' position report, transmitted in accordance with CAP 413, with F-15E (Ldr)'s displayed SSR conspicuity code, the controller would only have had about 7secs in which to assimilate the information and pass a warning to the pilot of F-15E (Ldr) about the JS41. Consequently, BM SM contends that whilst it is noteworthy that the RT phraseology used by both the pilot of F-15E (Ldr) and Primary TAC South was not in accordance with CAP 413, it was neither causal nor contributory to this Airprox.

The timing of the sequence of events compromised the ability of the military ATM safety barrier to operate. However, the crew of F-15E (Ldr) was able to acquire the JS41 on radar and then visually, enabling the flight leader to discharge his responsibility to 'see and avoid' other ac. This was complemented by the action of TCAS onboard the JS41 and the deconfliction advice offered by Humberside APP under their DS.

ScATCC (Mil) has re-briefed all controllers on the use of phraseology in accordance with CAP 413 Chapter 3 Para 1.5.1 and Chapter 3 Para 1.6.2.

ATSI reports that the JS41 crew departed Aberdeen inbound to Humberside, IFR, in receipt of a DS from Humberside RADAR on 119.125MHz. The F15E flight was on a VFR training flight and reported being in receipt of a BS from ScATCC (Mil) on UHF.

Humberside RADAR provides surveillance services through use of a local 10cm primary radar and feed from the nearby Claxby Radar source. The JS41 crew called Humberside RADAR at 1221:30, 33nm NNW of Ottringham VOR (OTR), in the descent to FL55 passing FL120 on track OTR. The controller identified the JS41 and a DS was agreed. The JS41 crew was then informed that vectors would be issued for an approach to RW20 and requested to continue on their present heading of 160°.

ATSI noted that prior to establishing RT contact with RADAR the JS41 had been squawking A4641, which is allocated to Scottish MILITARY Radar. A squawk of A4251 was then selected prior to handover to Humberside. As this code is allocated to Humberside RADAR it is assumed that prior co-ordination between Scottish MILITARY and Humberside Radar had taken place.

At 1222:00, when the initial exchanges with RADAR were complete and the JS41 was descending through FL112, there were two ac [the F-15 E flight] squawking A7001 about 9nm SW of the JS41 that were established in a LH race track pattern indicating between 1700 and 2000ft Mode C (1013hPa).

At 1222:30, RADAR gave the JS41 crew TI on the two A7001 contacts, which were approximately 10,000ft below and instructed the crew to turn L onto a heading of 140°. RADAR stated that the plan was to take the JS41 towards the coast as the, "*traffic could climb at any time.*"

SSR code A7001 is allocated for military fixed-wing low level conspicuity/climb out. The code is unvalidated and unverified and may be selected at the pilot's discretion. It is notified for use in the UK Low Flying System and it will be retained on climb-out by ac until alternative instructions are passed by an ATC unit.

By 1223:04, the two A7001 contacts had broken from their racetrack pattern onto a SE'ly track and had climbed to 2600 - 2800ft Mode C (1013hPa). The JS41 was now established on a track of 140°.

At 1223:30, the JS41 crew was instructed to stop descent at FL60. The level of the two A7001 F-15E contacts continued to indicate that they were climbing and now turning onto a track perpendicular to the JS41. After acknowledging the first stop descent instruction, the JS41 crew was instructed to stop descent at FL65.

At 1223:40, RADAR instructed the JS41 crew to, "*turn left heading 0-9-0 degrees..traffic was south 7 miles manoeuvring indicating 3 thousand 7 hundred feet climbing squawking low level."* Without waiting for a response from the JS41 crew, RADAR upgraded the instruction, "*now avoiding action turn left heading 0-9-0 degrees* (1223:50) *traffic was south 4 miles tracking towards indicating flight level 5-0 climbing.*"

The Deconfliction Minima (DM) against unco-ordinated traffic are: 5nm laterally (subject to surveillance capability and CAA approval); or 3000ft vertically and, unless the SSR code indicates that the Mode C data has been verified, the surveillance returns, however presented, should not merge.

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At 1223:47, the JS41 was passing FL87 and the more proximate A7001 contact [F-15E (Ldr)] was in the JS41's 1 o'clock - 5nm, crossing R - L, indicating FL45. The second A7001 [F-15E (2)] was 2nm behind the first, on the same track and indicating 1400ft below it.

About 13secs later, at 1224:00, RADAR updated the TI to the JS41, to which the crew responded, at 1224:10, "*TCAS R-A.*" RADAR responded, "*roger.*" At this time the vertical distance between the JS41 and the F15 reduced below the 3000ft DM to 2200ft - see Figure 1.

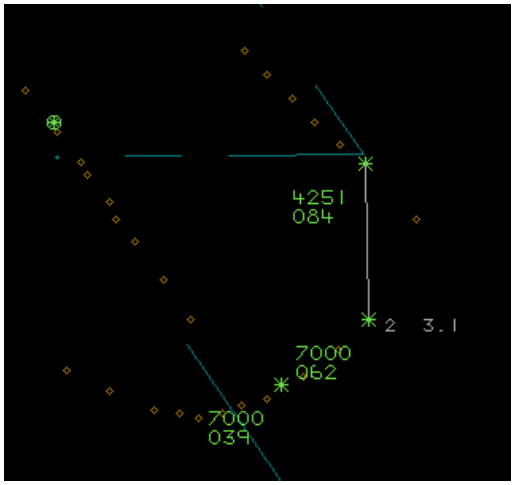


Figure 1: Claxby Radar 1224:00.

As F-15E (Ldr) neared the JS41 its Mode A SSR code was recycled (hence Figure 1 above showing A7000) and at 1224:07, its SSR code became A4611.

The JS41's turn onto 090° was observed to take full effect at 1224:14. The JS41 was now at FL81 with F-15E (Ldr) in its 4 o'clock, range 1.3nm, and indicating 1100ft below the JS41 - see Figure 2.

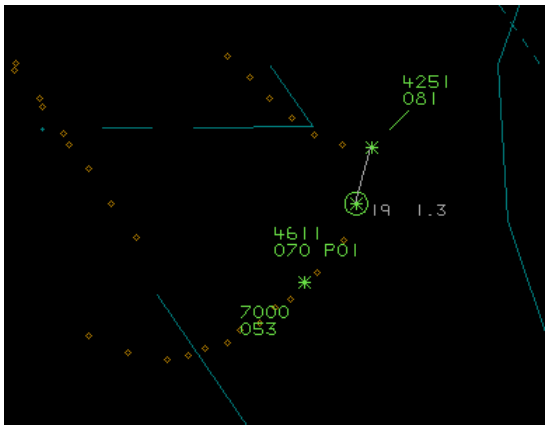


Figure 2: Claxby Radar 1224:14.

On the next update of the radar replay the JS41 had climbed 300ft, with F-15 (Ldr) passing 1nm behind and 1300ft below the JS41 - see Figure 3. Thereafter the lateral distance between the JS41 and the F-15E flight began to increase as the JS41 climbed to a maximum level of FL87.

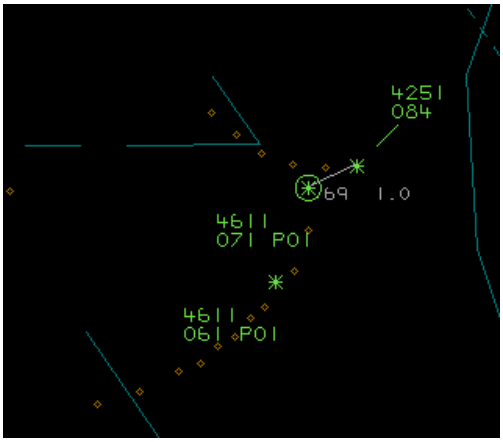


Figure 3: Claxby Radar 1224:23.

At 1224:50, RADAR informed the JS41 crew that the traffic was now routeing towards the NW and the JS41 crew confirmed they were CLEAR OF CONFLICT.

DM of 5nm was re-established between the JS41 and the second ac of the conflicting pair – F-15E (2) - at 1225:02.

The JS41 crew was given further vectors and descent for the approach to Humberside Airport. RADAR informed the JS41 crew at 1228:10 that, "*I've just spoken to Scottish Mil they* [the F-15E flight] *were operating low level and just weren't speaking to anybody* [when they commenced the climb]."

Within 1min of the JS41 crew's initial call, RADAR recognised the potential for conflict with the two F-15E ac operating low-level/climb-out nearby. By issuing a 20° L turn, RADAR took action to begin to try to maintain DM. One minute later, RADAR issued vertical instructions, recognising that the conflicting traffic was now climbing. Avoiding action was promptly given; however, 30sec later DM were lost.

ATSI was unaware what information, if any, the F-15 flight had on the conflicting JS41. However, as a recycling of their SSR Mode A codes is shown during the confliction then, it is possible they were only apprised of the conflict during this time.

The Airprox occurred when the F-15(E) flight climbed out from low-level and into confliction with the JS41 inbound to Humberside Airport.

The JS41 crew, in receipt of a DS from Humberside RADAR, was given prompt information and deconfliction advice, however, DM were not achieved for about 1min.

USAFE-UK comments that this was an encounter in Class G airspace where the Humberside controller and the crews of each of the aircraft took prompt and effective action; the Scottish MILITARY controller was not in a position to prevent the technical loss of separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The F-15E Ldr intended to operate from the surface to FL245 - a large tract of airspace in the AIAA; some Members contended this was not a wise place for the flight to be conducting GH, which the USAFE-UK advisor suggested might reflect a lack of familiarity with UK airspace. The BM SM report highlights the absence of a suitable position report in the F-15E Ldr's initial call that he was, "*..off low fly 11 in the climb..",* which was of little practical help to the controller. Members agreed that if an accurate position had been included in the F-15E Ldr's call this would undoubtedly have helped TAC South focus on the flight's location a lot quicker, rather than having to scan a wide area of airspace for the requisite squawk amongst a myriad other background tracks within the congested airspace of the Vale of York AIAA. In that case, however, Members noted that only around 7sec would

have been available to the controller in which to locate the flight if he was to give a warning about the proximity of the JS41 to the F-15E Ldr. Here, in the intervening 11sec from the F-15E Ldr's acknowledgement of the squawk to the CPA, TAC South was unable to proffer any TI and, although one controller Member believed that TAC South should have been able to spot the conflicting JS41 and say something about it, the Board agreed that TAC South was not well placed to affect the outcome. As it was, simultaneously, the F-15E's AI radar was already enabling the lead crew to acquire the JS41 whilst they were calling ScATCC (Mil), recognise the confliction with their ac plus the wingman and take sound avoiding action by levelling off and turning to pass clear astern of the JS41. Nevertheless, the F-15E Ldr's reported visual sighting range of 2·5nm suggested to one fast-jet pilot Member that this was a late sighting. It was the F-15's turn, taking the flight's projected upward vector ahead of the JS41 that triggered the latter's TCAS CLIMB RA. However, the JS41 crew's resultant climb was only evident on the recorded radar data at the CPA; hence, the F-15E Ldr's avoiding action turn and stop-off was instrumental in resolving the conflict, before TCAS could do so independently in the vertical plane. This was not meant to suggest that the JS41 crew was in any way tardy in their response to the RA or the avoiding action issued by RADAR. Rather, the incident provided an example for all pilots, but particularly those flying high performance aircraft, of the importance of not sweeping their flight vector through the 'TCAS bubble' ahead of an airliner to prevent undesirable reactions by TCAS. However, TCAS has proven its worth repeatedly and the message here was 'promptly follow the RA'.

The Board commended the Humberside RADAR controller for his sound appreciation of the situation when he observed the fast-moving F15Es, squawking A7001 at low-level, and recognised the potential for a conflict with the JS41 if the unknown ac climbed out of the LFS. By promptly turning the descending JS41 and subsequently stopping the descent at FL60 he showed sound forward planning in attempting to achieve more room to manoeuvre at an early stage and give the jets as wide a berth as feasible. However, once the F-15E flight turned L and climbed rapidly ahead of the JS41, controller Members recognised the only feasible avoiding action was to turn the JS41 eastbound and pass TI, endeavouring to try and direct the crew's eyes onto the conflicting F-15Es. Unfortunately, the speed differential between the jets flying at 400kt against the slower JS41 descending at almost half the F-15E's speed was too great to enable planned DM to be achieved. Consequently, horizontal separation reduced to 1nm; however, the combination of the F-15E flight's turn and level off, coupled with the JS41 crew's compliance with the avoiding action issued by RADAR ensured that 1300ft of vertical separation was preserved at the closest point as the jets passed clear astern of the JS41 climbing in response to the RA. The Board concluded, therefore, that this Airprox had resulted from a conflict in Class G airspace that was resolved by the crews involved and ATC, with their combined actions effectively removing any Risk of a collision.

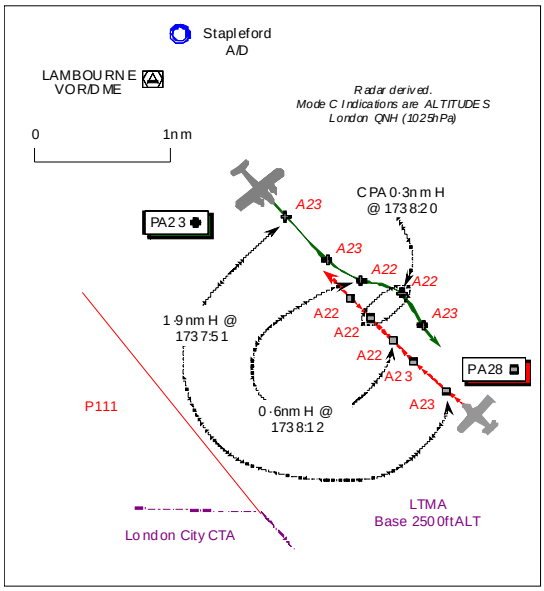
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace resolved by the crews involved and ATC.

Degree of Risk: C.

AIRPROX REPORT NO 2012105

Date/Time:	22 Jul 2012 1738Z	(Sunday)
Position:	5137N 00012E (3nm SE of Stapleford.)	
Airspace:	Restricted Zone R112	(Class: G.)
	Reporting Ac	*Reported Ac*
Type:	PA23	PA28
Operator:	Civ Pte	Civ Pte
Alt/FL:	2400ft	2200ft
	QNH (1025hPa)	QNH (1025hPa)
Weather:	VMC CAVOK	VMC NR
Visibility:	50nm	10km
Reported Separation:		
	Nil V/150m H	NR
Recorded Separation:		
	Nil V/0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER PA23 AZTEC PILOT reports he was inbound to Biggin Hill VFR with two other qualified pilots on board as passengers. In transit at 2400ft London QNH (1025hPa), he was receiving a TS from ATLAS CONTROL [at LATCC (Mil)]. There was no cloud and the visibility was unlimited; his passengers had been briefed to keep a lookout, but they were also admiring the view across London. Approaching the vicinity of Damyn's Hall A/D, heading 160° at 155kt the controller called 'opposite direction traffic half a mile [he thought - actually 2nm] same level'. His passenger in the RH seat first spotted the other ac [the PA28] about 400m away at the same level and pointed to it. He acquired it about 1sec later – a white low-wing single engine ac – about 300m away in a level cruise slightly offset to their R. Aware of P111 immediately to their R, he did not want to turn R (rule 10), which would have been directly towards the Olympic Site and unexpected, so he disengaged the A/P and broke hard L – probably into a 60° banked turn. He lost sight of the PA28 in the turn, but his passenger reported it passing down their RH side about 150-200m away and cleared in 2-3secs. Minimum separation was about 150m at the same altitude and the Risk 'high'. He reported the Airprox to ATLAS CONTROL about 1min after the event.

THE PIPER PA28 PILOT reports he was inbound to Elstree from Le Touquet VFR, routeing DVR – DET – LAM – BPK – Elstree in receipt of a BS from ATLAS CONTROL on 119.225MHz. He elected to route LAM to BPK to avoid the London Prohibited Zone P111 and also to keep out of the Stansted CTA, whereas his normal route back to Elstree would have taken him over the Northern part of the Lea Valley to Potters Bar. He was concerned prior to the flight that many other ac might be using the same routeing to avoid both the Olympic Prohibited Zone - P111 - and the Stansted CTA and the narrowest point (East of Cheshunt) is a corridor just 1.8nm wide. As a result of the risk assessment he was aware that he needed not only to be extremely careful to hold his heading in order to avoid CAS, but he was also concerned to keep a greater lookout than normal for other ac taking the same track. He can recall briefing his passengers at or around the point of the Airprox to help by keeping a good lookout for other ac but otherwise not to disturb him as he needed full concentration at this point. In transit at a level cruising altitude of 2200ft London QNH (1025hPa) in VMC, heading 315° at 112kt at apposition 3nm SE of Stapleford, neither he nor his passengers saw the PA23 flown by the reporting pilot.

Many lessons have been learned from this Airprox, in particular that the narrow route created by the airspace restrictions represents a potential danger zone, which he fully intends to avoid in future. He is very surprised that despite the extra planning and thinking, he did not spot this PA23.

THE LATCC (Mil) ATLAS CONTROL TACTICAL CONTROLLER 3 (TAC 3) reports that he was one of 3 controllers operating in the northern portion of R112. The PA23 was sent to him due N of R112 and proceeded inbound to Biggin Hill. The ac transited between the London/Luton and London/Stansted CTR's at altitudes between 2000 – 2400ft London QNH (1025hPa). Once 3nm N of P111, the PA23 turned onto a SE'ly heading

direct for Stapleford A/D. He had already arranged a crossing of Stapleford ATZ, however the pilot opted to overfly above the Zone. Traffic information was given on a contact as 'Traffic 12 o'clock 4 miles opposite direction similar level.' Seeing this track as an obvious confliction he called the traffic again at 1nm. The PA23 pilot responded 'visual, avoiding action'. He interpreted this to be the pilot asking for an avoiding action turn and he suggested a heading of 070°, however, the PA23 pilot stated that he did not ask for a turn, but was merely advising him that he had taken avoiding action. After a brief period of silence, the PA23 pilot stated he wished to file an Airprox; the details were obtained from him on frequency and the SUPERVISOR informed.

BM SAFETY MANAGEMENT reports that this Airprox occurred between the PA23 operating VFR in receipt of a TS from ATLAS CONTROL TAC 3 and the PA28 operating VFR in receipt of a BS from ATLAS CONTROL TAC 1.

TAC 3 reports their workload was low with 3 ac on frequency and routine task complexity. The unit did not obtain a report from TAC 1, nor impound the RT and associated landline recordings. However, the Unit did complete a brief analysis of the incident in the immediate aftermath and their notes were made available to BM SM.

The unit determined that TAC 1's workload was high with 4 to 5 ac on frequency; no comment was made on the complexity of the task. However, it is accepted that the ATLAS CONTROL task was complex, with controllers operating in unfamiliar airspace of known complexity with relatively high volumes of traffic. The unit's analysis of TAC 1's RT determined that no warning was passed to the PA28 pilot about the proximity of the PA23.

TAC 3 passed TI on the PA28 to the pilot of the PA23 at 1737:51 stating, "..*traffic 12 o'clock, 2 miles, opposite direction, similar height*." At this point, the PA28 was 1.9nm SE of the PA23, tracking NW'ly indicating 2300ft; the PA23 was tracking SE'ly, indicating 2300ft. The pilot of the PA23 replied that he was, "..*looking*" and, at 1738:06, transmitted, "*avoiding action* [PA23 C/S]." TAC 3 reports that he believed that the PA23 pilot was requesting avoiding action and replied, "*I'd suggest a left turn heading 0-7-0 degrees*." The PA23 pilot then advised TAC 3, "..*we've seen him we're just taking avoiding action*." At the point that TAC 3 offered the avoiding action, the PA28 was 0.8nm SE of the PA23, slightly R of the PA23's 12 o'clock, tracking NW'ly, indicating 2300ft London QNH (1025hPa); the PA23 was tracking SE'ly, indicating 2400ft London QNH (1025hPa). The pilot of the PA23 reported that the RH seat passenger sighted the PA28 first at a range of approximately 400m (0.2nm). The pilot of the PA28 reported that they did not sight the PA23 at any point during the Airprox.

The guidance material in CAP774 Chapter 3 para 5 states that:

'Controllers shall aim to pass information on relevant traffic before the conflicting aircraft is within 5 NM, in order to give the pilot sufficient time to meet his collision avoidance responsibilities and to allow for an update in traffic information if considered necessary'.

This section also states that 'high controller workload and RTF loading may reduce the ability of the controller to pass traffic information, and the timeliness of such information'.

The PA23 pilot's L turn to avoid the PA28 is evident on the radar replay at 1738:12. The CPA occurred at 1738:20 as the PA28 passed 0.3nm SW of the PA23, with both ac indicating co-altitude at 2200ft London QNH (1025hPa). Projecting the tracks of both ac prior to the PA23's turn demonstrated that 0.1nm horizontal separation would have existed at the CPA, had the PA23 pilot not turned to avoid the PA28.

Due to the paucity of available information, it has not been possible to determine whether there was an opportunity for TAC 1 to provide a warning to the pilot of the PA28 on the PA23; however, the implication from the unit's brief analysis is that TAC 1's workload prevented them from providing such a warning.

Given TAC 3's low workload, it is reasonable to argue that an earlier opportunity existed for them to fulfil their requirement within CAP774 to pass TI to the pilot of the PA23 before lateral separation reduced below 5nm. Moreover, the format of the TI passed was not in accordance with CAP413. Importantly, however, the TI succeeded in alerting the pilot of the PA23 to the PA28's presence and facilitated their visual acquisition of the PA28. Furthermore, the controller, believing that the PA23 pilot had requested deconfliction advice against the PA28, provided a sensible course of action to discharge their responsibility to prevent a mid-air collision.

Notwithstanding that the pilot of the PA28 did not acquire the PA23 visually and that the TI passed by TAC 3 to the PA23 crew was later than ideal, the TI was timely enough to alert the PA23's crew and facilitated their ability to 'see and avoid' the PA28.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a transcript of one of the relevant RT frequencies, radar video recordings, reports from one of the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board were dismayed that ATLAS CONTROL had not ensured that TAC1 contributed a report, nor had the Unit ensured that TAC1's RT frequency and landlines been impounded for the investigation. However, the Board noted that the incident occurred during the first live week of the Olympic airspace restrictions when procedures may have been still bedding down. Given the helpful insight provided by the BM SM report, coupled with the recorded radar data, the Board considered that sufficient information was available to assess this Airprox.

A civilian area controller Member questioned whether the sectorisation of ATLAS CONTROL, which was the ATCRU operating within R112 outwith established CAS, was appropriate as the two ac involved were allocated to different controllers despite their pilots planning virtually reciprocal tracks. The Member thought this unwise and it would have been better to have allocated the two flights to the same controller, minimising any potential requirement for co-ordination. The Board's ASACS Advisor suggested that whilst this would have been the ideal, it was not always feasible. Another controller Member asked if the flight data for the traffic flight-planned through the Olympic airspace was available to other controllers to interrogate in 'real time'. Whilst this was feasible, the Board was told that because the squawk allocation was random and not aligned to the controller operating position providing the ATS, another ATLAS controller would not be able to instantly recognise which ATLAS controller was working which track unless he actively interrogated the flight data. On a slightly different tack, some civilian controller Members wondered if there was a misperception here on the part of GA pilots as to the level of control afforded traffic transiting R112, insofar as this known traffic environment was created for security purposes rather than the provision of an ATS, which remained the normal ATSOCAS available to pilots in Class G airspace; ATLAS was, in effect, a 'super LARS' unit. Consequently, it was important to stress that 'see and avoid' prevailed in the Class G R112 and it was up to the pilots to state the ATS required; in the scenario assessed here, each pilot was responsible for sighting the other ac, whether TI or a warning was provided or not, and for affording appropriate separation.

The PA28 pilot, under a BS from TAC1, reports that he did not receive any advance warning from the controller on the conflicting PA23 ahead; given the similarity of the indicated transit altitudes of both ac evident on Mode C to both controllers and the geometry of the encounter, the Board agreed a warning would certainly have been justified. However, there was no STCA available to highlight the conflict to the controllers and, for whatever reason, it seems that no warning was forthcoming from TAC1. Nevertheless, the PA28 pilot had a responsibility to sight the PA23 and avoid it as necessary. It was unfortunate that he was unable to do so.

The reporting PA23 pilot had wisely obtained a TS to supplement his lookout and that of his pilot passengers. Nevertheless, the BM SM report suggests that with TAC3's low workload, an earlier opportunity might have existed for the controller to pass TI at a range greater than the 1.9nm it was given and before horizontal separation reduced below 5nm. Nonetheless, having received TI, Members estimated from the timings of his transmissions to TAC3, that the PA23 pilot saw the PA28 no less than 0.8nm away and therefore more than the 300m he had reported. Having seen the PA28, the PA23 pilot then immediately turned L to avoid it, which ensured the two ac passed no closer than 0.3nm abeam the recorded radar data revealed. In these circumstances some Members thought this was a late sighting. However, others recognised that with the two ac approaching head-on, or nearly so, both of small cross-sectional area, with virtually no crossing motion to draw the other pilots attention to it, they would have been equally difficult to spot. So the PA23 pilot, aided by his passengers and the TI given probably saw the PA28 in reasonable time. Whilst not unanimous, an overwhelming majority of the Members concluded that this Airprox had resulted from a conflict in Class G airspace resolved by the PA23 pilot, whose avoiding action had proved wholly effective. This, coupled with the minimum separation evinced by the radar recording, convinced the Board that any Risk of collision had been effectively removed.

AIRPROX REPORT No 2012105

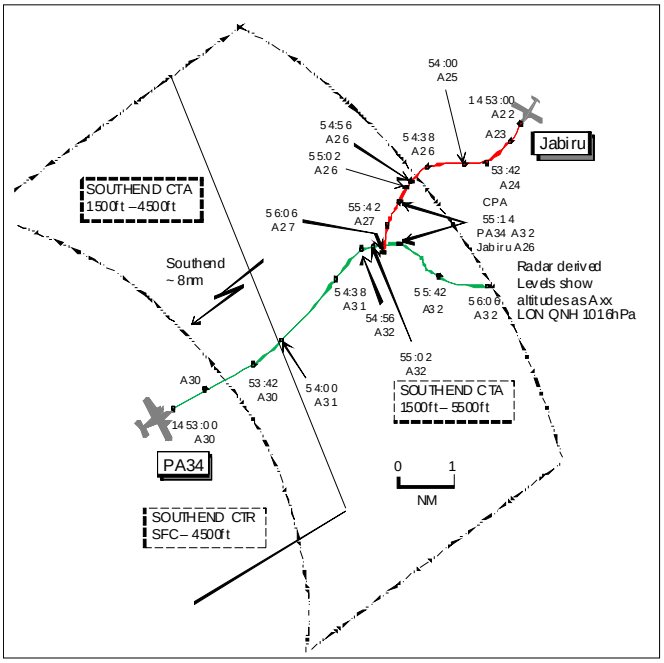
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace resolved by the PA23 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012106

Date/Time:	24 Jul 2012 1455Z	
Position:	5142N 00057E (12nm NE Southend - elev 55ft)	
Airspace:	CAS (T)	(Class: D)
	Southend CTA	
Reporter:	Southend APR	
	1st Ac	*2nd Ac*
Type:	PA34	Jabiru
Operator:	Civ Trg	Civ Pte
Alt/FL:	3000ft	2300ft
	QNH	QNH (1016hPa)
Weather:	VMC CLOC	VMC CAVOK
Visibility:	>10km	20nm
Reported Separation:		
	Not seen	Not seen
Recorded Separation:		
	600ft V/0·8nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SOUTHEND APR reports that the PA34 was an IFR departure towards CLN at altitude 3000ft. A 7000 squawk was observed tracking towards the CTA from the NE at altitude 2400ft. Several blind transmissions were made to establish contact with the ac. TI was passed to the PA34 flight which had requested a TS on leaving the CTA. The unknown contact entered the CTA indicating an unverified altitude 2500ft. Avoiding action was given to the PA34 pilot and the unknown ac passed down the port side of the PA34 by approximately 400ft and 1nm. The PA34 flight was subsequently instructed to resume its own navigation once it had passed the traffic. At 1456Z an Atlas Control squawk (1501) appeared on the display which was followed by a telephone call to him from Atlas advising of the unknown traffic's c/s; its first call to Atlas Control was when the ac was inside the Southend CTA. Two minutes later the traffic established communication; the controller advised the pilot that the ac was inside CAS before issuing a Southend squawk code. Owing to computer problems Atlas Control was unable to find the details of the Jabiru for en-route clearance through R112 so the flight was instructed to remain outside R112. Another flight requested transit clearance and entry into R112 as well as the PA34 from the NE. Owing to workload he was unable to accept handovers from Atlas or release CAT traffic waiting departure from Southend. The Jabiru flight was eventually given clearance from Atlas and continued en-route when S of the CTR/CTA.

THE PA34 PILOT reports departing Southend, IFR on an IR revalidation flight and in receipt of a RCS from Southend on 130·775MHz, squawking an assigned code with Modes S and C; I/F screens were in use. The visibility was >10km in VMC and the ac was coloured white and blue; lighting was not reported. Southend Approach instructed them, "avoiding action turn R heading xxx°". He took control from the candidate and immediately turned onto the assigned heading; the conflicting traffic was not seen. He was unaware that an Airprox had been filed until later in the day when informed by his company.

THE JABIRU PILOT reports being unaware that an Airprox had occurred until contacted by UKAB 2 days post incident. The flight was with a passenger from Clacton to Rochester, VFR and in receipt of a BS from Atlas then Southend squawking assigned codes with Modes S and C. The visibility was 20nm in CAVOK VMC and the ac was coloured white/blue; no strobe lights were fitted. The other ac was not seen by either himself or his passenger and, at the given reported position [12nm NE Southend], he was flying into sun heading 220° at 80kt and 2400ft QNH 1016hPa with a high workload changing squawk codes and changing frequencies.

AIRPROX REPORT No 2012106

ATSI reports that the Airprox occurred at 1455:13UTC, 12nm NE of Southend Airport, within the Southend Control Area CTA-1, Class D temporary controlled airspace (CAS(T)), which extended from an altitude of 1500ft to the base of CAS (5500ft: LTMA-8 & 4500ft: LTMA-7). The Southend CAS(T) was notified as active between 13 July 2012 and 15 August 2012, as part of the Olympic Airspace requirements.

The PA34 was operating on a local IFR training flight, having just departed from Southend Airport and was in receipt of a RCS. The Jabiru M/Light was operating VFR on a flight from Clacton Airfield to Rochester Airport and was not in receipt of an ATS.

CAA ATSI had access to Southend and ATLAS RT recordings, area radar recording, written reports from the Southend controller and both pilots.

The Wx for Southend Airport is provided: METAR EGMC 241450Z 10010KT CAVOK 25/12 Q1017=

At 1449:00 the PA34 departed from Southend RW06 and was transferred to Southend Radar, squawking 5051.

At 1450:22, the PA34 flight contacted Radar, *"Southend Approach (PA34 c/s) climbing two thousand feet maintaining a heading zero six zero."* The controller replied, *"(PA34 c/s) Southend Radar Radar Control Service say again your altitude.*" The PA34 pilot replied passing 1700ft for 2000ft and the controller then instructed the PA34 flight to climb to altitude 3000ft. At 1452:11, the PA34 was instructed to resume own navigation and the PA34 pilot responded, *"Resuming own navigation direct Clacton (PA34 c/s).*"

The ATSU indicated that the controller had become aware of the unknown ac operating NE of Southend CTA-1 and using a non-operational display equipped with Mode S was able to determine the c/s of the Jabiru.

At 1453:00 the PA34 levelled at altitude 3000ft, with the Jabiru M/Light at 2200ft and in the PA34's 12 o'clock at a range of 8·4nm.

At 1453:42, the controller transmitted, *"Southend Radar transmitting blind to aircraft (Jabiru c/s)."* There was no reply from the Jabiru flight.

At 1454:01, the controller passed the PA34 flight TI, *"(PA34 c/s) in your twelve o'clock at five miles opposite correction crossing right to left indicating two thousand five hundred feet unverified may enter the control zone from the northeast if not sighted turn right heading zero nine zero degrees."* The PA34 pilot replied, *"Turning right zero nine zero degrees (PA34 c/s).*"

The ATSU indicated that the Jabiru was tracking W as if turning away from CTA-1. At 1454:18, the radar shows the Jabiru at 2500ft QNH, 3·6nm NE of the PA34 which is indicating 3100ft QNH.

At 1454:37, the controller made a second blind transmission to the Jabiru with no reply.

By 1454:56, the Jabiru had turned L entering CTA-1, base 1500ft, at an altitude of 2600ft with the PA34 tracking NE.

At 1455:01, the controller gave avoiding action, *"(PA34 c/s) avoiding action turn right now heading one one zero degrees."* The PA34 pilot replied, *"Turning right heading one one zero degrees (PA34 c/s)."* The radar shows at 1455:02 shows the 2 ac on reciprocal tracks at a range of 1·3nm.

The controller then passed TI, *"(PA34 c/s) affirm traffic in your left eleven o'clock one mile indicating two thousand six hundred feet unverified,"* which the PA34 pilot acknowledged.

At 1455:14, the PA34 is in the R turn passing 0·8nm ahead and 600ft above the Jabiru (CPA).

At 1455:42, the controller advised, *"(PA34 c/s) clear of traffic turn left heading zero three zero degrees.*"

At 1456:40, the Jabiru flight (inside CTA-1) contacted ATLAS control on frequency 118·725MHz and reported squawking 1501. The ATLAS controller identified the Jabiru flight and asked the pilot to confirm that he had spoken to Southend. The Jabiru pilot replied that he would give Southend a call.

At 1457:44, the Jabiru flight contacted Southend Radar, *"Southend Radar (Jabiru c/s)."* The Southend controller replied, *"(Jabiru c/s) Southend Radar squawk five zero five four QNH one zero one seven you are inside Southend controlled airspace."*

The Jabiru pilot requested clearance to route via the Southend O/H routeing to Rochester and in receipt of an ATLAS code. The Jabiru flight was subsequently asked to hold in the Southend CTA-1 pending approval by ATLAS for the ac to enter the Olympic restricted airspace EG R112.

At 1507:48, the Jabiru flight was given a clearance to enter R112 and transferred to ATLAS control on 119·975MHz.

The Jabiru pilot's written report indicated that at the time of the occurrence his workload was high, setting a squawk and changing frequencies.

The controller was aware of the Jabiru operating NE of CTA-1 and tried to establish two-way communication.

When the range between the ac was 5nm the Southend controller gave the PA34 a tactical R turn of 30° and passed TI regarding the Jabiru.

When the Jabiru entered the Southend CTA-1 without first obtaining a clearance, the controller gave avoiding action with updated TI. The Manual of Air Traffic Services (MATS), Part 1, Section 1, Chapter 5, Page 13, paragraph 15.2, states:

'If radar derived, or other information, indicates that an aircraft is making an unauthorised penetration of the airspace, is lost, or has experienced radio failure: IFR flights shall be given avoiding action and traffic information shall be passed.'

It is not clear why the Jabiru pilot did not comply with the Air Navigation Order, Rules of the Air, Rule 29(1) which states:

Subject to Rule 31, before an aircraft flies within Class B, Class C or Class D airspace during the notified hours of watch of the appropriate air traffic control unit, the commander of the aircraft shall:

(a) cause to be communicated to the appropriate air traffic control unit a flight plan which complies with paragraphs (2) and (3) (as appropriate); and

(b) obtain an air traffic control clearance to fly within that airspace.

The Airprox occurred when the Jabiru ac entered the Southend CTA-1 Class D CAS without first obtaining an air traffic control clearance, which brought the Jabiru into conflict with the PA34.

The Southend Radar controller tried to establish RT contact with the Jabiru flight and continued to monitor the flight, passing appropriate TI and then avoiding action to the PA34 flight when the Jabiru penetrated CAS.

BM SAFETY MANAGEMENT reports that the Airprox occurred between a PA34 operating IFR within the Southend CTA in receipt of a RCS from Southend APP and a Jabiru operating VFR in receipt of a BS from ATLAS Control TAC 1.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The incident sequence commenced at 1453:56 as the Jabiru pilot made initial contact with the ATLAS Allocator (Alloc) and was instructed, "…*standby, looking for your flight plan*." The Alloc's workload was assessed by the Supervisor as high, with multiple flights free-calling for an ATS and the unit having suffered a failure of the electronic flight strip system. At this point, the Jabiru was 5·2nm NE of the PA34, tracking SW'ly, indicating 2400ft. Significantly, the Jabiru was 1nm NE of the boundary of the Southend CTA, the base of which was 1500ft.

At 1454:40, the Alloc confirmed that the authorisation number passed by the Jabiru pilot was correct and gave them, "…*permission to transit Romeo 1-1-2, Basic Service, the London Q-N-H 1-0-1-6*" which was read back. At

this point, the Jabiru was 2·7nm NE of the PA34, tracking W'ly, indicating 2600ft; the PA34 was tracking NE'ly, indicating 3100ft. At 1454:56, the Jabiru entered the CTA.

At 1455:00, the avoiding action turn issued by Southend APP and reported by the PA34 pilot was evident on the radar replay. At this point, the Jabiru was 1·3nm NE of the PA34, tracking SW'ly, indicating 2600ft; the PA34 was indicating 3200ft.

Immediately following the Jabiru pilot's read back, at 1455:05, the Alloc instructed them to, "*squawk 1-5-0-1*." This was read back and the Alloc then instructed the Jabiru pilot to, "…*continue ATLAS Control* [TAC 1] *1-1-8 decimal 2-7-5*" which was similarly read back. This point, 1455:14, was the CPA. The Jabiru was 0·8nm N of the PA34, tracking SW'ly, indicating 2600ft; the PA34 was tracking E'ly following the avoiding action turn issued by APP, indicating 3200ft.

At 1456:06 the SSR 3A code passed to the Jabiru was displayed on radar. At 1456:42, the Jabiru flight contacted ATLAS TAC 1 reporting, *"Atlas control er (Jabiru c/s) squawking one five zero one".* TAC 1 replied, *"(Jabiru c/s) Atlas Control identified confirm you've spoken to Southend*?" The Jabiru pilot replied, *"Er negative, will give Southend a call now*." Having confirmed the Jabiru's altitude as 2800ft on the London QNH, TAC 1 contacted Southend APP, who confirmed that the Jabiru had contacted them.

The CPA occurred before ATLAS had identified the Jabiru and there was nothing in the exchange of RT between ATLAS and the Jabiru pilot to suggest that the ac was proximate to either the Southend CTA or the PA34. On that basis, ATLAS was unable to affect the outcome of the incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

It was unfortunate that the Jabiru pilot had called Atlas Alloc on the ICF first to obtain permission to enter R112, instead of establishing 2-way with Southend to obtain CAS transit clearance. Atlas Alloc's primary task was to correlate pilots' initial calls of c/s and approval number with previously filed Flight Plans and their associated fps before issuing a clearance, assigning a squawk, a TAC control position and frequency. During this sequence, somewhat protracted owing to a problem with the electronic fps system, Alloc would have been unaware of the ac's position owing to the nature of the task. By the time the Jabiru pilot had selected the assigned Atlas squawk and then called Atlas TAC 1, he was inside CAS(T) and the flight was then transferred to Southend. Members commended the actions taken by the Southend APR throughout the incident sequence. He had seen the Jabiru tracking towards the CTA and had tried calling the flight on his frequency, but to no avail. The PA34 flight was given TI and a tactical R turn onto 090° when the Jabiru appeared to be turning R away from CAS but this was then upgraded to an avoiding action R turn onto 110° when the Jabiru turned L and crossed the CAS(T) boundary. Members agreed that it was this entry into CAS by the Jabiru pilot without clearance which had caused the Airprox.

Turning to risk, Members noted that neither aircrew had seen the other ac. The Jabiru pilot reported a high workload whilst speaking to Atlas; however, he was still responsible for maintaining his own separation from other traffic through see and avoid whilst actioning TAC's instructions. The PA34 flight was IFR on an IRT flight in which IR screens were in use. These screens are designed to obscure the pilot under test's lookout but can also make the examiner's lookout more difficult, particularly when turning and searching for other traffic. The examiner had taken control from the PF to execute the avoiding action turn issued but had not seen the Jabiru. The radar recording shows the ac passing with 600ft vertical and 0·8nm horizontal separation at the CPA with the PA34 having already crossed through the Jabiru's 12 o'clock and diverging. Even though the ac passed unsighted by both crews, the action taken by both the Southend APR and the PA34 crew were enough to allow the Board to conclude that any risk of collision had been effectively removed.

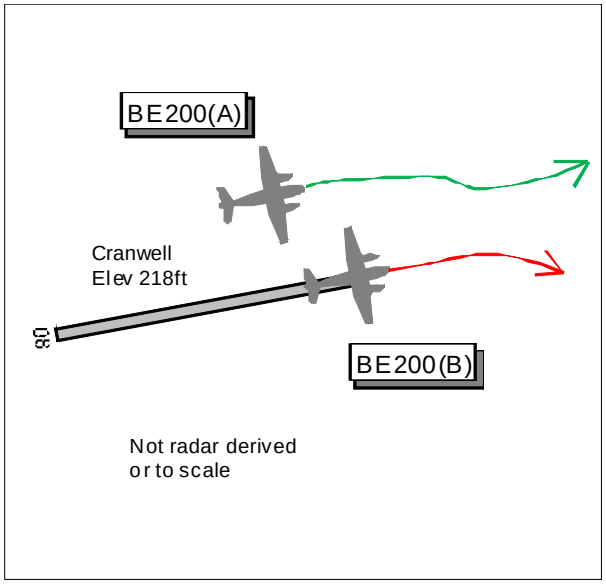
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jabiru pilot entered CAS(T) without clearance and flew into conflict with the PA34, which he did not see.

Degree of Risk: C.

AIRPROX REPORT NO 2012107

Date/Time:	25 Jul 2012 1351Z	
Position:	5302N 00029W (O/H Cranwell - elev 218ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BE200(A)	BE200(B)
Operator:	HQ Air (Trg)	HQ Air (Trg)
Alt/FL:	1000ft	
	QFE (1010hPa)	NR
Weather:	VMC HAZE	NR
Visibility:	10km	NR
Reported Separation:		
	400ft V/150m H	Not seen
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BE200(A) PILOT reports flying a dual student advanced training sortie from Cranwell, VFR and in receipt of a BS from Cranwell Tower on 268·625MHz squawking, he thought, 7010 with Modes S and C. The visibility was 10km in haze, flying 2000ft below cloud in VMC and the ac was coloured white/blue with HISL, nav, taxi, anti-collision and landing lights all switched on. On rejoining the RW08 RH visual cct through' Initial' [2nm from the threshold, 100m from the C/L on the deadside], the crew was informed that there was 1 Tutor in the cct, 1 Tutor joining O/H, 1 Tutor joining downwind and a King Air on an instrument approach. They were able to identify the Tutor in the cct and the Tutor descending deadside but were unable to locate the Tutor joining downwind. The ac was configured for the cct but they were still unable to identify the ac joining downwind. Having not heard a 'roundabout' call in accordance with local procedures [roundabout 2·5nm ESE Cranwell], he felt safe that the Tutor was still at a safe distance from the cct and, on approaching the upwind RW threshold he made the decision to turn. The crew confirmed that the lookout was clear and the PF rolled into the turn. Shortly after this, while turning through heading 110° level at 1000ft QFE 1010hPa and 140kt, the PNF took control to reverse the turn and commenced a climb, having identified a King Air 150m ahead and to their R, and 400ft below, in a climbing turn from the RW. After confirming that there was no longer a confliction, the PF went around at cct height to reposition. TCAS did not give a TA. He assessed the risk as medium. On reflection the crew was fixated on identifying the white Tutor in the haze and assumed the radar traffic was landing.

THE BE200(B) PILOT reports flying an IRT training flight from Cranwell, IFR and in communication with Cranwell Tower on 268·625MHz, squawking 7010 with Modes S and C. After landing it was established that an Airprox had occurred with another King Air in the visual cct. At no time during the flight was either of the crew aware of the close proximity of the other ac. Although the TCAS system was set to TA only, no TAs were received.

THE CRANWELL TOWER CONTROLLER reports BE200(A) flight reported departing out to initials. Radar traffic was broadcast as a King Air [BE200(C)] at 7nm for touch and go. BE200(A) rejoined through initials and was advised of the position of cct traffic and radar traffic [BE200(C)] at 4nm. A broadcast was then made for BE200(C) at 3nm for touch and go. BE200(A) flight, which was on the deadside, reported extending upwind. At this stage he understood that an Airprox occurred but he did not see it as he was looking in the other direction towards final. Wx conditions were very hazy and it was difficult to see ac in the cct. Tutor traffic, in particular, was difficult to see and he was spending longer than usual scanning for traffic to confirm their positions.

THE CRANWELL SUPERVISOR reports present in the VCR iaw with Cranwell ATC Order Book as the visual cct was full. The VCR was very busy with Duty Senior Supervisor, Duty Instructor, VCR team and SUP in attendance. The incident occurred when he was requesting a radar clearance for BE200(B) to enter the radar training cct. He remembered distinctly saying "that was close" as BE200(A) broke L to avoid BE200(B). His position at the time

allowed him to see the incident but the angle at which he was positioned did not allow him to judge the separation but he thought it was closer than it should be. He also made comment to the DI seated next to him. No mention was made on the RT; however, the BE200 Sqdn UFSO called ATC 1hr later to inform him that an Airprox was being filed.

BM SAFETY MANAGEMENT reports that this Airprox occurred between 2 BE200s within the RW08 RH visual cct at Cranwell. BE200(A) was manned by a student crew conducting a visual cct consolidation sortie; BE200(B) was on an IRT but operating within the visual cct and had just conducted a 'touch and go'.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Although the desk side recording from the Tower Supervisor position captured a comment from the Supervisor about seeing the Airprox occur, thereby giving a time stamp for the occurrence, and despite NATS SSR radar data showing ac at ground level within the Cranwell cct, the Airprox was not recorded on the radar replay. Extensive investigation by the RAC, involving confirmation of the time of the occurrence and the identity of all ac within the Cranwell visual cct, did not shed further light on the event. Analysis of the radar replay has shown an intermittent PSR-only contact in the vicinity of the Cranwell visual cct before, during and after the Airprox. In the absence of contrary evidence, BM SM contends that the PSR-only contact was BE200(A) and, given that other ac squawking SSR 3A data at ground level were displayed, albeit only their SSR return, either the crew of BE200(A) had not selected their transponder to the 'on' position, their selection was not effective or the transponder was unserviceable. Moreover, initially, there was some confusion over the identity of BE200(B) as the crew did not realise that they had been involved in an Airprox; this was confirmed following correlation of the available radar data with the transcript and DASOR from BE200(A). Cranwell local orders specify the use of the aerodrome traffic pattern conspicuity squawk within the visual cct. The ADC is not required to validate the SSR 3A of ac within the visual cct.

The ADC described the workload and task complexity as high, a view supported by the Supervisor who added that the unit's workload was similarly high. The ADC reported that 'Wx conditions were very hazy and it was very difficult to see ac in the cct. Tutor traffic in particular were [sic] extremely difficult to see and he was spending longer than usual scanning for traffic to confirm their positions'. The crew of BE200(A) assessed that visibility was 10km in haze with FEW at 3400ft; a view confirmed by the PNF who stated in a subsequent conversation that the conditions were hazy and that it was difficult to see the Tutors. The RAF Cranwell Met Office 1350Z Wx report states that Cranwell was BLUE, 20km visibility in nil weather, FEW at 3400, BKN 25000ft.

The incident sequence commenced at 1346:13 as BE200(B) was cleared to join the visual cct from Radar and was passed the airfield details and circuit state. At this point there were 2 other ac in the cct: 1 on short finals to land and BE200(A) downwind. At 1346:26 the crew of BE200(A) reported, "*departing downwind for initial to rejoin*." The ADC acknowledged this replying, "*roger, report rejoining through initials, one Tutor joining through the overhead*", which was acknowledged.

At 1347:05, the crew of BE200(B) reported, "*downwind touch and go*" and the ADC replied that there was, "*one King Air* (BE200(A)) *out to initials*", which was not acknowledged. At 1347:50, the ADC called APP advising them of BE200(A) routeing toward initials and, at 1348:02, received notification of an unrelated BE200(C) at, "*6 and ¾ miles* (BE200(C) c/s) *touch and go further*." The ADC made a subsequent broadcast to this effect at 1348:08. At 1348:11, the crew of BE200(B) reported, "*finals, gear down*" and was "*cleared touch and go*" by the ADC.

At 1349:07, the crew of BE200(A) reported, "*Initial*" and the ADC advised them, "*1 Tutor joining through Initials, 1 Finals, 1 joining downwind, radar traffic 4 miles, wind 0-3-0, 1-0 kt*" which was acknowledged. Analysis of the transcript demonstrated that this cct state was incorrect in that the, "*Tutor joining through Initials*" was actually descending on the deadside, having conducted an O/H join. However, based upon the report of BE200(A)'s crew, they sighted this Tutor and were not confused by the incorrect cct state; consequently, whilst noteworthy, this incorrect cct state was neither causal nor contributory to the reported Airprox.

At 1349:27, the pilot of the Tutor joining downwind broadcast on the TWR freq that they were "*abeam the roundabout*." The crew of BE200(A) did report however that they were 'unable to identify the Tutor joining downwind' and felt that they had 'fixated on identifying the white Tutor in the haze' to the detriment of a wider lookout.

At 1349:49, the ADC cleared BE200(C) on PAR to, "…*touch and go, one on touch* (BE200 (B)) *and go, 3 in*" and, at 1349:58 made the TWR broadcast to this effect. From this point until the approximate time of the CPA, the ADC was involved in a continuous exchange of RT with unrelated ac operating within the visual cct; including BE200(C), there were 6 ac operating within the cct area.

At 1350:39, the pilot of BE200(B) informed the ADC that, "*after this next touch and go, looking to depart into the radar pattern*" which was acknowledged. At 1350:46, the TWR Supervisor's deskside recording captured the Supervisor saying, "*…did you see that*?" which the Supervisor has stated was in response to observing the Airprox. The ADC stated in their DASOR that they did not see the Airprox as they were 'looking towards finals' the requirement for which is borne out by the tape transcript.

The crew of BE200(A) reported that 'having not heard a 'roundabout' call in accordance with local procedures (the call made by the Tutor pilot at 1349:27), the pilot felt safe that the Tutor was a safe distance from the cct and, on approaching the upwind threshold, the pilot made the decision to turn'. The pilot of BE200(A) has reported that they assumed that 'the radar traffic was landing' which suggests that they believed that they had the Airprox with BE200(C).

In their DASOR, the crew of BE200(A) make no mention of a second BE200 operating within the visual cct and the fact that they believed that the Airprox occurred with BE200(C) suggests that they had reduced SA of BE200(B). Based upon their report and subsequent provided information, the PF of BE200(A) believed that the other ac within the visual cct were all Tutors. This view was supported by the PNF who did not recall there being other BE200's in the visual cct. BM SM contends that this assessment may have been based on the cct state passed to the pilot of BE200(A) by the ADC at 1349:07, stating, "*1 Tutor joining through Initials, 1 Finals, 1 joining downwind, radar traffic 4 miles*". This could be interpreted as meaning that all of the ac within the visual cct were Tutors. Given the known difficulties in sighting Tutors and that the crew of BE200(A) were students, the ADC's desire to highlight to the crew of BE200(A) the specific presence of Tutors is understandable; however, the use of additional phraseology to boost situational awareness should be consistent in application, to ensure that ambiguity is not introduced. That said, notwithstanding the previously highlighted issue pertaining to the Tutor descending on deadside, the cct state passed by the ADC was correct in as far as the positions and numbers of ac were concerned and the pilot of BE200(A) was required to be visual with all ac within the cct, prior to entering the cct. Subsequent conversation with the PF revealed that the crew believed that the PNF had declared 'visual' with the ac on finals; however, the PF did not believe that this call confirmed the ac type and he believed that the ac was landing. In subsequent conversation with the PNF, he could not recall having stated that he was visual with the ac on finals. Had he been visual with the ac on finals (BE200(B)), then it is reasonable to argue that he would have been aware that there was another BE200 within the visual cct. However, BE200(B) had joined the visual cct prior to BE200(A) departing the cct and there were multiple exchanges of RT between the ADC and the crew of BE200(B) that the crew of BE200(A) would have heard; the purpose of these exchanges of RT being to boost the SA of all crews operating within the visual cct. Therefore, the information was available that would have allowed the crew of BE200(A) to have been aware of BE200(B)'s presence within the cct. BM SM contends that cct congestion was a contributory factor in the loss of SA of the crew of BE200(A).

Based upon the report of and subsequent conversation with the PF of BE200(A), whilst they were aware of the presence of an ac on finals (BE200(B)), they believed that the ac was landing and there are clear indications that this may have been HF related. The crew had already reported that they were task-focussed on visually acquiring the unrelated Tutor joining downwind and felt under a high workload. Moreover, given the dynamic cct state described to the crew of BE200(A) at Initial, it may be that they were affected by the 'Serial Position Effect' where the information in the middle of the transmission was not/incorrectly stored/recalled from working memory. Some research has demonstrated that high levels of psychophysiological stress, which can be caused by high workload, have a deleterious effect on working memory.

Whilst the potential ambiguity introduced by the ADC's reference to Tutors in the cct may have contributed to the crew of BE200(A)'s reduced SA, it was not a causal factor in the Airprox. Given the ADC's workload and the timing of events, once BE200(A) had passed inside Initial, there was no further ability for the ADC to affect the outcome of the incident.

In summary, the crew of BE200(A) were unaware of the presence of BE200(B) and, having conducted a lookout and believing there to be no confliction, turned into conflict with BE200(B). Whilst the inclusion of ac type in the ADC's transmission of the cct state to the crew of BE200(A) may have led them to believe that only Tutor type ac

were within the visual circuit, BM SM contends that sufficient cues were available to the crew of BE200(A) to highlight the presence of BE200(B); however, the crew of BE200(A) was unable to use these cues to adapt their SA. Critically, the crew was aware of an ac being on finals but do not appear to have visually acquired it as they passed Initials and, although in a position to be aware of its intentions, believed the ac to be landing and therefore no factor.

RECOMMENDATION

Whilst what follows should not detract from what the Cranwell ATC investigation was able to determine, the BM SM investigation of this Airprox has highlighted causal and contributory factors that would have been better captured and investigated by a more formal Station-level investigation. For instance, great benefit would have been obtained from an in-depth HF analysis, both in terms of determining cause and contributory factors, but also in terms of identifying potential mitigations.

AP3207 200.110.5 states that 'A Unit-Level investigation may be ordered by an Operational Duty Holder (ODH), Delivery Duty Holder (DDH) or his delegates to investigate an accident, incident or occurrence which warrants formal investigation but does not justify the convening of a Service Inquiry by the MAA'; however, it does not provide guidance on what types of incident might warrant a unit investigation. BM SM requests that RAF FS consider the development of a mechanism to inform the decision making of the ODH, DDH or their delegates in this regard.

HQ AIR (TRG) comments that the BM SM analysis is entirely plausible. It appears that the crew's coordination broke down in the cockpit, particularly in regard of who could see what. Hopefully this crew learnt a salutary lesson. Their concern over the sighting of the Tutor is understandable, as the combination of Tutors and hazy conditions is always a concern, but the option remained to request a position update or to fly through and rejoin if required. Whilst the crew did not identify BE200(B) during its final approach and roller, the PNF is to be commended for his lookout during the turn into the circuit, and for his prompt and positive action in taking control and resolving the conflict. The lack of IFF return warrants further investigation as it potentially indicates a HF-related error on the part of the crew or a technical issue. On the matter of Airprox investigation processes in AP3207, a draft amendment is awaiting release. The requirement for 'investigation' by units is stated in RA 1410(1) para 50, which has been updated recently, but no guidance is given. Not all events will require an Occurrence Safety Investigation (OSI), which is the only unit-level investigation in current use. However, as Airprox can be manifestations of some of the higher risks owned by Duty Holders at unit or group level, it behoves Safety Staffs to consider each event seriously as a potential OSI subject. OSIs can also be mandated by group Safety Staffs or by the MAA. As a minimum, 'investigation' should ensure that sufficient and complete data has been gathered and recorded on a D-ASOR for the UKAB to analyse; the AMC to RA 1410(1) implies that completion of a D-ASOR is the minimum requirement for such an investigation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members agreed that the BE200(A) crew did not have SA on the cct traffic when they rejoined the cct through Initial. Although the cct state passed by the ADC was incorrect – the Tutor joining through initials was in fact joining O/H – the BE200(A) crew had seen this traffic but did not assimilate that the '1 [ac on] finals' was BE200(B) whose crew had previously called downwind and then final. The student pilots on BE200(A) had seen something on final but apparently dismissed this as landing traffic when it was actually BE200(B) on a touch and go. BE200(A) crew had also not assimilated the Tutor pilot's call at 'the roundabout' as he positioned to join downwind and were focussed on looking for this Tutor when they turned at the upwind end into conflict with BE200(B) climbing out. One Member commented that owing to the reported difficulty of seeing Tutor ac in the haze perhaps it would have been better to only accept them via O/H joins instead of joining via downwind.

Looking at risk, it was not possible to verify the separation at the CPA in the absence of any SSR returns from the BE200(A). The ADC did not witness the incident as he was looking in the other direction, his attention only being drawn to it by the Supervisor making comment. With the BE200(B) climbing out and turning onto crosswind, positioned ahead of BE200(A,) the crew did not have opportunity to see the converging BE200(A). Members

agreed that the BE200(A) PNF did well to recover the situation when, visually acquiring BE200(B) an estimated 150m ahead and 400ft below, he took control, reversed the turn and commenced a climb. These actions were enough to persuade the Board that any risk of collision had been quickly and effectively removed.

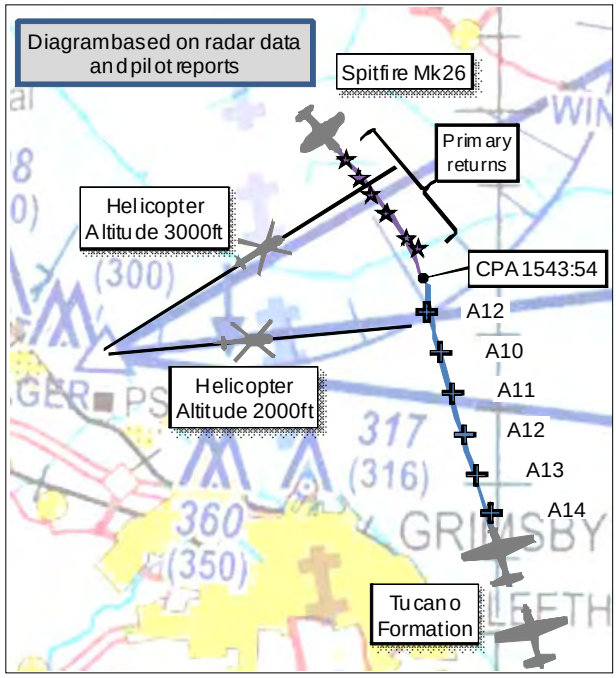
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The crew of BE200(A) did not have SA on cct traffic and turned into conflict with BE200(B).

Degree of Risk: C.

AIRPROX REPORT NO 2012108

Date/Time:	24 Jul 2012 1544Z	
Position:	5337N 00002W (4nm NNE Grimsby)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tucano	Spitfire Mk26
Operator:	HQ Air (Trg)	Civ Pte
Alt/FL:	1000ft (RPS 1012hPa)	approx 1500ft (NK)
Weather:	VMC CLBC	VMC CAVOK
Visibility:	10km	30km
Reported Separation:	500ft	0ft V/200m H
Recorded Separation:	NK V/0.25nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO PILOT reports instructing a navigation exercise, operating under VFR, leading a pair of Tucano ac. The ac were black and yellow in colour, with external lights and HISLs on. The SSR transponder was selected on in both ac with Modes 3/A and C and the low-level conspicuity code selected [7001]; Mode S is not fitted although the ac is fitted with TCAS, which was selected on. As the formation approached the Humber Estuary heading 347° at 240kts [the number 2 ac maintaining trail formation 0.4nm behind the leader] the student pilot [PF] spoke to Humberside APP [119.125Mhz], established a BS and climbed to altitude 1500ft [RPS 1012hPa]. The formation was advised of two helicopters at 6nm range heading E under a service from Humberside [APP], one at altitude 2000ft and the other at altitude 3000ft. The formation pilots descended to altitude 1000ft in order to increase separation from the helicopters and the PF advised Humberside APP of their change in altitude. The lead crew became visual with the first helicopter at a range of 2-3 miles in their 10 o'clock position and 1000ft above. The lead crew became visual with the second helicopter at a range of about 3 miles in their 1 o'clock position and 2000ft above them. One of the helicopters advised on RT that he had seen another ac 'just N of the Humber at about 1000ft heading S'. Humberside APP relayed this to the Tucano pilots, calling a potential contact in their 12 o'clock at a range of 1 mile. Almost immediately after this call the lead crew became visual with an ac in their 12 o'clock position at close range. The student pilot called "break right" to the formation whilst initiating a hard turn to the R. The Tucano pilot stated that had they not initiated avoiding action they would have passed within 200ft of the other ac, which he identified visually as a Spitfire. The other ac did not appear to take any avoiding action, and did not indicate on their TCAS.

He assessed the risk of collision as 'Medium'.

THE SPITFIRE MK26 PILOT reports conducting a ferry flight to position the ac for its new owners. The ac was painted in a camouflage colour scheme with beacon and wing-tip strobes on.

[UKAB Note(1): The Spitfire Mk26 is a sub-scale replica Spitfire.]

The SSR transponder was selected on with the VFR squawk and Modes 3/A and C. An ACAS was not fitted. At the departure A/D it was apparent that RT contact on the ground was quiet but satisfactory. After T/O, and on first contact with [an ATSU], it became apparent that his transmissions could be heard, but that he could not hear received transmissions due to the increased engine noise at cruise power. The ac route was modified such that

he remained clear of CAS. The pilot commented that he 'always works ATC in order to allow them and other ac to be aware of [his] presence'.

On reaching [an intermediate refuelling stop] he found that by throttling the engine back it was possible to 'obtain the airfield and TI by radio'. On departure for the destination A/D he set course for the OTR beacon, planning to remain clear of CAS by routeing via North Coates. While in the cruise, at 140kts, he saw two helicopters approximately 200ft higher than himself. He turned R approximately 30°, heading 170°, to increase separation and remain clear of the wake turbulence. He then saw two black and yellow Tucanos on his R in close formation at a range of approximately ¼nm to ½nm. He continued the R turn to increase separation. Before they passed through his 12 o'clock position they started a L turn towards him and he assumed they wanted to "take a look". The distance between them reduced to approx 200m but their tracks were now parallel. The pilot noted that he would normally be 'working Humberside ATC' in that area and that the [effective] loss of RT meant that the 'increased SA that it offers' had been lost.

He did not consider reporting this occurrence because they were all flying under VFR outside CAS where "see and avoid" principles were in operation and he believed they had seen each other in plenty of time.

He assessed the risk of collision as 'Low'.

ATSI reports that the Airprox occurred at 1543:54 UTC, 12.5nm NE of Humberside Airport, within Class G airspace, between a Spitfire MK-26 (Spitfire) and a Shorts S-312-Tucano-T1 (Tucano-A) flying in formation with a second Tucano (Tucano-B).

The Tucano formation were operating VFR on a navigation training exercise and were in receipt of a BS from Humberside Radar [119.125MHz]. Tucano-A was the formation leader. The Spitfire was operating VFR on a ferry flight and was not in receipt of an ATS.

CAA ATSI had access to RTF and radar recording of Humberside Radar, area radar recordings, written reports from both pilots and a written report from the Humberside Radar controller.

The weather for Humberside is provided:

METAR EGNJ 241520Z 20007KT 180V250 9999 FEW048 28/13 Q1016=

[UKAB Note(2): The 1550 METAR for Humberside was reported as:

METAR EGNJ 241550Z 18005KT 110V240 9999 FEW049 28/13 Q1016=]

At 1513:08, the Tucano formation contacted Humberside Radar for a BS whilst routeing S across the Humber at altitude 2000ft. At 1520:54, the formation reported changing frequency to Waddington.

At 1537:40, the Tucano formation again contacted Humberside Radar and reported, *"*[Formation C/S] *pair of Tucanos two P O B er low low level navex two fifty feet wishing to route south to north to the east of Grimsby for the estuary and request Basic Service ?????."* The controller asked the formation to report abeam Grimsby and agreed a BS, passing the Barnsley RPS as 1012hPa.

At 1538:14, two departing helicopters contacted Humberside Radar and a TS was agreed as they tracked to the NE of Humberside.

At 1539:50, the controller transmitted, [Formation C/S] *what level will you be climbing to once you've crossed the Humber I've got two helicopters outbound at two and three thousand feet."* The formation reported an intention to climb to 1500ft on 1012hPa. The northerly helicopter climbed to 3000ft and the southerly to 2000ft.

At 1542:23 the formation reported abeam Grimsby and the controller advised, [Formation C/S] *thank you my helicopters are er northwest of you by six miles and northeast bound lowest at level two thousand feet,"* which the formation acknowledged.

At 1542:27, area radar showed the Tucano formation, 13nm east of Humberside tracking N at FL009. An unknown primary radar contact (believed to be the Spitfire) was shown 11.1nm NE of Humberside Airport, tracking SE. The

distance between the Tucano formation and Spitfire was 9.2nm. The controller provided TI to the two helicopters regarding the Tucano formation and about the unknown contact [the Spitfire], which was S bound crossing the N coast of the Humber estuary.

At 1542:54, the Tucano formation reported descending to 1000ft. At 1543:00, the S'ly of the two helicopters, at altitude 2000ft, reported sighting the unknown traffic on the coast about 1000ft below him. At 1543:16, the controller advised, *"…*[Formation C/S] *then that traffic's north of you by three miles southbound just crossing the coast er estimated at a thousand feet by the helicopter."* There was no response from the Tucano formation.

At 1543:33, the controller transmitte*d, "*[Formation C/S] *did you copy the traffic on your nose range of a mile and a half opposite direction believed to be about a thousand feet unverified."* The formation responded, *"and visual with both* [Formation C/S]*"* and then at 1543:45, *"*[Formation C/S] *break right."*

As the formation started the R turn, the Humberside radar showed the Spitfire commencing a R turn onto a S'ly heading, as shown in picture 1 below. For clarity, a black line and arrow has been added to highlight the track of the Spitfire. The Tucano formation is shown flying 0.4nm in trail.

Picture 1: 1543:45 - Humberside radar

At 1543:54, the Humberside radar showed the Spitfire passing 0.25nm (CPA) NW of the formation, as shown on picture 2 below. For clarity, a black line and arrow has been added to highlight the tracks of the Spitfire and Tucano formation leader.

Picture 2: 1543:54 - Humberside radar

At 1544:28, the Tucano formation reported going to their en route frequency.

The Spitfire was not in receipt of an ATS at the time of the Airprox. The Tucano formation was in receipt of a BS from Humberside Radar. CAP 774, UK Flight Information Services, Chapter 2, Page 1, Paragraph 1, states:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.'

The controller provided a warning to the Tucano formation when the unknown contact was in their 12 o'clock position at a range of 3nm. However there was no immediate response from the Tucano formation and the controller again provided a warning when the Spitfire was at a range of 1.5nm. This very likely aided the SA of the Tucano formation, resulting in them sighting the Spitfire and taking avoiding action when the formation leader transmitted *"Break Right.".* In Class G airspace, the pilots are ultimately responsible for collision avoidance and should consider service provision to be constrained by the unpredictable nature of this environment

The Airprox occurred when the Tucano formation and Spitfire flew into proximity, which caused the Tucano formation to take avoiding action. The Humberside controller passed a warning to the Tucano Formation, which very likely aided the Tucano formation in acquiring a visual sighting of the Spitfire.

HQ AIR (TRG) commented that the Tucanos received an excellent service from the Humberside controller and that the TI received was instrumental in them achieving a visual sighting. The sighting passed by the helicopter crews must also be recognised as a useful factor in the building of SA. It is likely that the Spitfire sighted the Tucanos first and remained in a position to take further avoiding action. That said, he also stated that the Tucanos turned towards him in what he perceived to be an attempt to "take a look"; no such turn by the Tucanos is apparent on the radar picture and the reaction of the Tucano pilots implies that they only became visual at a late stage, thus the miss distance selected by the Spitfire might be viewed as inappropriate. It is apparent that the Spitfire's transponder return was not seen, either on the Humberside radar or the Tucanos' TCAS. As a result, a further mitigation was nullified, in addition to the Spitfire's effective loss of radio comms.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs and video recordings, reports from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

The Board initially commented on the likely activity in the lead Tucano cockpit in the moments leading up to the Airprox. The Mil RAF Members opined that the RT transcript indicated the student (PF) had either confused or simply not heard the Humberside controller's first TI call on the Spitfire Mk26 and was visual with the two helicopters above him but not with the conflicting traffic at his level. If the instructor had heard the calls correctly then there was a distinct possibility he was attempting to build the student's SA in the moments prior to the Airprox.

The Spitfire Mk26 pilot saw the conflicting Tucanos in his R turn, albeit at close range, before the Tucano crews saw him and commenced avoiding action. Pilot Members were of the view that the Spitfire Mk26 pilot's assessment of the risk of collision as 'Low' was not consistent with a first sighting at a range of ¼ to ½nm, which the Board considered to be a late sighting, and a reported separation of 200m. At the closing speeds and first sighting range reported, the Spitfire Mk26 pilot had approximately 5sec at best to effect any avoidance. Board Members opined that he had an opportunity to increase the miss-distance and that it was the late sighting and last ditch avoiding action of the Tucano pilot that increased the miss-distance from an assessed 200ft to an assessed 500ft. Overall, the Board were of the opinion that safety margins were reduced below the normal.

The Board were unable to determine why the Spitfire Mk26 transponder did not appear on the Humberside radar picture or activate the Tucanos TCAS. It was unfortunate that this information was not available, especially as the Tucano formation had just descended to increase separation on the helicopter traffic and inadvertently to the same height as the Spitfire Mk26.

Finally, all Board Members commended the Humberside controller on his outstanding performance. Whilst the Tucano crews may well have been better served with a TS rather than a BS, the controller's timely and persistent

traffic warnings to the Tucano crews was instrumental in preventing a much more serious outcome to this incident. The Board opined that his actions serve as an exemplar to all controllers.

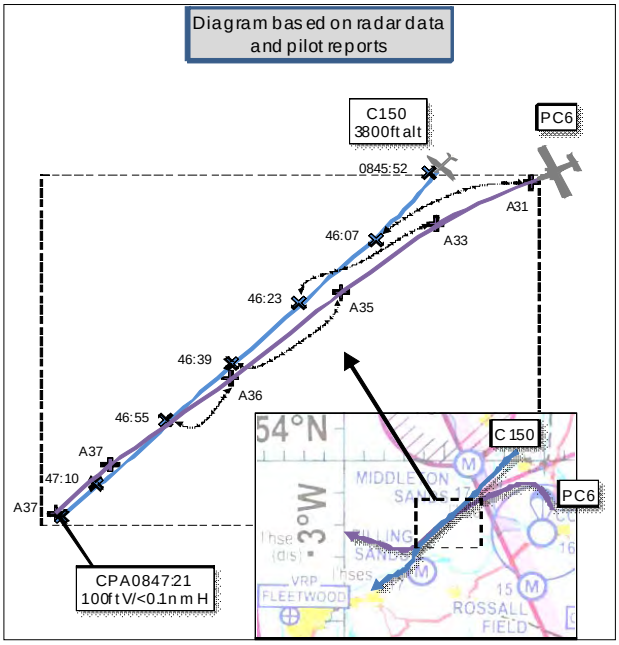
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the pilots in both aircraft.

Degree of Risk: B.

AIRPROX REPORT NO 2012109

Date/Time:	21 July 2012 0847Z (Saturday)	
Position:	5355N 00259W (2nm E Fleetwood VRP)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C150	Pilatus PC6
Operator:	Civ Trg	Civ Other
Alt/FL:	3800ft	↑3000ft↑
	QNH (NR)	QNH (NR)
Weather:	VMC NR	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:		
	0ft V/50-100m H	0ft V/0.5nm H
Recorded Separation:		
	NR V/<0.1nm H	



[UKAB Note(1): The C150 is reported as staying level at altitude 3800ft. The PC6 radar derived altitudes are shown as 'A<100's of feet>].

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C150 PILOT reports instructing on a trial flight, operating under VFR with a BS from Blackpool Radar [119.950MHz]. The ac was white in colour with the tail strobe selected on. The SSR transponder was also selected on with Mode 3/A but no Mode C or S. He was sitting in the RHS and at the time of the Airprox the student, in the LHS, had control of the ac. Approaching the Fleetwood VRP heading 270° and 80kts, level at alt 3800ft, the instructor looked R and immediately saw a blue and orange coloured Pilatus overtaking and climbing past his ac, passing through his level, abeam at a distance of between 50m and 100m. He took control of the ac and took immediate avoiding action by turning to the L.

He assessed the risk of collision as 'Medium'.

THE PILATUS PC6 PILOT reports operating under VFR in an orange, white and green ac with strobes selected on. The SSR transponder was selected on with Modes 3/A, C and S, but the ac was not fitted with TCAS. He was in RT contact with Cockerham A/G station [129.900MHz] when, heading 200° at 85kt in a climbing L turn, he saw a white single engine, high-wing ac, crossing from R to L ½nm ahead and which appeared to be heading S in a level cruise. He was not able to establish RT contact with the other ac on the A/G frequency. Keeping the other ac in sight, he overtook on the R.

He assessed there was no risk of collision.

ATSI reports that the AIRPROX was reported to have occurred at 0847 UTC, in the vicinity of Cockerham Free-Fall drop zone, situated 13.3nm NE of Blackpool Airport, between a Pilatus PC6/B2-H2 Porter (PC6) and a Rheims Cessna F150H (C150).

The PC6 was operating VFR from the Cockerham Sky Diving Centre and was in communication with the Cockerham Drop Zone (A/G) [129.900MHz].

The C150 was operating on a local training flight from Blackpool Airport and was in receipt of a BS from Blackpool Radar [119.500MHz].

AIRPROX REPORT No 2012109

The Cockerham Free-Fall drop zone is notified in the UK Aeronautical Information Publication (AIP), page ENR 5-5-3-1 (11 Feb 10), as a circle 1.5nm radius, at a position 535744N 0025007W, with a vertical limit of FL95 and activity notified on the day to London Area Control (Swanwick) and alternative contact 129.900MHz.

Blackpool ATSU advised that the ATC log for the 21 July 2012, indicated that Cockerham had reported active from 0645 UTC and was expected to be active until 1900 UTC. Blackpool ATC normally include this information on their ATIS for the benefit of departing and arriving ac. Overflights would normally be advised of the activity.

CAA ATSI had access to: RTF recording of Blackpool Radar; area radar recordings and written reports from both the pilots. The ATC unit were not immediately aware of the AIRPROX and there was no record of an incident in the ATC watch log. The controller concerned has retired since the date of the incident. The QNH used by the radar system was the London QNH of 1024 hPa.

The weather for Blackpool is provided:

METAR EGNH 210820Z 28004KT 240V330 9999 FEW018TCU 15/13 Q1024=

METAR EGNH 210850Z 30005KT 260V330 9999 FEW022TCU 16/12 Q1024=

At 0815, the C150 contacted Blackpool Radar on departure and a BS was agreed. The C150 reported in receipt of ATIS information 'INDIA'.

At 0840:01, radar recording showed the PC6 overhead the Cockerham drop zone at FL135 squawking 0033, indicating parachute dropping. The C150 was shown, without Mode C level reporting, tracking SW, 6.1nm NE of the PC6. The PC6 then descended rapidly and faded from radar cover in the vicinity of the Cockerham landing site.

The C150 continued to track SW and at 0844:16 is shown passing 2.5nm NNW of the Cockerham site. The PC6 was shown climbing from the site on a NW track, passing FL001. The distance between the two ac was 1.8nm.

At 0844:30, the controller advised an inbound helicopter that both Cark and Cockerham were active with parachute dropping.

At 0845:09, the PC6 had turned onto a SW track indicating FL014. The C150 was in the PC6's 1 o'clock at a range of 0.9nm and the tracks of the two ac were converging with the PC6 slightly faster.

At 0846:26, the PC6, at FL030, was shown 0.6nm behind the C150. The PC6 continued to catch up with the C150 on a similar track. At 0847:10 the distance between the two ac had reduced to 0.1nm, with the PC6 now maintaining FL034.

At 0847:21, the PC6 is shown passing less than 0.1nm to the R of the C150 (CPA). The PC6 was indicating FL034 (converts to 3697ft using QNH 1024 and 1hPa equal to 27ft). The C150 pilot's written report indicated flying at 3800ft and having sighted the PC6 within 100m to the R and below. The PC6 was shown to climb as the two ac continued on their slightly diverging tracks. Then at 0847:32 the PC6 made a R turn of 60° and the C150 made a L turn of 60°.

At 0848:05, the C150 requested a time check but made no mention of the Airprox.

The Cockerham Drop Zone was notified as active and it is likely that the C150 pilot was aware of this from the ATIS report. On returning to Blackpool, the C150 passed 2.5nm N of the Drop Zone site.

The PC6 departed from Cockerham drop zone and approached the C150 from behind, overtaking the C150 to the R, in close proximity, at a position 3.7nm WSW of the drop zone site.

Rule 11 of the RoA states:

'(1) Subject to paragraph (3), an aircraft which is being overtaken in the air shall have the right-of-way and the overtaking aircraft, whether climbing, descending or in horizontal flight, shall keep out of the way of the other aircraft by altering course to the right.

(2) An aircraft which is overtaking another aircraft shall keep out of the way of the other aircraft until that other aircraft has been passed and is clear, notwithstanding any change in the relative positions of the two aircraft.

(3) A glider overtaking another glider in the United Kingdom may alter its course to the right or to the left.'

The C150 had been operating for 32mins away from the airfield on a VFR training flight, in receipt of a BS and there was no requirement for the radar controller to monitor the flight. CAP774, UK Flight Information Services, Chapter 2, Page 1, Paragraph 1, and 5, state:

'A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.'

'Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a BS outside an ATZ, and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot's situational awareness. This will not normally be updated by the controller/FISO unless the situation has changed markedly, or the pilot requests an update. A controller with access to surveillance-derived information shall avoid the routine provision of traffic information on specific aircraft, and a pilot who considers that he requires such a regular flow of specific traffic information shall request a Traffic Service. However, if a controller/ FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

CAP774, UK Flight Information Services, Chapter 1, Page 1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

The Airprox occurred when the PC6 departed from Cockerham Drop Zone and climbed on a W track approaching the C150 from behind, passing to the R of the C150, which caused the pilot of the C150 to be concerned about the relative position and proximity of the PC6.

[UKAB Note(2): RoA 2007, Schedule 1, Section 4 'GENERAL FLIGHT RULES', Rule 9 'Converging' states:

'...

(3) Subject to paragraphs (1) and (2), when two aircraft are converging in the air at approximately the same altitude, the aircraft which has the other on its right shall give way.'

RoA 2007, Schedule 1, Section 4 'GENERAL FLIGHT RULES', Rule 8 'Avoiding Aerial Collisions' states:

'(1) Notwithstanding that a flight is being made with air traffic control clearance it shall remain the duty of the commander of an aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft.

(2) An aircraft shall not be flown in such proximity to other aircraft as to create a danger of collision.

...']

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

It was not clear why the Pilatus pilot had attempted to contact the C150 pilot using RT since the C150's track had provided adequate clearance from the Cockerham Parachuting Site. Members unanimously agreed that the Pilatus pilot, having seen the C150 crossing his nose from R to L at an estimated range of ½nm, had the responsibility to give way. He also had ample opportunity to do so in a manner that would not cause concern.

However, he chose to converge with the C150, climbing to its level and accelerating on a parallel track, such that he passed within 0.1nm with 50kts of overtake and pulled up into a climb as he passed abeam. The Board was satisfied that the Pilatus pilot was in a position to increase separation if the C150 had manoeuvred and therefore there was no risk of a collision. However, by conducting this manoeuvre and alarming the C150 pilot, the Pilatus pilot displayed a lack of airmanship.

PART C: ASSESSMENT OF CAUSE AND RISK

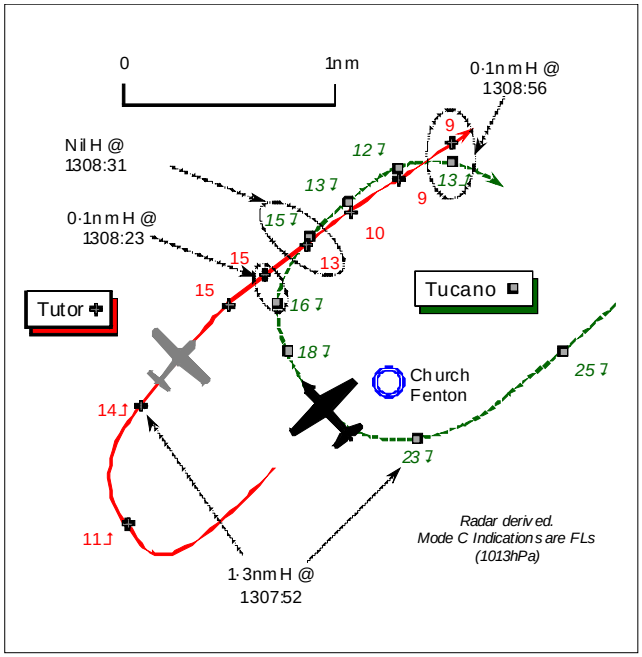
Cause: The Pilatus pilot flew close enough to cause the C150 pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 2012110

Date/Time: 24 Jul 2012 1308Z
Position: 5351N 00112W
(Church Fenton RW24RH cct - elev 29ft)
Airspace: Church Fenton MATZ/ATZ (Class: G)

	Reporting Ac	*Reported Ac*
Type:	Tucano T Mk1	Grob Tutor T Mk1
Operator:	HQ Air (Trg)	HQ Air (Trg)
Alt/FL:	1500ft↓ QFE (1015hPa)	1500ft QFE (1015hPa)
Weather:	VMC NK	VMC CLBC
Visibility:	NK	30km
Reported Separation:	200ft V/Nil H	2-300ft V/30m H
Recorded Separation:	100ft Min V @ 0·1nm H Nil H @ 200ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO T Mk1 PILOT reports he was flying solo in the cct to RW24RHC at Church Fenton and in communication with TOWER 'under MATZ control' on 234·1MHz. Setting up at 2500ft QFE for a PFL from HIGH KEY, he had tracked a Grob Tutor climbing away into the cct from a touch and go and called 'HIGH KEY' just as the Tutor pilot commenced his upwind turn. He judged that he had sufficient clearance from the Tutor since the equivalent position to HIGH KEY is the downwind position. When his Tucano was half-way between HIGH KEY and LOW KEY, he heard the Tutor pilot call downwind with intentions so he continued to lookout for the Tutor toward the 'dead' wing. TOWER told the Tutor pilot that there was one ahead – his Tucano - and asked the Tutor pilot if he was visual with his ac, stating his Tucano's position, but he did not hear the Tutor pilot reply or transmit after this point. Still feeling confident that they were sufficiently de-conflicted, he elected to continue with the PFL. Around the LOW KEY position he made a radio call asking if the Tutor pilot was visual or not, since he had still not heard any radio call and so started to level-off at 1500ft QFE. Heading 060° at 110kt, glancing at the TCAS display he noticed a contact indicating directly below at -200ft and rolled R to look below, where he saw the Tutor about 200ft below his ac. Immediately he initiated a 'go-around', applying full power and turning toward the deadside whilst transmitting to the Tutor pilot, warning him that his Tucano was directly above and he was going around. The Tutor pilot subsequently transmitted that he was heading out to Initial. He was 'relatively sure' that if he had continued his descent there would have been 'a fair chance' of collision or at least a close call. Nothing more was said by TOWER on the RT and he repositioned for a glide cct with no further incident.

A squawk of A4506 was selected with Mode C; TCAS I is fitted. The ac is coloured black/yellow and the HISLs were on.

THE GROB TUTOR TMK1 PILOT, a student, reports he was flying solo in the cct to RW24RHC at Church Fenton and in communication with TOWER under a 'procedural service', he thought, on 234·1MHz. During the cct consolidation phase of his briefed sortie a Tucano pilot called to join the cct through HIGH KEY. When he called downwind for a glide cct for a touch and go, TOWER informed him that the Tucano was ahead between HIGH KEY and LOW KEY. He was visual with the Tucano and based on his limited experience, thinking his pattern would fit in behind it, he did not perceive the Tucano to be a threat at the time, so he continued with the pre-landing checks. During this process he neglected to update the position of the Tucano as he was pre-occupied with the checks. It was only as he closed the throttle, abeam the initial aiming point heading 060° at 80kt, that he once again became aware of the position of the Tucano and its close proximity to his Tutor. It was about this time that the Tucano pilot made an RT call trying to establish whether or not he was visual with the Tucano. He attempted to respond in the affirmative, but was unable to key the transmit button successfully in time. He then had to concentrate on

descending in order to maintain sufficient vertical separation from the Tucano. As the Tucano went around above his Tutor, he transmitted his intention to descend and reposition to Initial. He estimated the minimum separation as 30m horizontally and 2-300ft vertically and assessed the Risk as 'low'.

He added that he thought his pattern would fit in with the Tucano and only realised that this would not be the case quite late. Additionally, this was the first time he had flown in the cct solo in the company of a Tucano. The Traffic Avoidance System (TAS) was switched off in accordance with the current SOP, although he was visual with the Tucano from the beginning of the downwind leg as a result of the TI given by ATC.

A squawk of A4506 was selected with Mode C/S. The ac is coloured white with a blue stripe; the HISLs were on

THE CHURCH FENTON AERODROME CONTROLLER (ADC) reports he was screening a trainee controller at the time of this incident. The Tucano pilot called HIGH KEY with intentions whilst the Tutor was crosswind. The Tutor pilot established himself on the downwind leg and called downwind with intentions. The trainee ADC replied correctly, 'one ahead between HIGH and LOW KEY, surface wind…'. Due to his experience at Church Fenton the controller knew that the Tucano PFL profile placed ac descending from HIGH KEY directly above the Control Tower, and that they would be unsighted for most of the Tucano's descent until around LOW KEY; also if the Tutor pilot maintained his course and speed, there might be a confliction. He moved as close to the VCR windows as his headset wire would allow him to see the downwind leg better; although it is a visual cct, he instructed the trainee controller to ask the Tutor pilot if he was visual with the Tucano ahead and this was done immediately. The Tutor pilot did not reply instantly and after a few seconds the Tucano pilot himself transmitted his height and called 'LOW KEY gear down'. At this point he was still not visual with the Tucano from the VCR. The trainee ADC transmitted 'clear touch and go' and he then saw the Tucano descending at LOW KEY. Once he acquired the Tucano he assessed the relative positions, courses and speeds of the two ac and was concerned that the Tutor had not seen the Tucano as he had maintained his course and speed, although from his perspective in the VCR, the Tucano looked like it would turn inside the Tutor on final and therefore there would be no collision. The Tucano pilot then transmitted asking if the Tutor pilot had seen his Tucano passing his position relative to the Tutor. There was another short pause before the Tutor pilot transmitted that he was going out to Initial. The Tutor pilot's instructor was in the VCR and he informed her of the situation in order that she could debrief the pilot after he had landed.

BM SAFETY MANAGEMENT reports that this Airprox occurred at Church Fenton, between a Tucano conducting a PFL and a Tutor conducting a glide cct, both in contact with Church Fenton TOWER.

TOWER was manned by a trainee and an experienced mentor who described their workload and task complexity as low.

The incident sequence commenced at 1307:29, as the Tucano pilot reported, "*HIGH KEY touch and go*", which was acknowledged by the trainee ADC. At this point, the Tucano was 2.4nm NE of the Tutor, tracking SW'ly, indicating 2500ft; the Tutor was in a R turn onto downwind, indicating 1200ft. The Tucano pilot had reported visual with the Tutor as he approached HIGH KEY; however, he had lost sight of the Tutor at some point after leaving HIGH KEY.

At 1307:47, the Tutor pilot reported, "*downwind glide, touch and go*" and was advised by the ADC of, "*one ahead* [the Tucano] *between high and low key, surface wind 3-1-0, 0-7*." At this point, the Tucano was 1.7nm ENE of the Tutor, tracking SW'ly, indicating 2500ft; the Tutor was tracking NE'ly, indicating 1200ft. The Tucano pilot reported being aware of the Tutor pilot's downwind call and 'continued to lookout for him toward the 'dead' wing.

The mentor ADC reported that he 'knew that the Tucano PFL profile [would] put him descending from HIGH KEY directly above the Tower, that we [the ADC mentor and his trainee] would be unsighted for most of his descent until around low key, and that if the Tutor carried on his course and speed there might be a confliction'. As a result the mentor instructed the trainee to ask the Tutor pilot whether he was visual with the Tucano; the trainee did this at 1308:23, but the Tutor pilot did not respond.

[UKAB Note (1): At this point, the radar recording shows the Tucano was 0.1nm SE of the Tutor, in a right-hand turn passing through N, descending through 1600ft Mode C (1013hPa); the Tutor is tracking NE'ly, indicating 1500ft Mode C (1013hPa). At 1308:31, the Tucano contact indicating 1500ft merged with that of the Tutor tracking NE'ly indicating 1300ft. The ac remain within 0.1nm of each other, on similar tracks, within 300ft of each other until the contacts separate after 1308:56.]

Based upon analysis of the individual pilots' reports, it was not until just before the Tucano pilot broke the conflict at 1308:56, that both the Tucano and Tutor pilots became fully aware of the Tutor's proximity and were not visual with it prior to the initial 'merge' at 1308:31.

At 1308:35, the Tucano pilot reported, "*LOW KEY gear down*" and was, "*cleared touch and go*" by the trainee ADC. At 1308:43, the Tucano pilot readback the clearance and asked, "*is he* [the Tutor] *visual with me*?" and then immediately stated, "*I'm right on top of you*." The Tutor pilot replied, "[Tutor C/S] *descending downwind to* [2-sec pause] *initial*."

Subsequent to completing his report, the ADC mentor has confirmed that by 'moving as close to the window as his headset wire would allow' they were able to visually acquire the Tutor for much of the incident sequence; however, they did not acquire the Tucano until it reached LOW KEY. Moreover, the ADC mentor reported and confirmed in a subsequent conversation that immediately after they had visually acquired the Tucano, the latter's pilot questioned whether the Tutor pilot was visual with his ac.

The unit have completed a detailed investigation into this incident; however, this investigation was conducted without a radar replay. Consequently, the investigation concluded that the CPA occurred immediately prior to the Tucano pilot breaking the conflict at 1308:56. The BM SM investigation has determined that the CPA was earlier and the conflict prolonged, thus the severity of the incident was greater than it initially appeared.

In hindsight, the ADC mentor has acknowledged that they could have pursued a reply from the Tutor pilot to the question at 1308:23, whether he was visual with the Tucano. However, they were conscious of allowing the Tutor pilot time to reply and that both of the ac's pilots were trainees and should not, ideally, have their checks interrupted. Moreover, the CPA occurred at 1308:31, meaning that any follow-up action by the ADC would not have prevented the Airprox, merely alerted both pilots to their potential proximity and, arguably, shorten the duration of the conflict. Finally, both crews were operating within a visual cct where it was their responsibility to 'see and avoid', to use the available RT calls to enhance their SA and to integrate themselves according to the order of recovery correctly provided by the ADC. On that basis, given the timescales involved and the limitations on the ADC's lookout imposed by the construction of the Control Tower and the length of their headset lead, it is inappropriate to suggest that the ADC was in a position to affect the outcome of this incident.

THE TUCANO T MK1 PILOT'S UNIT comments that this was well handled by an inexperienced student. There are a number of points worth highlighting: the student had a strong understanding of the sequencing that should exist with regard to HIGH KEY and downwind calls, which is worth noting by QFIs teaching these elements of the course; the student had the confidence and captaincy to act when events did not seem to be correct; mixed traffic patterns can lead to more confliction than would otherwise be the case; and strong SA was provided by TCAS being selected on in the visual cct and ac squawking in the visual cct. We have had many discussions on the merit of squawking/selecting TCAS on in the visual circuit and this occurrence vindicates such a policy. It is perceived that this policy is not RAF wide across fleets or Stations, which is possibly worth wider consideration.

HQ AIR (TRG) comments that this incident was well handled by the unit and triggered a Safety Investigation, which resulted in several recommendations. The Tutor student appeared to be aware of the confliction following completion of his downwind checks and was faced with an uncomfortable decision on how to avoid a collision. A hard turn away might have been the best option but this would have placed him unsighted on the Tucano then descending and overtaking him from his high 4 o'clock. Clearly an earlier decision to continue when the Tucano called 'High Key' created the conflict and an orbit or widen to go around would have been more appropriate; further guidance on such situations will now be provided to students. The consideration of CWS settings in the circuit is also under review and its continued use in the circuit should be considered by all users of such equipment. However, the lack of TAS warning to the Tutor was not critical in this instance as the pilot appears to have been visual and to be able to take late but effective avoiding action; by contrast, the TCAS warning appears to have highlighted to the Tucano pilot that his presumption that the Tutor student had taken satisfactory steps to deconflict were incorrect. His questioning of the Tutor pilot's SA was commendable.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, radar video recordings, reports from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

Although the mentor ADC had suspected that a conflict might materialize between the two ac and was looking for the Tucano, it was unfortunate that he had not acted on his instincts to press his trainee for a reply from the Tutor pilot to confirm that he had the Tucano in sight. The BM SM report had highlighted that although this might have alerted the Tutor pilot to look for the Tucano, as the CPA occurred only moments later it would have had little impact on the outcome. The Board was concerned that the ergonomics of the Control Tower, coupled with the length of their headset cables had impeded the controllers' ability to look-out of the VCR; the HQ Air (Trg) Member briefed the Board that the use of a wireless headset is being investigated, which would allow controllers greater freedom. However, a controller Member who is familiar with the Control Tower layout at Church Fenton suggested that the Duty Instructor's (DI) position in the VCR is best placed to observe the cct now that the cct direction is RH on RW24 and the Board was briefed that the DI was in the Tower for the Tutor student's solo ccts. As the cct relied on visual acquisition and separation, it was the responsibility of both the Tucano and Tutor student pilots to sequence themselves appropriately in the pattern. In the Board's view, the Tutor student was probably operating at the limit of his ability for that stage of training, which led some Members to suggest that the DI could have been more circumspect and prompted his student what to do when the Tucano started the PFL.

The Tucano pilot was plainly aware of the Tutor in the cct when he passed HIGH KEY, had seen it climbing out from the 'touch and go' and perceived that he would be ahead of it in the pattern. He might also have expected the Tutor pilot to react to the 'HIGH KEY' call by extending upwind. In fact the Tutor pilot had already extended upwind from the point at which he would normally turn cross wind (500ft) in order to climb for a glide circuit (1500ft downwind) but this extension was insufficient to establish separation from the Tucano. As it was, the Tucano was between HIGH and LOW KEY when the Tutor pilot called downwind for his glide cct and a pilot Member perceived that this downwind call would have come earlier than the Tucano pilot expected and was the first clue that the Tutor was close by in both range and height. Nevertheless, TOWER correctly gave the Tucano priority in the cct and, in response to the Tutor pilot's downwind call, told the Tutor pilot that the Tucano was ahead of him in the landing sequence. Up until this call, the Tucano pilot would have been unaware that the Tutor pilot was practising the higher 'glide' cct, flown at 1500ft. This eroded any anticipated vertical separation against the Tucano still further as the latter descended toward LOW KEY, directly above the Tutor, which was not spotted on the Tucano pilot's TCAS display 200ft directly below him until after his query on the RT he reports. It seemed that the Tucano pilot's relative inexperience had allowed him to press on, unsighted on the Tutor but knowing he had priority in the cct, possibly discounting it as a factor, unaware until a late stage that separation was not assured against the Tutor below him. Critically, the Tutor student had also been unsighted for a period downwind and it was not until he was abeam his touchdown aiming point on the RW he reports that he re-acquired the Tucano, descending above him. The Board recognised that the student would have been confronted with a difficult situation with virtually no experience to fall back on, but he still had to 'give way' and avoid the Tucano as best he could. An orbit downwind was an option – albeit rather extreme; a Tutor pilot Member suggested another way would have been to have widened his cct somewhat, thereby affording the Tucano priority in the cct and avoiding an unfamiliar final turn for the inexperienced Tutor pilot. However, this could only have been accomplished if the Tutor student had maintained his lookout during his checks and remained aware of the Tucano as it descended towards him; given the cct priorities, this led some Members to conclude that the Cause was that downwind the Tutor pilot lost sight of the Tucano. It was evident from the recorded radar data that the conflict had persisted for the majority of the downwind leg and the two ac were within 0.1nm, just before the Tucano steadied abeam the A/D at 1308:23; this was also just the point the mentor ADC instructed his trainee to clarify if the Tutor pilot was visual with the Tucano a mere 100ft vertically above him the radar shows. A further 20sec elapsed before the Tucano pilot queried whether the Tutor student was visual with his ac and about the point that the radar recording shows the Tucano turning R, which is when its pilot probably appreciated what was happening. Members suggested that the Tutor pilot's inability to react and answer the RT showed how he might have been at the limit of his capacity. Moreover, given the Tutor pilot's stage of training, it was not clear if he had been taught how to sequence in the cct with a faster ac and pilot Members opined that the DI should have been more proactive here. The Board concluded therefore that this Airprox resulted because the Tutor pilot did not give way to the Tucano ahead. Members were reassured to learn from the HQ Air (Trg) comments that additional guidance on sequencing in the cct will be forthcoming for tyro students as a result of this Airprox.

Turning to the inherent Risk, the Tutor pilot's chosen option to resolve the situation was to descend below the Tucano whilst clearing the cct back to initial. It was evident from the recorded radar data that the Tutor was descending during the 'merge' downwind, albeit that the reducing Mode C indications could also be a reflection of the glide cct. However, the Tutor pilot reports he descended to maintain sufficient vertical separation from the Tucano, albeit that his recollection did not correlate entirely with the radar and RT recordings. Nevertheless, it seems he was aware of the problem and was trying to resolve it. However at these close quarters, given both

pilots' relative inexperience, the Board agreed that the safety of the ac involved had certainly been compromised in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:The Tutor pilot did not give way to the Tucano ahead.

Degree of Risk: B.

AIRPROX REPORT No 2012111

AIRPROX REPORT NO 2012111

Date/Time:	17 Jul 2012 2310Z	(Night)
Position:	5103N 00227W	(8nm E Yeovilton)
Reporter:	Yeovilton TC	
Airspace:	Yeovilton MATZ	(Class: G)
	1st Ac	*2nd Ac*
Type:	Lynx	C130 Hercules
Operator:	RN	HQ Air (Ops)
Alt/FL:	2000ft	>250ft
	QFE (1018hPa)	RPS (1018hPa)
Weather:	IMC (Night)	VMC CLBL
Visibility:	0km	10km
Reported Separation:		
	NK	>1nm
Recorded Separation:		
	600ft V/2.3nm H	

CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RNAS YEOVILTON APP CONTROLLER reports that he was the night supervisor, located in the Radar Room. A Lynx helicopter was conducting a PAR to RWY27 under IFR in IMC, with a DS from Yeovilton TDN [282.050MHz]. The weather was reported as 9000m in mist with cloud BKN at 2000ft and wind 260° at 6kts. When the Lynx was at 9nm [from touchdown] he observed a 'fairly fast moving contact', squawking 7001 and 'indicating 3000ft'. The contact was observed to head S from a position 14.5nm NE of Yeovilton, straight towards the Lynx. He attempted to call the unknown ac on both 234.300MHz (Yeovil APP) and 127.350MHz (Yeovil LARS) but received no reply. When the unknown ac was about 10nm N of the Lynx he issued avoiding action, via the PAR controller, for the Lynx pilot to 'maintain 2000ft [height, QFE 1018hPa] and turn L immediately to heading 120°'. The unknown ac continued to head straight towards the 8nm point on the PAR approach track, whilst descending, and the avoiding action was reissued as an immediate R turn to heading 190° along with instructions to re-contact Yeovil APP. Due to the unknown ac's greater speed, the two contacts converged with less than 0.5nm separation, he thought, 'within the same level as observed on Mode C'. Because of the rapidly unfolding situation, and with only two controllers on duty (APP and PAR controllers), both of whom were involved with the avoiding action, there was no opportunity to attempt to raise the unknown ac on UHF Guard frequency. He 'monitored the ac on radar' and, at 0022L, the Lynx pilot reported that the unknown ac in question appeared to be large and fast moving and that he believed it was a C130.

He assessed the risk as 'Very High'.

[UKAB Note(1): The weather for RNAS Yeovilton was reported as follows:
METAR EGDY 172318Z 19006KT 9000 BR FEW020 BKN045 14/14 Q1021 BLU BECMG SCT020 WHT]

THE LYNX PILOT reports that he was established on the PAR to RWY27. The SSR transponder was selected on with Modes A and C and a discrete squawk. The ac was not fitted with Mode S or an ACAS. He was operating in IMC, under IFR, with a DS from Yeovilton TDN. As he was approaching the initial descent point at altitude 2000ft [QNH 1018hPa], TDN issued avoiding action turns, initially on to heading 120° and then on to heading 190°, against unknown traffic N of him, tracking S at a similar height. The traffic was tracking through the Yeovilton MATZ stub but was not in RT contact with Yeovilton. He was transferred back to Yeovilton APP, on a DS, as the TDN controller lost radar contact but APP was unable to maintain 3nm separation. Shortly thereafter, he was advised that the conflicting traffic had cleared to the SE.

He assessed the severity of the occurrence as 'High'.

[UKAB Note(2): In a subsequent conversation with the Lynx pilot he stated that he was instructing a student crew, whilst seated in the rear of the ac. Following the TI calls he donned his NVG in an attempt to gain visual contact with the conflicting traffic but was unable to do so as he was in IMC.]

THE LYNX SQUADRON DUTY AUTHORISER reports he had noted that 2 x C130 were booked in to Night Rotary Region (NRR) 2 but with no route details. A NOTAM detailed entry timings for the 2 x C130 but they took the form of a block booking of 7 NRRs, all with the same entry time. He checked the Centralised Aviation Data Service (CADS) and noted that the 2 x C130 were shown as routeing from their home base to the Salisbury Plain Training Area (SPTA) but with no further route detail. The C130 Sqn was contacted but he was informed that the crews were not available as they were not yet on duty for their planned night flying. Additionally, he was informed that the C130 Sqn block-booked areas, with the final decision on routeing being made on the evening of the sortie.

THE C130 PILOT reports that he spoke with the Lynx crew by phone after the incident. It was agreed that safety of flight had not been compromised and therefore he did not feel obliged to submit an Airprox. He was informed some weeks later, after his return from Operations, that a controller Airprox had been filed and he then submitted the information he could recall through the Station FSO.

THE BRIZE NORTON STATION FSO reports the following, made after consultation with the Hercules crew and agreed 'by a representative' of the crew as an accurate reflection of events.

The [C130] crew were conducting low-level NVG training on a sortie that included operations over a number of 'dummy DZs', operating autonomously under VFR and IFR, using NVG, with the ac navigation and 'Grime' lights selected on. The SSR transponder was selected on with Modes A, C and S; the ac was fitted with TCAS and the RPS was set [1018hPa]. An approach reference for one of the DZs was located approximately 6.5nm E of Yeovilton, underneath the E [MATZ stub], with the DZ itself located approximately 1.5km W of the village of Stalbridge [10nm ESE of Yeovilton]. The crew planned to fly to the DZ at low-level [250ft MSD], transiting underneath the E'ly Yeovilton MATZ stub as they did so. They approached from the NE, through intermittently marginal Wx conditions. The Lynx helicopter was seen in the crew's L 11 o'clock at a range estimated at 4-5nm, they thought; however, at a position under the Yeovilton E'ly MATZ stub, the Wx deteriorated below minima and the ac captain executed a low-level Wx abort, iaw SOPs, which took them through the MATZ stub. The crew maintained visual contact with the Lynx helicopter during the Wx abort, which moved from the L 11 o'clock to the L 10 o'clock position and appeared to turn away from their track, they thought. Although the crew noted the proximity of the Yeovilton MATZ, they believed that the A/D was closed and that the MATZ was therefore inactive. Hence they did not attempt to establish RT contact with any Yeovilton agency. The crew also reported that TCAS was fitted but was 'working only intermittently' during the sortie and was not operating at the time of the incident. The crew did not perceive this event as an Airprox.

The Brize Norton Station FSO commented that this event raised a number of concerns and that investigation was ongoing. It was unclear why the crew thought the airfield would be inactive; the BINA entry is unambiguous on this point. The intermittent nature of the TCAS serviceability was also under investigation. The crew's perception of severity had been changed from the original submission of 'High' to one of 'Low', in order to reflect that the crew did not at any stage perceive this event as an Airprox.

The Brize Norton Station FSO further commented on why the C130 crew believed Yeovilton A/D to be shut. Yeovilton routinely closed at the end of the normal working day and reopened at a later time to cater for night flying and it would appear that the co-pilot phoned the station during this hiatus. It was further established that Yeovilton regularly operates night flying on 3 nights per week and, while they get the details of other flying activity that may affect them they do not, as a matter of course, promulgate their own flying activity. They would, however, expect ac transiting in their vicinity to contact them.

THE RNAS YEOVILTON DSATCO reports that, based on the findings of the RAF Brize Norton investigation there was no further action required to resolve this matter. Essentially, the C130 crew assumed that Yeovilton was closed and flew through the MATZ without clearance. Having seen the Lynx, the C130 crew remained visual at all times and were content that there was no risk of collision. However, they subsequently did not contact Yeovilton ATC, which was a cause for concern.

HQ NAVY COMMAND comments that it was disappointing to see that an assumption was made that Yeovilton was closed and therefore no attempt was made to call the unit when flying in such close proximity. This was fundamentally flawed and resulted in an infringement of the MATZ whilst station-based traffic was conducting an IFR recovery in IMC under a DS. Yeovilton routinely conduct Night Flying every Monday, Tuesday and Wednesday with Thursday used as a reserve night. This Airprox occurred on a Tuesday and the default assumption should have been that the airfield would be open. C130s have been operating in this area for many years and in my own experience of several tours at Yeovilton they have normally called on the ICF to alert the unit of their position. Had that been done on this occasion, the Airprox is unlikely to have occurred. It is understood that the C130 procedures have been reviewed and the correct NOTAM and CADS action has now been resumed. Several barriers to safety failed on this occasion, including an intermittent unserviceability to TCAS; notwithstanding the recorded separation achieved, this incident has served to highlight these failings.

HQ AIR (OPS) commented that they echo the concerns of the RAF Brize Norton SFSO and hoped that the Occurrence Safety Investigation (OSI) made recommendations that would prevent a repeat of this situation. In addition, it was disappointing to note that, although the Lynx Sqn Authoriser tried to use CADS to highlight any possible conflicts, the lack of detail on the Hercules task meant this barrier to MAC was not effective in this case.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the pilot of one ac and an 'agreed narrative' from the pilot of the other, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board first considered the degree of pre-flight coordination between RAF Brize Norton and RNAS Yeovilton. It was established that previous coordination had been achieved by a NOTAM, in this case the C130 Sqn, detailing the planned route Way Points (WPs) with location and timing. However, the constraints of the NOTAM required the C130 crew to fly the route to within ±5nm of the planned track and to within ±15mins of each planned WP arrival time. It was felt that this imposed an onerous degree of restraint to the requirement to achieve effective operational training; indeed a degree of restraint that prevented effective operational training in many instances. Additionally, other airspace users were often confronted with a NOTAM consisting of dozens of WPs, along with their associated data, against which it was often impractical to achieve deconfliction. Consequently, it was decided to undertake a one year trial whereby C130 crews would submit an area NOTAM, with entry and exit times to low flying areas, rather than a specific route. The Board agreed that whilst this undoubtedly increased flexibility for the C130 crews, to a large degree it removed any effective deconfliction from within the areas. The Military Low Flying Advisor commented that deconfliction had now reverted to the previous NOTAM system pending a review of procedure. It was also noted that at least 2 opportunities to achieve additional deconfliction had been missed and that personnel from both RAF Brize Norton and RNAS Yeovilton had attempted to coordinate with the other, to no avail. The Board expressed disappointment that neither organisation had sufficiently robust processes in place to capture and act on these attempts at coordination, especially in light of routine night flying at RNAS Yeovilton and the regular use of adjoining low flying area by C130 crews.

The Board then considered deconfliction action carried out on the night. It was agreed that neither crew was best served by the failure to achieve meaningful deconfliction before flight but the Board felt that on this occasion the onus of responsibility fell to the C130 crew. Some Members opined that routeing under the E stub of the RNAS Yeovilton MATZ amounted to poor planning, albeit understandable given the C130 crew's mistaken belief that Yeovilton was shut, and that they would have been better advised to attempt RT contact with Yeovilton as they neared the MATZ in marginal Wx conditions. In the event it was the C130 crew's climb into the Yeovilton MATZ stub without clearance that caused the Airprox.

The Board was unable to reconcile a disparate element of the reports, namely that the C130 crew maintained visual contact with the Lynx having aborted from LL due to the Wx but that the Lynx pilot was unable to establish visual contact with the C130 using his NVG. It was felt that this may have been a combination of the limited field of view of NVG, the dynamic environment of the helicopter changing heading whilst the Lynx pilot was attempting to scan along a line of bearing, given by Yeovilton APP TI, and the variable Wx conditions.

Additionally, The Board agreed that the information required to conduct an accurate analysis of this incident had not been satisfactorily captured as evidenced by the lack of an Airprox report from the C130 pilot. The Board Secretariat noted that a total of 8 Defence Aviation Safety Occurrence Reports (DASOR) were associated with this

incident. The MAA Advisor stated that whilst the elements concerned had all provided meaningful and valuable data, some had not carried out Airprox reporting iaw the relevant MAA regulations and that this error would be followed up.

Finally, the Board considered the disparate risk assessments from the Yeovilton APP Controller and the C130 crew. A Military ATC Member stated that this was probably due to an incorrect assessment of the miss-distance by the APP Controller as he looked across at the PAR scope and saw the contacts converging but without fully appreciating the non-linear scale of the display. The Board agreed that the available radar information strongly indicated a CPA of the order of 2.3nm and that consequently safety margins were not 'much reduced below the normal'.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C130 crew penetrated the Yeovilton MATZ without clearance.

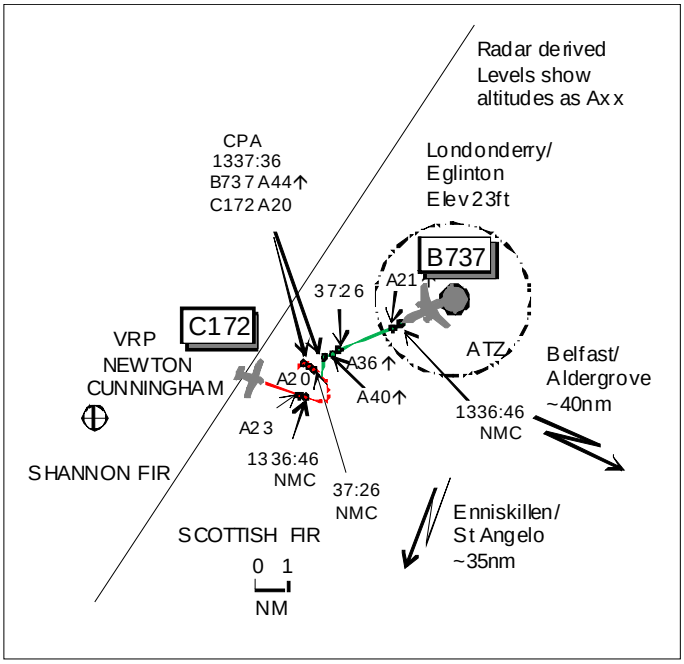
Degree of Risk: C.

AIRPROX REPORT No 2012112

AIRPROX REPORT NO 2012112

Date/Time: 27 Jul 2012 1338Z
Position: 5501N 00717W
(5nm SW Londonderry - elev 23ft)
Airspace: SFIR (Class: G)
Reporter: Londonderry ADC/APP

	1st Ac	*2nd Ac*
Type:	B737-800	C172
Operator:	CAT	Civ Trg
Alt/FL:	1800ft↑ (QNH)	2000ft (QNH)
Weather:	NK NR	VMC CLBC
Visibility:	NR	20km
Reported Separation:	NR	Not seen
Recorded Separation:	Nil V/3·3nm H or 2400ft V/0·6nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LONDONDERRY ADC/APP reports that the departing B737 was airborne at 1336. Previously the flight had been given TI on an ac [AC3, not the C172] not above 2000ft 13nm SW of the aerodrome and departure instructions of, "RW26 straight ahead altitude 2500ft or above before turning L to BEL". At 1337, before the flight made its L turn and when about 3-4nm W of the aerodrome, the crew reported passing a contact 100ft below their ac. He could see the B737 but no other ac and the crew was told this. As the crew made no further remarks the flight was transferred to Scottish Control. He spoke to Belfast Radar controller and asked if he could see the departing B737 and explained what happened. The only radar contact that Belfast could see W of Londonderry was the B737. The ac about which the B737 flight was given TI was much further S than had been passed and was in contact with Belfast, the controller confirmed the ac's location. Later the Belfast controller telephoned and advised that a C172 flight on a navex from Enniskillen to Newtownards had reported at Dungiven at 1346. As the student pilot of this ac was uncertain of his position, believing in fact that he was at Toome, the controller wondered if this C172 was the conflicting ac. The C172 pilot had said that he had been lost earlier in the flight and was instructed to land at Belfast, which he did. The next day a Belfast controller telephoned to say that after reviewing the radar replay for the relevant period the B737 could be seen climbing out from Londonderry but there were no other contacts. When the C172 pilot contacted Belfast the ac was 8nm S of Londonderry, just W of Dungiven. This ac flew from Newtownards to Enniskillen earlier in the day and had been issued a 7034 squawk code and was still using code on the return flight. If this ac had been transponding continuously, the departing B737 crew should have seen the ac before departure.

THE BELFAST RADAR 1 CONTROLLER reports that at 1346 the C172 flight contacted Belfast on 128·5Mhz and the pilot reported being unsure of his position. After establishing that the pilot was clear of cloud and visual with the ground, the flight was identified and informed of its position from Belfast/Aldergrove and with reference to towns in its vicinity; the ac was approximately 4nm SE of Dungiven. The C172 pilot believed his ac to be nearer to Toome Bridge which is 15nm further to the SE. Subsequently the pilot reported visual with a motorway and intending to route to Newtownards. The pilot reported on a navex from Enniskillen to Newtownards flying solo. The QNH was passed and the ac's altitude appeared accurate. He updated the pilot with towns en-route; however, the pilot turned away from his anticipated route and heading checks indicated that the ac's compass was probably incorrect. The pilot was informed of geographical features within his area and was advised to follow the Western shore-line of Lough Neagh, which he did. Belfast City ATC was advised of the ac. During the event Radar 2 was

manned and some traffic was transferred to 120·9Mhz. At approximately 1358 another controller took over the control position and as Watch Manager he contacted Newtownards Flying Club. The club representative stated the C172 pilot had 80hr experience and the ac had 4hr endurance on departure from Newtownards and it was anticipated the ac had sufficient fuel for another 1hr and 10min. The radar controller continued to provide assistance to the C172 flight and as the ac reached Lurgan/Portadown the pilot reported some Wx ahead. Assistance was given to join Belfast CTR from the SW towards Nutts Corner VRP, landing clearance was coordinated with ADC and the ac landed safely at 1420. Five minutes before the C172 flight contacted Radar passing Dungiven at 1346, Londonderry ATC enquired whether there was any traffic on Belfast's frequency which may have flown within their vicinity; Dungiven is 10nm SE of Londonderry.

THE B737 PILOT reports after take-off from RW26 at Londonderry, IFR when passing through 1800ft a TCAS contact was observed. This traffic became 'proximate' in their 11 o'clock showing 100ft vertical separation and 2-3nm laterally. This traffic was at approximately 2000ft and their flight conditions were intermittently VMC; the ac was not seen. They continued to climb straight ahead to 3000ft and turned L towards BEL once separation was assured; neither a TA or RA was received. During a subsequent telephone conversation with Londonderry ATC Supervisor it was revealed an Airprox had been filed after it became clear that the intruding ac was flown by a student pilot who was unaware of his position. He thought that the controller interpreted the minimum separation of 100ft in isolation. Whilst he, the Capt, was satisfied that no immediate risk of collision had occurred, given the Class G airspace surrounding Londonderry the situation highlights the requirement for radar information to be made available to CAT ac.

THE B737 COMPANY SAFETY DEPT comments that they did obtain agreement from Belfast some years ago to provide low altitude radar service to fill the gap between handover from Scottish to Londonderry. This will be investigated to see if it can be revived as at least an SSR signal may be detected by Belfast even if intervening terrain prevents primary returns.

THE C172 STUDENT PILOT reports departing Enniskillen VFR squawking with Modes S and C. The visibility was 20km flying 2000ft below cloud in VMC and the ac was coloured white/blue with strobe lights switched on. After departing Enniskillen flying at altitude 2000ft QNH at 100kt he encountered bad Wx and diverted to the N. After a period the Wx improved and upon identifying his position S of Londonderry he contacted Belfast/Aldergrove and informed them of his position. He diverted into Aldergrove owing to visibility and cloud base and landed safely. At no time did he see a B737 but if he had evasive action would have been taken.

ATSI reports that an Airprox was reported when the B737 came into proximity with a C172 at approximately 2000ft altitude as the B737 climbed-out from Londonderry/Eglinton RW26.

The B737 departed Londonderry/Eglinton on an IFR flight to Birmingham and was in receipt of an Aerodrome Control Service from Londonderry/Eglinton ATC on 123·625MHz. The B737 was squawking Mode A code 6012.

The C172 was on a VFR navigational exercise from Enniskillen/St. Angelo to Newtownards and the pilot had departed Belfast Aldergrove earlier that same day with the Mode A code 7034 for its inbound flight to Enniskillen/St. Angelo.

Londonderry/Eglinton ATC provides Aerodrome Control and Approach Procedural services without the aid of surveillance.

ATSI had access to both pilot reports, reports from ATC at Londonderry/Eglinton and Belfast Aldergrove, recorded area surveillance (Prestwick Multi Radar Tracking (MRT)), transcription of frequencies 123·625MHz (Londonderry/Eglinton) and 128·5MHz (Belfast Aldergrove Approach). Additionally a video of the Malin Head radar was provided by the Irish Aviation Authority.

METARs for Londonderry/Eglinton were:

EGAE 271320Z 29017KT 9999 FEW030 SCT034 17/10 Q1014=

EGAE 271350Z 29018KT 9999 FEW030 SCT034 18/10 Q1014=

AIRPROX REPORT No 2012112

At 1257:01 UTC an ac displaying code 7034 is seen departing the vicinity of Enniskillen/St. Angelo to the NW at FL020. The contact is visible on Prestwick MRT for 40sec before disappearing. For the purposes of clarity in the remainder of this section the 7034 contact shall be assumed to be the C172.

At 1302:34 the C172 reappears for just over 1min on MRT 8nm NW of Enniskillen/St. Angelo at FL015. The contact reappears on MRT again at 1308:24, 13·3nm N of Enniskillen/St. Angelo at FL017 before fading 8sec at 1308:24. MRT did not redetect the C172 until 1342:09 i.e. after the Airprox.

Throughout the period of recorded surveillance replay observation another ac, AC3, is observed operating in the vicinity of the Sperrin Mountains [High ground ranging ~15nm from S to SE of Londonderry] at recorded altitudes not above 2000ft.

Between 1316:37 and 1316:52 the Malin Head (MH) radar detects the C172 in the Shannon FIR, 9nm S of Letterkenny aerodrome [26nm SW Londonderry], near Ballybofey; NMC level information was detected.

At 1331:57 the C172 was detected again by MH 5·5nm NE of Letterkenny aerodrome. The ac was on an E'ly track and NMC level information was detected.

The MH radar continues to detect the C172 on its E'ly course (Mode A only) until 1332:07 when the C172's Mode C appeared as altitude 1200ft, 1·7nm NNW of the Newton Cunningham VRP [12nm final approach RW08 Londonderry]. This position is underneath Eglinton CTA-1 in Class G uncontrolled airspace. The contact disappears at 1332:48 having taken-up a SE'ly track.

The C172 was detected by MH as it passed over the Newton Cunningham VRP at 1333:26 on an E'ly track; no level information was detected.

At 1333:50, as the B737 was lined-up and waiting for departure from Londonderry/Eglinton RW26, it was passed its departure clearance to Birmingham, via the Belfast VOR (BEL), with climb to FL250. At 1334:20 the B737 flight was further instructed to fly straight-ahead until passing 2500ft when it could turn left for the BEL. After reading back its clearances the B737 flight was informed by ATC, *"you might see about thirteen miles southwest be one aircraft he's not above two thousand feet."* The B737 flight was cleared for take-off at 1334:30.

At 1335:51 the C172 reappears on the Shannon/Scottish FIR boundary at a position 7·3nm on the extended C/L RW26 Londonderry/Eglinton. Five seconds later the MH radar detects the C172 at altitude 2100ft. The ac is proceeding on an E'ly track and indicates altitude 2200ft at 1336:03.

The B737 appears on the MH radar at 1336:46 with the C172 proceeding ESE'ly in its 1130 position, range 3·9nm. The C172's previous radar update shows the C172 at altitude 2300ft however, as the B737 becomes airborne, no level information was detected from either ac.

At 1336:50 the B737 crew reported on 123·625MHz, "*we've got er traffic two and half miles ahead just a hundred feet below us."* The controller responded at 1337:00, "*er that I know nothing about sir I'm sorry about that."*

The B737 passes through altitude 2300ft, the last reported altitude of the C172, at 1336:56; however, at this time, the C172 is not detected by MH, with only the C172's ESE'ly track history remaining on screen. The B737 is 3·3nm from the last recorded position of the C172.

The B737 continues to climb straight ahead passing 2500ft, 2700ft, 2900ft and 3200ft on sequential updates of the radar.

At 1337:26 the C172 reappears in the B737's 12 o'clock at a range of 0·9nm routeing from the L as the B737 climbs through 3600ft; the C172 is now on a NNW'ly track.

The next update of the MH radar at 1337:31 shows the C172 at 2000ft in the B737's 12 o'clock, range 0·9nm, as the B737 climbs through 4000ft. *See Figure 1 below.*

Figure 1. Malin Head Radar – 1337:33 UTC

[UKAB Note (1): CPA occurs on the next radar sweep at 1337:36 as the B737, climbing through altitude 4400ft, passes 0·6nm E of, and 2400ft above, the C172 indicating 2000ft.]

The B737 continues to climb at a rate in excess of 4000fpm as it makes a L turn towards BEL. The C172 maintains altitude 2000ft as it makes a wide LH orbital manoeuvre before rolling-out on a SE'ly track.

At 1337:50 the B737 flight was transferred to Scottish Control.

Between 1338:00 and 1340:00 a call was made between Eglinton Tower and Aldergrove Approach in which the Eglinton controller enquired about the position of AC3. This was given by Aldergrove as being in the Magherafelt area [25nm SE Londonderry]. The Eglinton controller then reported that the departing B737 crew had observed another ac 100ft below it and asked the Aldergrove controller if any other ac could be seen in the vicinity. The Aldergrove controller reported that there was not and that he was not aware of any other ac going over in the direction of Londonderry/Eglinton.

At 1345:10 the C172 pilot called Aldergrove Approach, reporting, "*…student pilot I got into cloud there erm over er Derry direction er just for your information over*." ATC then confirmed that the C172 was squawking 7034 and the pilot's intentions were ascertained. Aldergrove Approach provided the pilot with extensive navigational assistance and it became apparent that the C172's compass was giving grossly incorrect readings. As the weather closed in on Belfast the pilot elected to be guided into Aldergrove Airport where a successful and safe landing was made.

Although the intended routing of the C172 is not known, the radar data suggests that the aircraft flew N from Enniskillen/St. Angelo, passing Letterkenny, until Lough Swilly where it turned to the E to pass the Newton Cunningham VRP. The C172 then executed a wide orbital manoeuvre over the City of Derry/Londonderry, where its pilot subsequently reported getting into cloud. There was no indication that the C172 pilot was aware of the presence of the departing B737.

The B737 departed in accordance with its clearance. Its crew had been informed about the presence of AC3 traffic further S, which may have heightened the pilots' awareness of other traffic in the vicinity. Neither they nor the Londonderry/Eglinton controller were aware of the presence of the C172 to the W of the aerodrome in Class G uncontrolled airspace.

The available radar data was intermittent. The ac appears to be at the same level at 1336:56, 2300ft, at approximately 3·3nm distance. Later, as the C172 reappears in the B737's 12 o'clock, range 0·9nm, there is 2000ft vertical distance between the 2 ac.

The Airprox occurred in Class G uncontrolled airspace W of Londonderry/Eglinton aerodrome when a B737 departing RW26, in the climb to FL250, came into proximity with a C172 at 2000ft manoeuvring O/H the city.

Neither ATC nor the B737 crew were aware of the presence of the C172 beforehand, the pilot of which had very likely become disorientated/lost on a navigational exercise.

AIRPROX REPORT No 2012112

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It appeared to Members that the C172 pilot was significantly off-track when, in his written report, he diverted to the N owing to bad Wx not long after departing Enniskillen. If he had intended to route on a direct track between Enniskillen and Newtownards, this would have passed >30nm S of Londonderry. As it was the C172 is captured on recorded radar routeing through Irish airspace when to the W of Londonderry before turning to the E/SE. It was when the C172 pilot commenced an orbit over the city of Derry/Londonderry that its presence was noticed by the B737 crew. Pilot Members concurred with the B737 crew's viewpoint that the Londonderry controller had probably taken the 100ft vertical separation reported on the RT in isolation whereas this had occurred when the B737 and C172 were shown on the recorded radar to be over 3nm apart. The B737 crew had seen the C172 on TCAS and continued their climb straight ahead, ensuring that they passed well above the Cessna before turning L towards BEL; these actions had negated the generation by TCAS of any TA or RA warnings and had turned this incident into a benign encounter. Members agreed that incidents like this can occur at any time when TCAS-equipped ac operate from a non-radar equipped airport in Class G airspace. In the absence of any RT calls from the C172 pilot the Londonderry controller could not have known about the C172. There could be any number of ac operating VFR in the vicinity not talking to the ATSU at an adjacent airport, highlighting the need for CAT aircrew to be ever vigilant for the appearance of unknown traffic in Class G. All of these elements, when combined, were enough to allow the Board to classify this incident as a controller perceived conflict, where normal safety parameters and procedures pertained and any risk of collision had been effectively removed.

The NATS Advisor informed Members that provision of radar services to Londonderry traffic from Belfast/ Aldergrove, prior to transfer to Scottish ACC, was not practicable owing to lack of low level coverage, cited as 3000-3500ft.

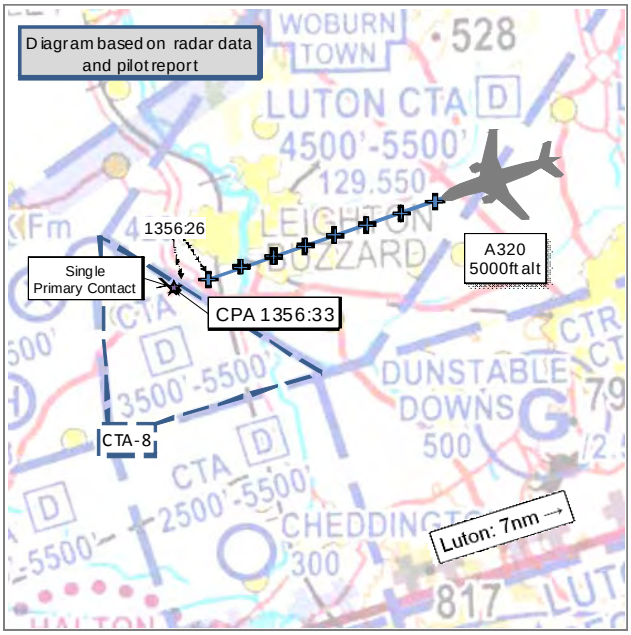
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived conflict.

Degree of Risk: E.

AIRPROX REPORT NO 2012114

Date/Time:	25 Jul 2012 1357Z	
Position:	5154N 00042W (Luton radar pattern DW RW08)	
Airspace:	Luton CTA	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	A320	Untraced Glider
Operator:	CAT	NK
Alt/FL:	5000ft (QNH 1017hPa)	NK (NK)
Weather:	VMC NR	NK
Visibility:	NR	NK
Reported Separation:	200ft V/300m H	NK
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports reaching the end of the radar pattern downwind leg for RW08, heading 260° at 220kt [altitude 5000ft, QNH 1017hPa]. He was operating in VMC under IFR with an 'approach service' from Luton APP. The SSR transponder was selected on, with Modes A, C and S, as was the TCAS. He was instructed by ATC to turn L on to heading 180° for the base leg. During the turn he saw a white glider 300m off the L wing, about 200ft below him, which he immediately reported to ATC. The response from the controller was that they were 'not in a glider area' and that there was no traffic on the radar.

He assessed the risk of collision as 'High'.

[UKAB Note(1): Radar recordings of the area clearly show primary and secondary returns from the A320. The Heathrow 10cm radar shows a single primary return in the reported Airprox position at 13:56:26, with the A319 crossing that position and starting the L turn at 13:56:33. A primary return is then seen just to the S of the Airprox position, as the A320 rolls out on to heading 180°. This contact immediately fades and then reappears at 13:57:28 and tracks to the NE before fading again at 14:00:35, by which point the A320 is at 7nm on final approach to RW08. Regrettably, due to the multitude of pop-up and fading primary returns in the area, it has not been possible to trace the glider pilot.]

ATSI reports that an Airprox was reported by an Airbus A320-232 (A320), in the London Luton Control Area (CTA–8), which comprises Class D airspace from altitude 3500ft to 5500ft, when the A320 came into conflict with a glider.

The A320 was operating IFR on a flight from Prague (Ruzyne) to London Luton and was in receipt of a RCS from Luton Radar [129.550MHz]. The glider has not been identified.

CAA ATSI had access to recordings of RTF from London Luton Radar, area radar recordings and a written report from the pilot of the A320.

The London Luton METARs were reported as follows:

METAR EGGW 251350Z 00000KT CAVOK 26/14 Q1017=

METAR EGGW 251420Z 04005KT 350V080 CAVOK 27/14 Q1017=

AIRPROX REPORT No 2012114

At 1349:50 the pilot of the A320 contacted Luton Radar at altitude 5000ft, heading 270°. He was instructed to turn L heading 255°. The heading of the A320 was adjusted to 245° and then back again to 255°.

At 1355:10 the A320 pilot was 'downwind left hand' at altitude 5000ft. Using radar replay of the Heathrow 10cm radar an intermittent primary contact could be seen on L base to Luton RW08; however, on the Multi-Radar Tracking (MRT) no primary contact was visible.

At 1356:39, using the Heathrow 10cm radar, a primary return could be seen just ahead of the track of the A320 although no primary return could be seen using the MRT. The default display for Luton Radar is MRT.

At 1356:40 the pilot of the A320 reported that there was, "*a glider about just two hundred feet below us now on the left wing*" to which the Luton Radar controller replied that nothing was showing on radar and the A320 pilot responded, "*yeah but he was there just er fairly close*". The A320 was vectored for the ILS approach and landed without further incident.

In certain circumstances, when Luton is using RW26, CTA-8 is available for use by RAF Halton and Dunstable Downs gliding sites up to 4500ft. Luton were using RW08 all morning prior to the Airprox report. A section of airspace to the S of CTA-8 is delegated to Dunstable Downs on request during RW08 operations but only up to 3500ft.

Although a primary contact was visible on radar using the Heathrow 10cm radar, there was no primary contact visible using the MRT picture. Even if the primary contact had been visible on the MRT the Luton Radar controller would have assumed that any ac associated with the contact would have been operating below 3500ft, beneath CAS.

An Airprox was reported by an A320 pilot, in the London Luton Control Area (CTA–8) when the A320 came into conflict with a glider.

The Luton Radar controller was unable to provide instructions or advice that would have provided assistance in avoiding the conflict.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Reporting Pilot, RTF recordings and radar video recordings.

The Board's discussion was limited by the lack of information available and unsuccessful tracing action on the glider pilot, resulting in much of the Board's deliberation being conjecture. Some Members opined that the conflicting ac was operating below Class D airspace at relatively low altitudes and may therefore have been a motor-glider, based some distance away. Alternatively, Members opined that a glider pilot from the local area would have been acutely aware of the complexity of the local airspace structure and restrictions and offered a number of possible scenarios:

The glider pilot may have been flying with the mistaken belief that Luton was operating on RW26 and used the CTA-8 airspace up to altitude 4500ft iaw local agreements.

The radar picture is subject to error and with an actual Airprox position slightly to the E, the glider pilot could have been flying legally in Class G airspace up to altitude 4500ft.

Given that modern, high-performance gliders can have wing-spans approaching that of short-haul airliners, the A320 pilot may have under-estimated the vertical separation from the glider. In which case, the glider pilot may have been operating legally in Class G airspace below the Luton CTA

In the absence of a report from the glider pilot, or consistent recorded radar data of his track, it was not possible to determine whether this was a benign incident or an infringement of Class D airspace.

PART C: ASSESSMENT OF CAUSE AND RISK

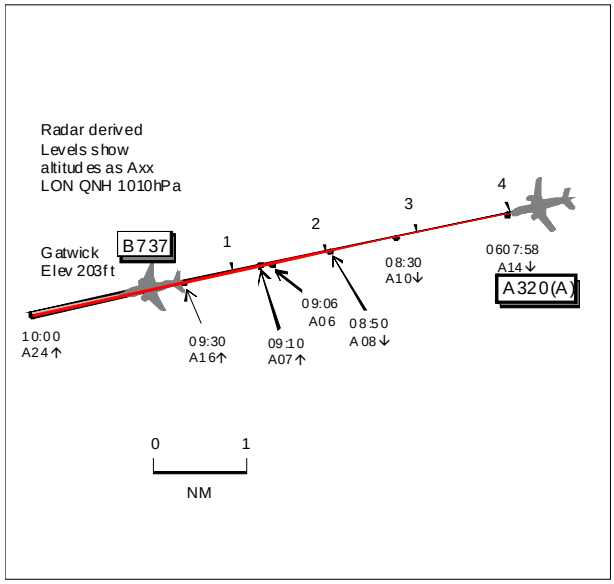
Cause: Sighting Report.

Degree of Risk: D.

AIRPROX REPORT No 2012115

AIRPROX REPORT NO 2012115

Date/Time:	4 Aug 2012 0609Z (Saturday)	
Position:	5109N 00011W (Threshold RW26L Gatwick - elev 203ft)	
Airspace:	ATZ	(Class: D)
	Reporting Ac	*Reporting Ac*
Type:	B737-400	A320(A)
Operator:	CAT	CAT
Alt/FL:	On ground	500ft↓
	QNH (1010hPa)	QNH
Weather:	VMC RAIN	NK NR
Visibility:	8km	NR
Reported Separation:		
	NR	NR
Recorded Separation:		
	>1500ft V/Nil H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports departing Gatwick, IFR and in communication with Gatwick Tower. They were cleared to, "line-up after the departing A320 on RW26L", which they read back and followed the A320 [A320(B)] onto the RW via Taxiway A. Entering the RW there was an ac on approach seen on TCAS at 1500ft and approximately 4·5nm. As A320(B) was airborne ATC cleared the ac on approach to land RW26L. Immediately the Capt advised ATC, "(B737 c/s) still on RW26L" but the approaching ac's crew confirmed, "clear to land". The Capt broadcast again, "negative, go-around, (B737 c/s) still on RW26L" before ATC gave the recently departed A320(B) flight a frequency change. The FO then broadcast, "(B737 c/s) still on RW26L" twice before ATC told the approaching ac's crew to go-around. The Capt commented that it was a busy morning, they were 1 of 5 ac at the hold with landing ac. Cloud was at 400ft with slight rain in the vicinity. They had considered clearing the RW at Taxiway B, the Capt called, "go-around" after the landing ac's crew confirmed landing clearance to mitigate the situation and prevent an accident.

THE A320 [A320(A)] PILOT reports inbound to Gatwick and receiving landing clearance at 500ft on final for RW26L. At the same time a B737 crew reported that they were still on the RW at the threshold. ATC immediately instructed them to go-around, which they did before performing another approach to RW26L. He assessed the risk as high.

THE GATWICK AIR CONTROLLER reports he had just launched an ac, an A319, on a BOGNA departure followed by an A320 [A320(B)] on a DVR departure 1min behind. A B737 was lined-up on the RW when the first departure, the A319, requested a L turn onto heading 220°, owing to Wx, which he approved level-capping the flight to 3000ft and coordinating with Radar. He asked Radar if he could keep the flight climbing to 5000ft which was approved. He then inadvertently selected the B737 strip as airborne (possibly incorrectly correlating it with the A320(B) radar return) and after looking at the Electronic Flight Progress Strip (EFPS) display and the final approach ATM he cleared the A320(A) to land. There was a blocked transmission and his immediate thought and reaction was to confirm the landing clearance. There was another blocked transmission which ended with a clipped transmission from the B737 pilot stating he was on the RW. He then realised he had inadvertently issued a landing clearance whilst the B737 was still awaiting take-off clearance. He heard a go-around transmission which he then acknowledged and instructed the A320(B) flight to climb straight ahead to maintain 3000ft. A320(B) was subsequently turned onto 180°, the ac commencing the go-around at about 1·5nm.

ATSI reports that the Airprox was reported in the Gatwick ATZ (Class D airspace), which comprises a circle radius 2·5nm centred on the longest notified RW (08R/26L) up to 2000ft above aerodrome level (203ft), between a B737 and an A320 [A320(A)].

The B737 was operating on an IFR flight from Gatwick to Marseille and was in receipt of an Aerodrome Control Service from the Gatwick AIR controller on frequency 124·225MHz.

The A320(A) was operating an IFR flight from Geneva to Gatwick and was in receipt of an Aerodrome Control Service from the Gatwick AIR controller on frequency 124·225MHz.

CAA ATSI had access to recordings of RT from Gatwick Tower together with area radar recordings, and recordings from the Gatwick ATM and ASMGCS. ATSI also had access to written reports from both pilots and the AIR controller and a copy of a Human Factors interview carried out with the AIR controller.

The Gatwick METARs are provided for 0550 and 0620 UTC: EGKK 040550Z 19004KT 160V220 9999 SCT010 SCT018 15/14 Q1011= and EGKK 040620Z 17005KT 130V210 9999 FEW009 SCT015 15/14 Q1011=

Prior to the incident A320(A) was on final approach for RW26L at Gatwick with 3 ac due to depart ahead – an A319, another A320 (A320(B)) and the B737.

At 0606:10 the A319 flight was cleared for take-off.

At 0606:40 the B737 flight was instructed to line up after the departing A320(B).

At 0607:10 the A320(B) flight was cleared for take-off.

At 0607:20 A320(A) flight checked in on the AIR frequency and was instructed to continue approach.

At 0608:00, as A320(B) became airborne, the previously departed A319 requested a L turn for Wx avoidance onto 220°. The AIR controller instructed the A319 flight to maintain 3000ft and approved the turn onto 220°. A320(A) was approaching a 3·5nm final.

The AIR controller coordinated the turn and a climb to 5000ft for the A319 with the Radar controller. At the completion of the coordination phone call, A320(A) was 2·5nm from touchdown. The B737 was still on the RW awaiting take-off clearance.

The AIR controller was surprised at how much closer the A320(A) was to touchdown at completion of the phone call. The EFPS for the B737 was still in the RW bay of the display but the controller assumed that he had forgotten to move the strip during the phone call. The controller moved the strip into the departure bay without observing the ATM or looking out of the window.

At 0608:30 the AIR controller cleared the A320(A) flight to land.

When the A320(A) crew read back the landing clearance the transmission was blocked. According to the written report from the pilot of the B737 they immediately transmitted that they were still on the RW when the A320 flight was given landing clearance – it is likely that this is the transmission that blocked the A320(A) crew's read back.

The controller re-iterated the landing clearance to the A320(A) crew which was read back.

Immediately after this at 0608:50 the AIR controller instructed the A319 flight to climb to altitude 5000ft. The read back from the A319 crew was partially blocked by the FO of the B737 stating, *"????? ????? (B737 c/s) on runway two six left".* The Capt of the B737 then broadcast (0609:00) to the A320(A) "*(A320(A) operator) go around I say again go around*." The controller stated that he heard the tail end of the FO's transmission and looked out of the window to see the B737 still on the RW.

The A320(A) crew read back the instruction to go-around and immediately afterwards, having become aware that the B737 was still on the RW, the AIR controller instructed the A320(A) flight, *"(A320(A) c/s) continue er go around*

straight ahead er maintain three thousand feet", which was correctly read back (0609:10). A320(A) flight initiated the go-around at 1·25nm from touchdown, minimum altitude 600ft QNH.

The AIR controller had formulated a plan for the 3 departures ahead of A320(A) which required precise execution. When the A319 flight requested a turn for Wx avoidance which required a rapid response the controller's execution of the plan for the 3 departures was interrupted.

After the coordination phone call the controller was surprised at how much closer A320(A) was to touchdown than prior to the phone call and his priority became giving A320(A) flight landing clearance.

Although the electronic flight progress strip for the B737 was still in the RW bay the AIR controller made the mistaken assumption that the B737 was airborne and that the strip was in the wrong place. The controller did not look out of the window or check the ATM to confirm his assumption.

The situation was resolved by the Capt of the B737 instructing A320(A) flight to go-around quickly followed by the AIR controller giving positive instructions to the A320(A) crew to go-around and climb to altitude 3000ft.

An Airprox was reported when a B737 and A320(A) came into conflict at Gatwick when A320(A) flight was given landing clearance by the AIR controller whilst the B737 flight was still on the RW awaiting take-off clearance.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

It seemed that the telephone call to Radar to coordinate the A319's L turn and climb had distracted the AIR controller. His 1st action after that call was to move the EFPS of the B737 from the RW bay into the departure bay, without looking at the ATM or out of the window, before clearing A320(A) flight to land. The B737 crew showed excellent SA, which led the crew to broadcast that their ac was still on the RW but this transmission was blocked by the A320(A) crew's read back of their landing clearance. AIR, on hearing the blocked read back, re-iterated the landing clearance, which was read back correctly. AIR had then cleared the A319 to climb but the crew's read back was partially blocked by the B737 FO repeating that their ac was on the RW. With the B737 lined-up the crew was concerned about the A320(A) approaching from behind unsighted, which led the B737 Capt to broadcast go-around instructions to the A320(A) flight; this was read back by the A320(A) crew. Meanwhile, AIR had become aware of the B737's position from the FO's transmission and the Capt's instruction to go-around and when the A320(A) crew called going-around AIR had re-iterated the instruction and added an altitude restriction. The radar recording shows the A320(A) commencing the go-around at 1·25nm from touchdown having reached a minimum altitude of 600ft. Although this had had the potential to become a very serious incident, the actions taken by the B737 and A320(A) crews were enough to allow the Board to conclude that any risk of collision had been removed.

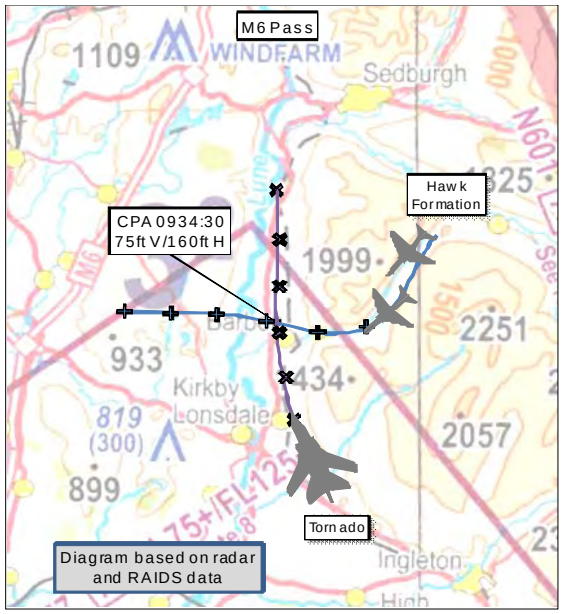
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The AIR controller cleared A320(A) flight to land while the B737 was on the RW awaiting take-off clearance.

Degree of Risk: C.

AIRPROX REPORT NO 2012116

Date/Time:	7 Aug 2012 0934Z	
Position:	5414N 00234W	(8nm SE Kendal)
Airspace:	Lon FIR - LFA17	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Tornado	Hawk TMk1
Operator:	HQ Air (Ops)	HQ Air (Ops)
Alt/FL:	550ft	↓250ft agl
	(1010hPa)	RPS (1012hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	10km	25km
Reported Separation:		
	75ft V/160ft H	75ft V/100-200ft H
Recorded Separation:		
	75ft V/160ft H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports flying a singleton low-level sortie [not below 250ft MSD], operating autonomously under VFR. The light grey coloured ac had navigation lights and HISLs selected on. The SSR transponder was selected on with Modes 3/A, C and S but the Tornado is not fitted with an ACAS. The ac was fitted with a RAIDS pod.

[UKAB Note (1): The Rangeless Airborne Instrumented Debriefing System (RAIDS) consists of ground equipment for data entry and replay and a data link pod fitted to the ac. Ac with RAIDS pods fitted are capable of data linking when in proximity such that a range of parameters, including separation range, can be recorded and assessed at the ground station.]

He descended to low-level at approximately 0925, having previously conducted an approach to RAF Linton-on-Ouse, and made a 'blind call' on the low-level common (LLC) RTF [278.000MHz] to state the location and direction of his route. At 0934:30, as he headed N at 430kt towards the 'M6 pass' [at a position approximately 8nm SE of Kendal], he heard a RT call of 'lead pull up' on LLC. As he heard this he looked to his R and saw a Hawk ac taking avoiding action by pulling up and passing over the canopy from R to L. The Tornado pilot maintained wings level. Subsequent ground examination of the RAIDS data showed that the ac passed with a separation of approximately 182ft.

THE HAWK PILOT reports leading a pair of ac operating autonomously under VFR at low-level, routeing W towards the Lake District in fighting-wing formation [UKAB Note (2): In fighting wing formation the subordinate ac maintains a swept position on the lead ac at a range of approximately 750m. This allows the leader flexibility of manoeuvre whilst also enabling some visual cross-cover between ac]. Both black coloured ac had navigation lights, HISLs and nose light selected on. The lead ac SSR transponder was selected on with Modes 3/A, C and S but the Hawk is not fitted with an ACAS. Both ac were fitted with a RAIDS pod. At 0934 the Hawk formation was at low level, heading 298° at 420kt. Approaching the S end of the 'M6 pass' and crossing a N-S valley near the village of Kirkby Lonsdale, he was aware of a Tornado in his L 10 o'clock position at close range (estimated at similar height and inside 0.5nm). He took immediate avoiding action by breaking up and R, away from the Tornado, to avoid a potential collision. The other formation pilot became visual with the Tornado at approximately the same time and called 'lead pull up' on LLC. The incident was closely followed by a transmission on LLC by the Tornado pilot, who declared his proximity to the Hawk formation and, after being questioned by the Hawk pilot,

informed him that he was a singleton. An initial investigation was conducted after landing using RAIDS data which indicated a minimum separation distance of 182ft.

The Hawk pilot also commented that the current low-level deconfliction is achieved using the 'Record of flight form (138 EAW form)'. The route deconfliction of the subject Tornado was one of 18 received that morning and consequently, due to the number of deconfliction sheets received, the Hawk pilots did not identify the confliction issue during mission planning. In addition, the quality and resolution of the faxed forms may have been a factor in not identifying the confliction.

He assessed the risk as 'High'.

THE HAWK STN COMMANDER reports that he had separately tasked the Air Safety Cell at his Station to liaise with command staff in order to determine whether there were any immediate lessons to be identified, with the aim of preventing a re-occurrence. He observed that this incident reinforced the need for crews to maintain an effective lookout and to 'expect the unexpected'.

THE TORNADO STN OC OPS WING stated that the short term measure of faxing low level routes and times to all low flying units was a way of increasing SA that other traffic was likely to be in the area at the same time. Due to tactical and weather factors, it was unlikely that ac would remain on the planned track line. However, the aim was to increase aircrews' awareness that there would definitely be planned traffic in the same LFA. Making blind calls on [LLC] was a further mitigation and had potential to build SA.

Following a survey, it appeared that the Stn Sqns faxed route details to all fixed wing units that might use the low flying system. However, they only receive faxes back from one other Tornado Stn. For the system to build SA for all users, all users had to participate. This was the second recent Airprox where other users were aware of the planned presence of Tornados in the same area they planned to fly in, but the Tornado crews were not afforded the same SA.

[Faxing routes] was a stop gap measure; a more robust solution was required that would build SA of other users in a specific area, followed by a method of providing collision warning. It was important to maintain operational capability through tactical flexibility and the current low flying system allowed this. In the meantime, all Stn Tornado crews had been reminded of the importance of using all sensors to build SA on other traffic in all flight regimes.

HQ AIR (OPS) comments that this near miss reinforced the need for effective lookout during flying operations but also demonstrated the limitations of the human eye. The Hawk pilot highlighted the limitations of the current system in place to de-conflict during the planning stage; the current process of faxing maps around other flying units was not a particularly robust mitigation to MAC. HQ Air is pursuing the acquisition of a defence-wide de-confliction planning tool, similar in nature to the CADS system that JHC already uses, which would aid de-confliction at the mission planning stage; this incident added further evidence to support its funding. Finally, if either ac had been fitted with CWS, then it is likely that prior warning of the developing situation would have been signalled to at least one of the crews and earlier avoiding action could have been taken. The acquisition of CWS for Tornado had been approved (though it is not yet fitted), and CWS is being considered by the MOD for the Hawk T1 fleet; this incident added further evidence to support its funding also.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, ac data link information and reports from the appropriate operating authorities.

The Board first considered the deconfliction procedure extant at the time of the Airprox. Members agreed that the process was not robust with weaknesses including: the possible poor quality of printing of the received fax routes; the quantity of information requiring planning consideration and the potential to miss a conflicting route; the untested list of fax addressees resulting in missed conflicts; and assurance of delivery of the required deconfliction information when using fax as the transport medium.

Mil Pilot Members raised airmanship considerations, including defensive flying techniques when exiting or crossing a valley mouth. The Hawk flight could have remained high when approaching the valley exit until able to

scan thoroughly along the valley they were entering; equally, the Tornado crew could have flown well clear of the mouth of the entering valley, enabling earlier visual scan into the valley and more time to evade aircraft exiting.

Pilot Members also discussed the applicability of an ACAS in the low flying (LF) environment. It was noted that LF is specifically designed to defeat conspicuity through terrain masking and as such would naturally limit the effectiveness of an ACAS; however, even in this Airprox scenario Members considered that an ACAS providing an alert as soon as the aircraft were in line of sight would likely have provided extra seconds of warning and prevented the aircraft flying into such close quarters.

Finally the Board considered the degree of risk. Some Board Members considered that the 182ft miss-distance was close enough to indicate that there had been a real risk of collision. Others noted that, although it had been a close encounter, the aircraft did not miss entirely through providence. The Hawk pilot had seen the Tornado in time to take effective avoiding action; furthermore his reaction, backed up by a call from his wing-man, was not a snatch on the controls resulting in an over-stress. On balance, the Board agreed that, although safety margins had been much reduced, the Hawk pilot's manoeuvre had resulted in a collision being avoided.

PART C: ASSESSMENT OF CAUSE AND RISK

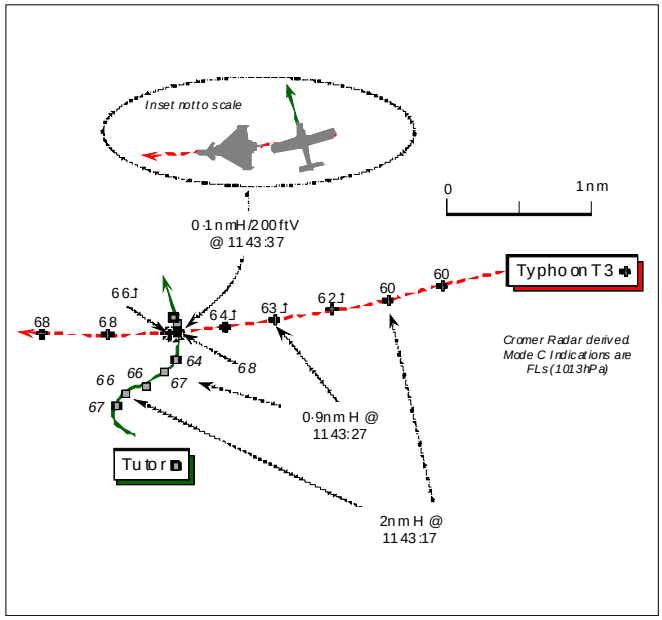
Cause: A conflict in the UKDLFS resolved by the Hawk pilot.

Degree of Risk: B.

AIRPROX REPORT No 2012117

AIRPROX REPORT NO 2012117

Date/Time:	9 Aug 2012 1143Z	
Position:	5236N 00005E (17nm WSW of Marham)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Tutor TMk1	Typhoon T Mk3
Operator:	HQ Air (Trg)	HQ Air (Ops)
Alt/FL:	7000ft↑ RPS (1023hPa)	5000-28000ft↑↓ RPS (1023hPa)
Weather:	VMC CLAC	CLOC
Visibility:	30km	10km+
Reported Separation:	50ft V/250ft H	Not seen
Recorded Separation:	~200ft V/0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB TUTOR TMk1 PILOT, a QFI, reports he was instructing an elementary flying training student on a routine IF sortie - Instrument Flying 2. This sortie commences with a SID from Wyton to pick up radar vectors for a PAR at Marham on RW24, overshoot and depart to the SW for IF climbing, turning and descending practice followed by a visual RTB to Wyton.

On completion of the PAR at Marham, the Tutor ac was climbed through cloud under a DS from Marham ZONE on 233·075MHz then, once VMC, they continued under a 'reduced' TS. The student, who was wearing an IF hood, then performed some IF turns. Having successfully completed these he began to teach the student the IF 45° AoB level turn to the R at 100kt. A full lookout scan to the R was completed as well as a scan of the Traffic Alert System display (TAS), which was clear. About 5secs into the R turn a contact appeared on the TAS, along with the automated audio warning, in the 4 to 5 o'clock position at about 1nm, 500ft below, climbing and moving rapidly. As neither he nor his student had visual contact with the other ac he rolled his Tutor level just as Marham ZONE alerted him to the conflict. The contact was still approaching rapidly and now showing on TAS 200ft below within 0.5nm but they still did not have visual contact. To avoid the other ac he attempted to climb and turn his aeroplane; climbing through 7000ft Chatham RPS (1023hPa) [on a N'ly heading] with further automated audio warnings coming from the TAS, he saw a Typhoon in a slight climbing attitude passing under the nose of his Tutor from R – L at high speed, some 50ft below his aeroplane with horizontal separation of about 250ft and a 'high' Risk of collision. He confirmed visual contact on the Typhoon to ZONE and they recovered back to Wyton without further incident.

The ac is coloured white; the HISLs were on. A squawk of A3661 was selected with Modes C and S on.

THE EUROFIGHTER TYPHOON T Mk3 PILOT reports he was conducting a passenger flight in Class G airspace during the period of this Airprox, which occurred at 7000ft, he thought, some 10nm W of Marham. He was operating under a TS with London MILITARY in a block from 5000ft to 28000ft amsl (1023hPa). He did not have any recollection of traffic called to him by the controller in the Marham area, nor had he correlated any radar tracks in the location of the Airprox, which was confirmed from a review of the ac's recorded AI radar data. . He was not visual with a Tutor at the time of the Airprox and was only made aware of the incident the following day.

UKAB Note (1): The Typhoon pilot initially perceived that he had not descended below 7850ft, which was the lowest indicated height on the HUD recording but apparently for a different time and location. The lowest indicated SSR Mode C for the Typhoon during the incident sequence was FL59 equating to about 6300ft RPS (1023hPa), just before the Airprox occurred.

THE MARHAM APPROACH CONTROLLER (APP) reports that because of light traffic levels over the lunch period he was also monitoring the DIRECTOR's frequencies from the same control position but did not receive any calls during the period. In the 15mins leading up to the Airprox his workload comprised only the subject Tutor transiting back to Wyton, a Tornado making a visual recovery to Marham and a pair of Tornado GR4s departing Marham for GH over the Norfolk coast, [plus another Tutor] so he was operating well within his capacity.

On departure from Marham, the Tutor was under a TS that was upgraded to a DS at the request of the pilot for a brief period until he achieved VMC, when once more a TS was requested and provided. At the time of the Airprox, about 1143Z, the pair of GR4s were operating in a block of airspace up to FL190 in the vicinity of Blakeney Point under a TS; Blakeney Point is approx 30nm NE of Marham with CAS a further 8nm to the N, so his attention was divided between the Tutor transit and monitoring the GR4s to ensure they did not infringe CAS. Blakeney Point is routinely used as a radar handover point from London MILITARY, but it is also used as a holding area by F-15 ac prior to working in Holbeach AWR. A recent Airprox involving GR4s and F-15s in that location meant that he was particularly conscious of scanning for conflicting traffic in that area. The Tutor and the GR4s were separated by around 45nm and whilst routinely scanning his radar display between them he spotted a very fast moving contact approximately 2-3nm E of the Tutor, indicating below the Tutor's level but climbing. He immediately called this conflicting traffic to the manoeuvring Tutor crew at a range of 2nm and shortly afterwards the Tutor pilot reported visual with the conflicting ac. The remainder of the period that he was controlling the Tutor was uneventful and the ac recovered to Wyton. The Tutor crew did not report an Airprox to him on frequency at the time of the incident, nor was there any hint in the crew's communications for the remainder of time on frequency – about 14mins - that an Airprox had occurred. It was not until the following morning that the Airprox was brought to his attention, so these details are recalled from memory to the best of his ability.

THE LATCC (MIL) NE TACTICAL CONTROLLER (NE TAC) reports he was controlling 4 ac during this period, with a PLANNER on duty; the subject Typhoon conducting GH in the East Anglian MTRA, an ac conducting an air test - non-squawking - also in the East Anglian MTRA and two high level transits to the N in the OTBED area at FL300 and FL400 respectively. Whilst NE PLANNER was on the line to Marham taking a pre-note, he extended the displayed radar range out to about 148nm to scan for any conflicting traffic in the MONTROSE Sector against the two high level transits. Whilst this range was selected the Typhoon turned and descended SW bound, at which point he has been informed that an Airprox occurred. The Typhoon pilot did not mention an Airprox on the RT and he did not remember the incident.

BM SAFETY MANAGEMENT reports the Tutor pilot was conducting simulated IF WSW of Marham in receipt of a 'reduced' TS from Marham APP; the Typhoon pilot was operating within the East Anglian MTRA in receipt of a TS from LJAO NE TAC.

The Typhoon pilot reported operating in the block 5000ft to 28000ft RPS (1023hPa) with +10km visibility in nil weather and SCT cloud at 5000ft. The Tutor's pilot reported operating at 7000ft on the RPS (1023hPa) with 30km visibility in clear with cloud at 5500ft.

LJAO NE was manned by both a TAC and PLANNER controllers; however, due to a number of factors outwith the unit's control, it was not until some days after the Airprox that the controllers involved were requested to submit DASORs. Consequently, their ability to recall the event had understandably reduced. In addition to the Typhoon operating within the East Anglian MTRA, NE TAC was providing an ATS to a C130 with an unserviceable transponder conducting an air test within the East Anglian MTRA and 2 further individual ac transiting N at high level. Although NE TAC was unable to recall their perception of their workload and task complexity, BM SM contends that this traffic loading and scenario represented moderate to high workload and task complexity. The ATS provided to those ac operating within Class G Airspace was not 'reduced' due to high traffic density or controller workload.

Due to low traffic levels at Marham, APP was band-boxed with DIR and ZONE, with a SUPERVISOR present; the unit did not provide a DASOR narrative from the SUPERVISOR. At the time of the Airprox, in addition to the Tutor on UHF, APP was providing an ATS to an un-related pair of GR4s manoeuvring in the vicinity of Blakeney Point on ZONE UHF, and 3 other ac on ZONE VHF; these ac were operating 9.8 and 23.6nm NE and 17.5nm NW of Marham. One of the ac, another Tutor, was in receipt of a BS; however, it has not been possible to determine the types of ATS provided to the other 2 ac. On initial contact with ZONE at 1138:42, the other Tutor pilot [not the reporting Tutor pilot] requested a TS; however the pilot was told that, "*it'll be a Basic Service due to controller workload*." Notwithstanding the addition of this other Tutor, the workload at 1138:42 reflected that which existed

throughout the incident sequence. APP, a highly experienced controller, described their workload and task complexity as 'medium'. SATCO Marham has stated that other controllers were available, albeit on a lunch break, if APP or the Supervisor had deemed the workload excessive and required an additional control position to be opened.

The surveillance based ATSs provided by APP were 'reduced' due to the selection of 'Angels Suppression' to reduce heavy cluttering of the surveillance display. Given the frequency with which the Marham surveillance display is affected by clutter, there is an entry within the FOB to this effect stating that crews will only be told that the ATS is 'reduced'.

The incident sequence commenced at 1140:57, as the Typhoon steadied on a WSW'ly track, indicating FL107; the Tutor was 14.9nm WSW of the Typhoon, tracking SW'ly indicating FL67. At this point, APP's unrelated GR4 pair were 33nm NE of the Tutor and 21 and 23nm NNE of Marham; the Tutor was 15.1nm W of Marham.

NE TAC's unrelated C130 air-test was 4.5nm NE of the Typhoon; the 2 high-level transiting ac were 48.8 and 47.2nm NNW of the Typhoon, tracking NNW'ly, at FL380 and FL300. Shortly before, at 1140:50, NE TAC had extended the surveillance display range to 146nm to facilitate scanning into ScACC Montrose sector's airspace.

Between 1140:50 and 1141:12, APP was involved in an RT exchange with an unrelated GA ac on ZONE VHF; there were no further transmissions on the ZONE UHF or VHF until after the CPA.

Between 1141:00 and 1142:00, NE TAC co-ordinated with Prestwick Centre MONTROSE Sector about the passage of one of the 2 high-level transit ac. Based upon the transcript of the NE PLANNER's landlines, this controller was not involved in any landline liaison at this point. During this period, at 1141:09, the Tutor turned onto a S'ly track and, at 1141:17, the Typhoon commenced a steady descent. At this point, the Tutor was 12.3nm WSW of the Typhoon indicating FL67. APP's unrelated GR4 pair were 34.7nm NE of the Tutor and 22.5 and 23.5nm NNE of Marham; the Tutor was 14.8nm WSW of Marham. NE TAC's unrelated C130 was 7.9nm NE of the Typhoon; the 2 high-level transiting ac were 51.3 and 49.6nm NNW of the Typhoon, tracking NNW'ly, at FL 380 and FL300.

At 1141:18, during the co-ordination with MONTROSE Sector, NE TAC reduced the range on their surveillance display to 116nm. It is reasonable to suggest that this was to enable them to scan the area around the Typhoon and/or the C130. At 1141:30, NE TAC increased the surveillance display range back to 146nm and this range setting was maintained until 1143:44 when the surveillance display range reduced to 93nm. The unit has stated that this range scale was maintained to enable NE TAC to scan for conflicting traffic in MONTROSE Sector's airspace, prior to the NE PLANNER handing the ac over. At this range scale, 1nm was approximately equal to 1.8mm on the surveillance display.

At 1141:40, the Tutor commenced a R turn; the Typhoon was 9.3nm ENE, tracking WSW'ly, descending through FL95. At 1142:09, the Tutor rolled-out of the turn tracking NW'ly; the Typhoon was 6.5nm ENE, tracking WSW'ly, descending through FL83. APP's unrelated GR4 pair was 40 and 38.8nm NE of the Tutor and 26.5 and 24.5nm NE of Marham; the Tutor was 16.6nm WSW of Marham. NE TAC's 2 unrelated high-level transiting ac were 58.4 and 57.2nm NNW of the Typhoon, tracking NNW'ly, at FL 380 and 300.

At 1142:33, the Tutor commenced a L turn onto SW before, at 1143:05, commencing a right-hand turn; at this point, the Typhoon was 3nm NE of the Tutor indicating FL59 - the lowest displayed SSR Mode C for the Typhoon during the incident sequence. Based upon the reporting Tutor pilot's account, it was shortly after 1143:05 that they received a warning from their TAS of the Typhoon's proximity, rolling the Tutor's wings level at 1143:19 as they received accurate TI from APP under the 'reduced' TS provided, "[Tutor C/S] *traffic east, 2 miles, tracking west, indicating slightly below* [radar replay shows 700ft]*, climbing*" which was acknowledged immediately at 1143:24. APP did not make or receive any landline calls or RT transmissions between the start of the incident sequence and 1143:19.

Between 1142:00 and 1142:56, NE TAC did not make or receive any landline calls or RT transmissions. From 1142:56 to 1143:30 NE TAC was involved in an exchange of RT with the 2 high-level transit ac, instructing them to squawk their ScATCC (Mil) assigned SSR codes, in preparation for the NE Planner to hand the ac over. The handover commenced at 1143:08 and was completed at 1144:20.

[At 1143:33, the Tutor can be seen on radar (the FL64 Mode C is probably a spurious indication) having steadied on a N'ly track, with the Typhoon 0.5nm NE climbing through FL64. The CPA occurred in between sweeps and at 1143:37, the Typhoon, climbing through FL66, had passed beneath the Tutor that was indicating FL68 and shown at this point 0.1nm E of the Typhoon.]

At the CPA, APP's unrelated GR4 pair was 35.4 and 37.7nm NE of the Tutor and 23.1 and 24.9nm NE of Marham; the Tutor was 17.1nm WSW of Marham. NE TAC's 2 unrelated high-level transit ac were 69nm and 68.1nm NNW of the Typhoon, tracking NNW'ly, at FL 380 and FL300.

ANALYSIS

Whilst the Tutor crew had received TI about the Typhoon, the earliest point at which they would have begun to assimilate this information was approximately 12secs prior to the CPA, once they knew the area from which the Typhoon was approaching. The timing of this information gave the crew little opportunity to assimilate the TI, visually acquire the Typhoon and act. It is reasonable to argue that the distance between the Tutor and the manoeuvring GR4 pair complicated APP's task by dividing their attention; however, BM SM contends that the 'split' between the Tutor and the GR4 pair was not excessive and would not routinely be expected to represent a significant challenge to an experienced controller. APP confirms this by stating that they were 'operating well within [their] capacity'. Moreover, based upon APP's task load, that no transmissions occurred on their frequencies between 1141:12 and the controller passing TI at 1143:19, it is reasonable to argue that an opportunity existed to pass TI to the Tutor's crew earlier than 1143:19.

Whilst it was disappointing that Marham did not submit a narrative from the ATC SUPERVISOR, given the APP controller's level of experience, it is unlikely that the SUPERVISOR would have been closely monitoring their actions. Whilst in hindsight it appears that the decision to band-box APP, DIR and ZONE together may have contributed to the Airprox, the level of workload associated with this task does not at first appear unreasonable for an experienced controller. That said, it is reasonable to expect that the refusal of a TS to the other Tutor pilot at 1138:42, due to controller workload, should have prompted further action from APP or the SUPERVISOR, to provide additional capacity by separating the ZONE task from APP. It is possible that the provision of that additional capacity may have eased APP's task enabling them to provide earlier TI to the crew of the subject Tutor.

The guidance material contained within CAP774 Chapter 3 Para 5 states that

'Traffic is normally considered to be relevant when, in the judgement of the controller, the conflicting aircraft's observed flight profile indicates that it will pass within 3nm and, where level information is available, 3,000ft of the aircraft in receipt of the Traffic Service'.

However, for ac conducting unpredictable high-energy manoeuvres within an airspace block, the task of assessing this 3nm/3000ft 'bubble' is fraught with difficulty. Agreed best practice in these situations is to pass TI on conflicting ac that will pass within 3nm and through or close to the vertical limits of the manoeuvring ac's block. In this instance, the Tutor passed through the Typhoon's manoeuvring block on a number of occasions prior to the start of the incident sequence but no TI was passed when an opportunity to do so existed. This may be suggestive of low levels of awareness by NE TAC of the manoeuvring capability of Typhoon ac.

In relation to the events that occurred during the incident sequence, NE TAC's ability to detect the confliction was inhibited by the large displayed radar range scale in use - a range scale that they were required to use in order to provide an ATS to the high-level transit ac. Whilst the confliction between the Tutor and Typhoon was evident when NE TAC momentarily reduced the range on their surveillance display at 1141:18, NE TAC did not identify the confliction. This may have been due to the level of the Typhoon at that time allied with the radar range issue such that NE TAC discounted the Tutor as a threat. Alternatively, NE TAC's scan may not have detected the Tutor. However, once NE TAC increased the range scale on the surveillance display at 1141:30, their ability to detect the confliction reduced rapidly as the distance between the 2 radar contacts reduced on the display. As an example, the distance between the contacts at 1141:30 would have been approximately 17mm. Coupled with the difficulty in detecting the conflict, BM SM contends that the complexity of the task load faced by NE TAC affected their ability to divide their attention effectively between all ac that were in receipt of an ATS and thus prevented the provision of TI. The LJAO North SUPERVISOR recalls being cognisant of the increased complexity presented by the C130 undergoing an air-test with an unserviceable transponder and thus opening the NE Planner position; however, the task complexity coupled with the increasing geographic split might have suggested that a second TAC controller

was required. Unfortunately, the NE Planner did not submit an occurrence report so their thought processes and awareness of NE TAC's workload and task complexity was unrecorded. Of note was the fact that STCA did not activate during this incident.

Notwithstanding that the Tutor crew and the Typhoon pilot were operating in Class G airspace and had a responsibility to 'see and avoid' other ac', both were in receipt of a TS and had a reasonable expectation that they would be provided with TI, in order to assist them in discharging that responsibility. In this instance the safety barrier provided by LJAO NE TAC did not operate and that provided by Marham APP operated ineffectively, given the timing of the TI relative to the CPA.

RECOMMENDATIONS by BM SM

RAF ATM Force Cmd was requested to:

Highlight to ATM personnel that best practice for the provision of TI to ac conducting high-energy manoeuvres is to pass TI on conflicting ac that will pass within 3nm and through or close to the vertical limits of the manoeuvring ac's block.

Monitor DASORs to identify whether the issue identified by this investigation with regard to the provision of TI to manoeuvring traffic is an emerging trend, to determine whether there is a requirement to adapt either controller training or the CAP774 guidance material referred to above.

Consider the requirement for LATCC (Mil) Planner endorsed controllers to be re-briefed on assessing task complexity in addition to task load when determining sector manning.

Maintain a dialogue with the ARCS IPT to continue to investigate the lack of activation of STCA at LATCC (Mil).

RAF ASACS Force Cmd and RN Fleet Capability Aviation ATC were requested to take note of the recommendation to RAF ATM Force Cmd with regard to the provision of TI to manoeuvring traffic, to determine its applicability to their operations.

OUTCOMES

Following direction from the A/D Operating Authority, SATCO Marham reviewed the unit's manning of control positions. Whilst content with the unit's procedures overall, SATCO has directed that Supervisory staff will maintain enhanced oversight of Ops, specifically where ac are geographically split.

In light of safety concerns generated by several LJAO Sectors operating in the same airspace, a review was conducted into the 'Method of Operations' of the E and NE sectors and recommended a re-sectorisation of the airspace. This re-sectorisation will be implemented shortly and should significantly reduce the likelihood of LJAO controllers facing a N-S split, as experienced by NE TAC during this incident.

Unfortunately, the Tutor pilot did not declare the Airprox on the frequency in use at the time. Consequently, through the availability of staff and the time elapsed following the incident, the recollections of those ATM personnel involved were affected. Particularly those at LATCC (Mil) due to the time required to identify the Typhoon involved and that it was in receipt of an ATS from LJAO NE. All Tutor pilots operating at Wyton have been reminded of the requirement to report an Airprox immediately and RAF Flight Safety continue to promote this across the wider RAF community.

THE EUROFIGHTER TYPHOON T Mk3 PILOT'S STATION FLIGHT SAFETY OFFICER comments that following liaison with BM Safety Management and the UKAB, the HUD recording was reviewed in close detail with the Typhoon pilot. The Typhoon HUD video was examined for a period of 4 mins either side of the Airprox timing of 1143:37Z. The weather conditions were better than military visual flight criteria above cloud tops, which were about 2000 ft below the ac. The Typhoon's manoeuvring was benign from straight and level to a 45° AOB turn to the L, which was to allow the rear-seat passenger to recover from feeling airsick. Although the LATCC (Mil) radar recording confirms that the Tutor was in the Typhoon's 11 o'clock, within the visual arc of the HUD, the Tutor is not shown. Furthermore, there are no recorded AI radar tracks.

HQ AIR (OPS) & (TRG) combined comment: This incident occurred in Class G airspace, in VMC conditions, and both ac were in receipt of a radar service, yet the paucity of TI from both Marham APP and LATCC (Mil) NE TAC, meant that neither ac was notified of the presence of the other until a late stage in the incident. Fortunately, the Tutor's TAS gave enough warning for the Tutor pilot to change its flightpath, which probably affected the outcome of the Airprox for the better. Of note, this investigation has been hindered by the fact that the timing of the Airprox was initially incorrectly reported by the Tutor pilot; if the Tutor crew had reported the Airprox as it occurred, then an accurate timing of the event would have been available from the start of the investigation. All aircrew should be reminded of the content of RA1410 Para 41, which states that 'as soon as practicable after the event, an Airprox should be reported by the pilot to the ATSU providing the ATS'.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies and radar video recordings, together with reports from the Marham APPROACH controller, LATCC (Mil) LJAO NE TAC controller and the appropriate ATC and operating authorities.

The Board agreed with the BM SM perspective that if the Marham SUPERVISOR and the LATCC (Mil) LJAO NE PLANNER controller had contributed reports, their inputs would have provided a more complete picture of the circumstances surrounding this Airprox.

With APP's traffic about 45nm apart, controller Members recognised the controller had an awkward split, which demanded a wide-ranging scan diverting attention away from where the Tutor was operating. However, it was evident from the BM SM report that APP was manned by an experienced controller who did not consider his workload/task complexity to be high - only 'medium' he reports. Both the BM SM Advisor and another familiar with Marham's operations considered that the traffic under service should have been well within the controller's capabilities. Nevertheless, controller Members noted that APP had refused to provide a TS to another Tutor pilot during the period of this Airprox, only offering a BS, ostensibly due to his workload whilst DIR and ZONE were bandboxed onto the APP position. As additional controllers were apparently available, controller Members suggested that opening another control position to work the GR4s, might have enabled ATC to provide a better service overall and facilitated earlier recognition of the conflict by the controller here, leading to earlier TI for the Tutor crew. As the Typhoon had been operating in the vicinity of the Tutor beforehand, where potentially TI might have been warranted it was suggested, APP should have been keeping a watchful eye for it. Indeed, some controller Members suggested that as it would have been evident from the Typhoon's squawk that the ac was under an ATS from LJAO NE, APP might usefully have effected co-ordination and, by being more pro-active, could potentially have averted the close quarters situation. Notwithstanding any 'reduced' TS deemed to be provided by Marham, which would be unknown to Wyton pilots unless stated on the RT, it was pointed out that at these levels Marham with better lower level coverage, could probably detect the confliction more readily. As it was, APP had not spotted the fast moving Typhoon until it was about 2-3nm E of the Tutor, climbing from just below the Tutor's level the controller reports. The Military terminal controller Member opined that TI should be called as soon as practicably possible, but the Board noted that TI had not been passed to the Tutor pilot until the Typhoon had closed to a range of 2nm. Members agreed with the MAA Advisor's view that this was unsatisfactory and the TI was passed too late to be of practical use. Controllers should be aiming to provide comprehensive TI not later than 5nm range the Advisor opined; however, if the traffic was fast moving, as here, it might need to be provided at greater range if pilots of relatively slow, low performance aeroplanes such as a Tutor were to make effective use of the information in the time available. This demanded a thorough comprehensive scan of the radar display. The Board agreed the late TI provided by APP to the Tutor crew was a contributory factor within this Airprox. The Tutor pilot reported that his ac's TAS had alerted him to the Typhoon when it was about 1nm away and just before the TI was transmitted by APP; as the TI was given at 2nm his recollection was therefore slightly awry. However, in the short timespan from first alert to CPA, as the Tutor QFI manoeuvred his aeroplane and both he and his student searched for the other ac, the geometry of the situation and the airframe had probably obscured the Typhoon until it was seen passing under the nose of his Tutor about 250ft away from R – L at high speed, some 50ft below his aeroplane in a slight climbing attitude. This coupled with the high-speed of the conflicting ac, left the Tutor pilot very poorly placed to affect the outcome.

The Tutor had been manoeuvring on a relatively steady bearing to the Typhoon, just L of the nose, as the Typhoon pilot maintained his westbound course in a gentle climb, possibly distracted by his airsick passenger. Nevertheless, the Typhoon pilot had not seen the Tutor despite obtaining a TS from LJAO NE TAC to supplement his lookout and assist him with his responsibility to 'see and avoid' other traffic within Class G airspace. It was

evident from the Typhoon pilot's report, as confirmed by the BM SM investigation, that NE TAC had not spotted the conflict with the Tutor nor passed TI to the Typhoon pilot at any stage. The Typhoon pilot would be aware of the limitations of radar in detecting gliders and light ac with a composite structure; however, the Airprox did not occur in an area of poor radar coverage, nor was the TS 'reduced' in any way. Consequently, the Typhoon pilot could reasonably expect a 'full' TS to be provided by NE TAC unless he had been advised to the contrary. Whilst the Board was cognisant that the recorded radar data available to the Board did not replicate exactly the picture displayed to NE TAC, the recording shows that the Tutor was detected by the radar sources available to LATCC (Mil). A confliction between the Tutor and Typhoon was evident, BM SM reports, when NE TAC momentarily reduced the range on their surveillance display over two minutes before the Airprox occurred. There was no reason to doubt, therefore, that NE TAC could have passed TI to the Typhoon pilot if he had spotted the developing conflict, but it was evident to the Board that NE TAC was working an even more difficult split of traffic over a wide area displayed on a very large radar range scale, whilst also completing some of the actions normally expected of the PLANNER when closed up. Cognisant that NE TAC was also coping with a large vertical split with the Typhoon down in the lower airspace and other traffic in the upper air, with the added complication of a non-squawking C130 air test, Members questioned the wisdom of this traffic allocation; it was unfortunate that the NE PLANNER had not provided any insight into this aspect. Here the LJAO controllers had focused on the high level traffic in receipt of a RCS as the priority at the time, but to the detriment of the Typhoon pilot operating in Class G airspace who received no help at all to alert him to the Tutor under the TS that had been agreed. The MAA Advisor commented that although the Typhoon pilot had requested to operate over a large vertical block of airspace, if the traffic situation dictated that the controller could not provide a satisfactory service from 5000ft - 280000ft and fulfil his responsibilities to report traffic in the vicinity throughout these levels to the Typhoon pilot, then perhaps the controller might have offered the pilot a higher base level for his sortie - well above the level where light ac might normally be encountered, say above 10000ft, which might have been acceptable if the aims of the sortie could still be achieved. Members suggested that the LJAO controllers might not have been entirely alert to the great manoeuvrability of this agile jet fighter, but it was evident that the Typhoon pilot had been in the lower levels of his notified operating block for several minutes beforehand and the BM SM report mentioned that NE TAC had omitted to call TI on the Tutor on other occasions when it would have been appropriate. The Board concluded that the LJAO NE Sector controllers had not provided a satisfactory TS to the Typhoon pilot and the absence of TI was a contributory factor to this Airprox. However, the Board was encouraged to learn that the investigation of this Airprox had led to a review by the Unit and the planned resectorisation of LJAO NE and E Sectors.

The Board was aware that it is not uncommon for some aspects of Airprox initial reports to be incorrect; nevertheless, Members encouraged pilots to report Airprox promptly on the RT at the time they occurred. Even a brief 'heads-up' on the RT followed up by a landline call would facilitate more accurate reporting by pilots, which would also alert controllers and ATSUs to the incident at an early stage. If, having declared an Airprox over the RT, pilots or controllers subsequently elect not to file a formal report or withdraw the Airprox, as is their prerogative with the agreement of all involved, then nothing important will be lost in the intervening period. In this occurrence the Tutor pilot initially reported an erroneous time and location and the Typhoon pilot was mistaken when he initially reported he had not descended to the level reported by the Tutor pilot. However, the accurate timing and location of the Airprox were evident from the recorded LATCC (Mil) radar data which shows the Typhoon climbing through FL66 Mode C as it passed beneath the Tutor indicating FL68. Since the Typhoon pilot did not see the Tutor at any stage, the Board agreed unanimously, that this Airprox had resulted from a non-sighting by the Typhoon pilot.

There was unanimous agreement amongst the Members that this was a risk-bearing Airprox, but the degree of Risk engendered considerable debate. Alerted by their TAS and the belated TI, only the Tutor crew was aware of the impending conflict but plainly at a late stage and unaware that the conflicting aircraft was a fast jet. The Tutor pilot had endeavoured to resolve the conflict by turning and trying to climb above the Typhoon, which itself was in a shallow climb, but had inadvertently turned towards the Typhoon thereby prolonging the conflict. The low performance of the Tutor compared to the Typhoon militated against the Tutor pilot's avoiding action having a great impact; the Board noted HQ Air's view that it was of benefit in increasing the separation, nevertheless it was difficult to assess if the Tutor pilot's actions had had a significant affect on the outcome. With the Typhoon pilot completely unaware of the presence of the Tutor above him as he underflew it, this suggested to some Members that an actual Risk of collision had existed at these close quarters. However, other Members perceived that the 200ft of vertical separation that did exist was sufficient to prevent the two ac colliding. Furthermore, when appraised of the correct time and location of the Airprox, the Typhoon unit reviewed the HUD recording and confirmed that at no stage was the Tutor visible in the HUD's field of view. The Board remained fairly evenly divided over the level of Risk and a vote was required to finalise the assessment. By a majority of the Members, it was concluded that the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

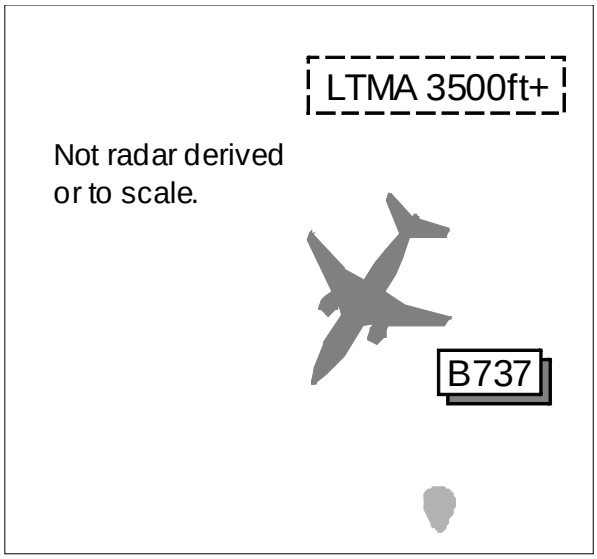
Cause: A non-sighting by the Typhoon pilot.

Degree of Risk: B.

Contributory Factors: The absence of TI to the Typhoon pilot and late TI to the Tutor crew.

AIRPROX REPORT NO 2012118

Date/Time:	9 Aug 2012 1708Z	
Position:	5122N 00042E (6nm NE DET)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-800	Untraced Balloon
Operator:	CAT	NK
Alt/FL:	FL110	(NK)
Weather:	VMC NR	NK
Visibility:	NR	
Reported Separation:	Nil V/100-200m H	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Gatwick, IFR and following a TIMBA 3E arrival level at FL110 and 250kt approaching LARCK. He, the Capt, noticed a balloon at their level approximately 100-200m away whilst the FO was busy with other operational tasks. The balloon appeared to be 10-20m in diameter and light coloured, possibly white/silver/tanned. This event happened very quickly and, with no other reference in his visual field, the distance and size was hard to tell. His judgement of size and distance was based on his closure speed. He reported the encounter immediately to ATC.

ATSI reports that at 1708:09UTC the pilot of a B737 reported having, *"…passed a weather balloon very closely."* The LTC S controller requested further details from the pilot and the following description was given, *"…it was about 20 seconds ago, about 100 metres from the aircraft at our level… oval shape and light coloured… may be 20 metres in diameter"*. At the time of the sighting the B737 was approximately 1nm N of the TANET – DET track with 6nm to run until abeam DET. The LTC S controller took the details and also passed these to another flight behind the B737 on the TIMBA 3E. In the absence of a debrief of the B737 pilot, the geometry of the ac's encounter with the balloon is not known.

Meteorological information indicated that a large anticyclone covered the UK and the recorded winds at 2000ft, 5000ft and 10000ft showed the wind backing from E'ly to N'ly at speeds between 11-20kt. This data excluded many of the notified AIP balloon launch sites and, despite extensive enquiries, the origin of the balloon could not be ascertained. Notably there was no recorded balloon activity from Shoeburyness around the time of the reported encounter.

UKAB Note (1): The UK AIP at 1-1-5-7 Airspace Restrictions, Danger Areas and Hazards to Flights para 3.5 Radiosonde Balloon Ascents, states that the Met Office releases helium or hydrogen filled balloons from a number of locations throughout the UK listed at EENR 5.3. A typical installation consists of a balloon, diameter at launch approximately 1·5m, to which is attached a small parachute. The radiosonde is attached underneath the parachute on a suspension string of approximately 33m in length. The distance the balloon travels away from the launch site is dependent on the wind strength, but they can obtain altitudes of over 80000ft. Prospective launch sites included Herstmonceux (off-white/brown colour) and Larkhill (red), as well as independent releases from Reading University and Shoeburyness. The UK Met Office carried out an investigation using timings, atmospheric wind observations and average properties of a Wx balloon to produce a likely launch area. The nearest site at Herstmonceaux [30nm SSW of reported Airprox position] launched balloons on 8th and 9th Aug at 2315UTC which made it unlikely to be the balloon encountered.

UKAB Note (2): AUS/DAP made comment that there was no notified mass 'toy balloon' release on the 9th Aug. There were numerous 'Captive/tethered balloons' notified. Any captive balloon operators given permission by AUS have to report any breakaways to a pre-ordained ATSU (normally LAC Swanwick in the London area) as one of the conditions of the 'permission'. LAC Swanwick Ops had no notification of a breakaway balloon on the 9th Aug.

UKAB Note (3): A recommendation was made to the MOD and CAA, following 3 incidents between May – July 2002 involving encounters with untraced balloons, to review the arrangements for balloon release in UK airspace. The MOD believed the risk to the aviation community as minimal. A Met balloon suspended package would cause minimal damage, considered less than that associated with a bird strike, and the suspension string also unlikely to present a hazard to ac. The CAA commented that ICAO classifies Met balloons in the 'light' category, perceiving that they pose little risk to ac. Also the risk of damage in the event of collision with a Met balloon was also considered less than that associated with a bird strike. DAP agreed to liaise with Royal Meteorological Society to determine a suitable manner of reminding amateur meteorologists of the ANO requirement Article 68, notification and permission given in writing from CAA through DAP. Also DAP agreed to amend the UK AIP to emphasise this requirement and to write to other organisations (e.g. universities) to remind them.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the B737 pilot, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members agreed with the B737 pilot's comments regarding the difficulty of estimating size and distance of a balloon when seen only briefly and with no other visual references to gauge against. Without knowing the balloon's actual size it would be difficult to then estimate the separation that pertained at the CPA. There is no doubt that the B737 pilot had seen a balloon, reported as a Wx balloon type on the RT at the time, but with the lack of any other information available, Members could only classify this as a sighting report but were unable to determine with any confidence the risk.

PART C: ASSESSMENT OF CAUSE AND RISK

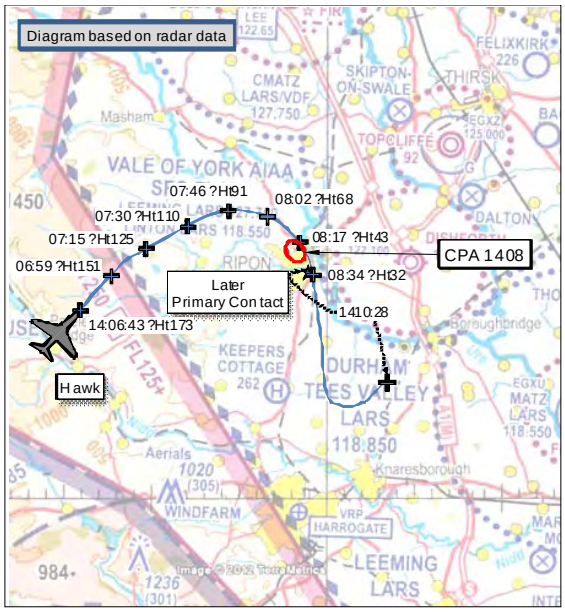
Cause: Sighting report.

Degree of Risk: D.

AIRPROX REPORT No 2012119

AIRPROX REPORT NO 2012119

Date/Time:	9 Aug 2012 1408Z	
Position:	5408N 00135W	(ivo Ripon)
Airspace:	Lon FIR	(Class: G)
	Vale of York AIAA	
	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk1	Untraced
Operator:	HQ Air (Ops)	NK
Alt/FL:	↓3600ft↓	NK
	QNH (1026hPa)	
Weather:	Intermittent VMC	NK
Visibility:	40km	NK
Reported Separation:		
	0ft V/300m H	NK
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T Mk1 PILOT reports conducting a Radar to PAR approach at RAF Leeming operating under VFR with a 'reduced' TS from Leeming Director [262.950MHz].

[UKAB Note(1): Leeming Director had radar suppression selected in order to reduce clutter. As this may also suppress some primary contacts, a full TS is not provided, iaw the RAF Leeming FOB]

The Hawk ac was overall black in colour with external lights, HISLs and nose light selected on. The SSR transponder was selected on with Modes 3/A and C. The ac is not fitted with Mode S or an ACAS. The reporting pilot (PF) was flying with reference to ac instruments with the ac captain [PNF] acting as safety lookout. Meteorological conditions were assessed as FEW-SCT Cu, base 3500ft, estimated tops 5000ft, with a Cu cell to the L of the ac's track, over the centre and W of Ripon, he thought.

[UKAB Note(2): The Dishforth and Leeming METARs were reported as follows

METAR EGXD 091350Z 27005KT 9999 FEW042 BKN250 21/12 Q1026 BLU NOSIG

METAR EGXE 091350Z 25008KT 9999 FEW045 SCT180 23/13 Q1026 BLU NOSIG]

While the ac's flight path remained clear of cloud in 40km visibility, VMC (1500m H and 1000ft V clear of cloud) could not be maintained at all times due to cloud disposition in the Leeming radar pattern. Shortly after hand over from London Mil to RAF Leeming, in the descent from FL80 to height 3000ft [QFE 1021hPa, from the ATC tape transcript], he was instructed to turn R onto heading 180° to intercept the radar pattern. A standard IF descent profile was flown with the pilot reducing the descent rate to level-off at height 3000ft. Passing 3600ft, clear of, but adjacent to, the E edge of a Cu cell, the PNF became aware of a paraglider with a light green/yellow canopy at the base of cloud in the 3 o'clock position, co-altitude at a range of approximately 300m. As the PF continued the descent an estimated 4 more paragliders were observed up to ¼nm W of the first contact. Some appeared to be operating near to or within the base of cloud. ATC were informed of the paraglider activity and the Radar Controller responded to the effect that no activity was apparent on radar.

He assessed the risk of collision as 'Medium'.

[UKAB Note(2): Due to the help and full cooperation of the local paragliding community it has been possible to trace 6 individuals who were 'overhead Ripon' at the Airprox time and at altitudes between 3370ft and 4085ft.

However, none were flying a light green/yellow coloured canopy and none recall seeing or hearing another ac at that time and position. It has therefore not been possible to trace the other 'aircraft'.]

THE LEEMING DIRECTOR reports working 2 ac, one of which was the subject Hawk. During the ac handover from LJAO, an unknown contact was observed in the Hawk's 12 o'clock position at a range of approximately 5nm. The contact was called to the Hawk pilot via London Mil (prior to Leeming accepting the ac) on receipt of which the Hawk pilot initiated a 30° R turn [to heading 070°]. Once the Hawk pilot was on frequency, a [R] turn to heading 180° and descent to height 3000ft [QFE 1021hPa] was initiated for positioning. As the Hawk pilot levelled at 3000ft, he advised that he had passed 3 parachutists. There were no radar returns at that time, nor had Leeming ATC received any pre-notification of activity ivo Ripon.

He assessed the severity of the occurrence as 'High'.

THE LEEMING SUPERVISOR reports that he was present in the ACR and that the Director's routeing of inbound ac for RW34 was the most suitable route considering their positions and heights in relation to the A/D. The paragliders were not visible on the radar screen at the time of the incident which may have been as a result of radar suppression, selected due to an increased amount of displayed radar clutter. Having been made aware of the location of the gliders all further inbound ac were directed around the area to prevent any possible conflict. He assessed the controller workload as 'Low'.

BM SAFETY MANAGEMENT reports that the Airprox occurred on 9 Aug 12 between a Hawk in receipt of a TS from Leeming APP and an untraced paraglider. The Airprox was not observed on the NATS radar replay; consequently, the BM SM investigation has been based wholly on the reports from Leeming APP, the Hawk pilot and the tape transcript.

The Hawk pilot reported 40km visibility with 'FEW-SCT Cu, base 3500ft, tops estimated at 5000ft, with a Cu cell inside [the ac's] track over the centre/west of Ripon'. At 1408:17, the Hawk pilot reported to Leeming APP that they had, *"just gone past 3 parachutists."*. Leeming APP reported that there was no radar return in the Hawk's reported position, a view supported by the Supervisor. The Hawk pilot and Leeming APP also reported that there was no notified paraglider activity in the vicinity of Ripon. The Supervisor added that a processed radar channel had been selected in order to control the level of radar clutter that was observable on the surveillance display. Following the Hawk pilot's report at 1408:17, the processed channel was de-selected and the paragliders remained un-detected by radar.

The RAF Leeming FOB, Order A2 Para 3, states that 'Whenever radar suppression causes the controller to reduce the radar service the phrase "identified DS/TS reduced" will be used to minimise R/T'. Analysis of the transcript demonstrated that APP had reduced the ATS in line with the guidance within the FOB and the Hawk pilot acknowledged in his report that they were receiving a reduced TS.

Given that the paragliders were not displayed on Leeming's surveillance display, and that no paraglider activity had been notified to Leeming APP, they were not in a position to affect the outcome of the incident. This Airprox represents additional evidence to support the argument for pan-platform electronic conspicuity for Class G airspace users.

[UKAB Note(3): The Hawk pilot reported passing altitude 3600ft at the time of the Airprox, although from the tape transcript he was passed and acknowledged the Leeming QFE on initial contact. It is therefore assumed that he was passing height 3600ft at the time of the Airprox. Radar replays from 2 different radar heads and from a wider composite picture all show the Hawk pilot descending through that height between 14:08:26 and 14:08:27. It is therefore assumed that a small timing error of approximately 10sec exists in the Leeming tape transcript timings. The error does not have a material effect on the Airprox chronology.]

HQ AIR (OPS) comments that, given the Hawk pilot could not maintain VMC, perhaps a DS would have been more appropriate. However, in this case it was likely that the outcome would have been the same because the paragliders were not painting on ATC radar. In this instance it seemed they chose not to notify their activity via NOTAM and did not, or were not able to, carry an electronic conspicuity device. Additionally, a paraglider has little energy to manoeuvre away from a fast closing ac; therefore, the paraglider pilots were relying on the lookout of other airspace users to avoid them. This is not a robust mitigation for mid-air collision given air traffic levels in that area and the limitations of the human eye.

THE BHPA comments that, as all the ac were operating legitimately and normally within Class G airspace, collision avoidance remained the responsibility of the pilots. In some quarters there seemed to be an over reliance on primary radar for collision avoidance, to the extent as to question whether the known limitations are as widely understood as they should be. There are many more ac in use now than there used to be that, due to one or more of the following, give poor if any primary returns; smaller, and/or slower, and/or modern construction materials. There remains no suitable electronic conspicuity device for hang gliders or paragliders at any price.

The paraglider pilots were on cross country flights and so, within airspace constraints, were using the best available lift. Therefore it would have been impossible to issue a meaningful NOTAM. At first look Leeming Supervisor's action of directing all further inbound ac around the area seemed sensible, however as the paragliders were thermal soaring they would have been constantly moving on, both vertically and horizontally. Thus after a short period of time the action could actually have increased the likelihood of another confliction elsewhere. The best action would probably have been to have raised the awareness of soaring activity with the pilots they were in communication with.

Any suggestion that the current Rules for Class G are not robust mitigation for mid-air collision goes against the currently agreed and legislated UK position, and the possible ramifications for all airspace users should be carefully considered by any proponents considering a change to such a position.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from one of the pilots involved, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board were unanimous in agreeing that both pilots were operating in class G airspace and that as such the Hawk pilot was required to give way to the paraglider under Rule 9 (Converging) of the RoA: para 9(1)(a), 'flying machines shall give way to airships, gliders and balloons', and 9(3), 'when two aircraft are converging in the air at approximately the same altitude, the aircraft which has the other on its right shall give way'. Notwithstanding current legislation, the Board also agreed that the provisions of Rule 9 were written at a time when ac operated at slower speeds and with smaller speed differential and consequently had more time to 'see and be seen'. The Mil Pilot Members opined that avoidance of microlights and paragliders had historically been regarded as a normal operating hazard but that modern risk appetites required a more robust mechanism to reduce the risk of mid-air collision. In the absence of any form of electronic conspicuity, they suggested that paraglider notification of likely routeing and education of the paraglider communities to traffic patterns local to RAF stations would be useful as an interim measure.

Mil and Civ Pilot Members agreed that technological improvements had resulted in relatively modern flying equipment, such as microlights and hang-gliders attaining levels of performance that now took them potentially in to confliction with much larger, heavier and faster classes of ac. An added complexity was that they were also less constrained in their points of departure and arrival than larger ac and so could be more difficult to integrate into the airspace traffic environment.

In assessing the cause and risk, all Members agreed that the Hawk pilot's sighting of the paraglider in his 3 o'clock was so late as to be effectively a non-sighting and that the miss-distance was therefore somewhat providential; however, the majority agreed that the paraglider pilot was under the base of cloud due to the thermal lift and the Hawk pilot was skirting around the Cu cell and that there was therefore an element of deconfliction, even though they weren't aware of each other's presence. Moreover, it seemed likely that if the ac had not been hidden from each other by the Cu cell, there was a possibility that earlier visual contact would have been achieved. Therefore, in this case by a majority, it was agreed that safety margins were reduced below normal but not to the extent that a degree of risk of 'A' was justified.

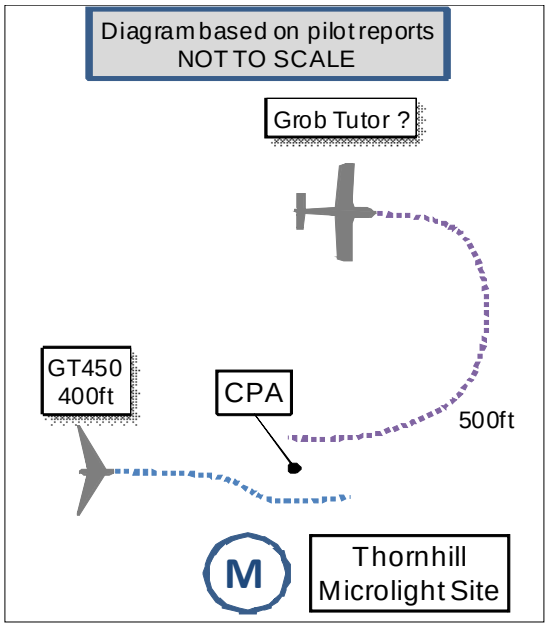
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the Hawk pilot.

Degree of Risk: B.

AIRPROX REPORT NO 2012121

Date/Time:	9 Aug 2012 1430Z	
Position:	5608N 00411W (Thornhill Microlight Site elev 45ft)	
Airspace:	Scot FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Quik GT450	Grob Tutor TMk1
Operator:	Civ Pte	HQ Air (Trg)
Alt/FL:	400ft (1025hPa)	500ft QNH (1009hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	20km	30km
Reported Separation:	200ft V/100m H	200ft V/0.5nm H
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE QUIK GT450 PILOT reports flying downwind (DW) at Thornhill Microlight Site (Thornhill), to the N of the site, over the Flanders Moss and away from neighbouring buildings, for the W'ly RW. He was operating autonomously under VFR in a grey coloured microlight with a landing light. The ac is not fitted with an SSR transponder or ACAS. Heading 090° at 50kt and 400ft [1025hPa], he checked the two windsocks 'as it was reasonably choppy'. When he looked back up he saw the [conflicting] ac coming the opposite way, not far above him and 500m 'off to the port side'. He took avoiding action by descending and turning R and kept the [conflicting] ac in sight until he landed.

He assessed the risk of collision as 'High'.

[UKAB Note(1): The Quik GT450 is a 2-place, tandem, tricycle gear, weight-shift microlight with a MTOW of 450kg, V_{NE} of 110mph and V_S of 38mph


].

THE GROB TUTOR TMK1 PILOT reports occupying the L seat, whilst demonstrating a PFL to a student in the R seat, to the area of Flanders Moss, N of Thornhill. He was operating under VFR with a BS from Scottish Information [119.875MHz], he thought, in a white ac with navigation lights and HISLs on. The SSR transponder was configured to squawk Modes A and C and the ac was also fitted with an ACAS. Whilst in a descending turn to the R, heading 260° at 80kt and approaching 500ft [QNH 1009hPa], he saw 'people on the ground and a

microlight below him and 0.75nm to the L'. He initiated a go-around to maintain 500ft MSD and climbed above and to the R of the microlight. He estimated that he remained 200ft above and ½nm away from the microlight, having seen him before he commenced the go-around. He watched the microlight pilot complete his cct and land. He noted that there was no NOTAM advising Thornhill as active. He also noted that he had a 'poor cross-cockpit view' during the first half of the PFL 'final turn'.

He assessed the risk as 'Low'.

ATSI reports that an Airprox was reported by the pilot of a Quik GT450 Microlight (M'light) when he came into proximity with a Grob G115E (G115) in the vicinity of Thornhill.

The M'light was on a VFR flight from Islay to Thornhill and was not in receipt of an ATS. The G115 was on a VFR flight, which departed from Glasgow; the pilot indicated in his report that he was in receipt of a BS from Scottish Information [119.875MHz].

Thornhill is notified in UK AIP ENR 5.5 and depicted on both 1:250,000 and 1:500,000 charts. The Scottish Airsports Club request that all ccts and manoeuvring are carried out to the N of the site only, over Flanders Moss. Activity times are not given in the AIP.

ATSI had access to both pilots' reports, recorded area surveillance and recording of the Scottish Information RTF.

Meteorological information for Glasgow (18nm SSW of Thornhill) was as follows:

METAR EGPF 091420Z 28009KT 240V310 9999 FEW031 19/12 Q1026=

[UKAB Note(2): The reported heights and altimeter pressure settings of the Quik GT450 [1025hPa] and Grob Tutor [1009hPa] results in a calculated vertical separation of approximately 550ft. However, the Glasgow QNH was reported as 1026hPa and both pilots were in close agreement as to the vertical separation. In a subsequent telephone call, the Grob pilot said that he could not recall the QNH setting and that he had probably reported a mistaken QNH.]

The G115 pilot departed Glasgow at 1407 and, climbing to altitude 1800ft, departed the Glasgow CTR to the NW in the vicinity of Alexandria. He then turned R onto a direct track for Thornhill and climbed to 3400ft. The G115 pilot retained SSR code 2607 (Glasgow APP) as he flew towards Thornhill.

A primary position indication symbol was observed on radar replay to have routed to the E, outside CAS and N of the N'ly boundary of the Glasgow CTR. This ac was also on a direct track to Thornhill and ahead of the G115.

At 1418:00 the primary only ac had manoeuvred such that it was N of Thornhill, over Flanders Moss. It then manoeuvred such as to suggest it was DW, then base leg, for Thornhill's westerly strip.

At 1419:00 the G115 was 4nm WSW of Thornhill at 3400ft on track to the Microlight Site. The primary only ac had disappeared from surveillance coverage whilst on base leg. The M'light pilot's report indicated that his ac was inbound to land.

The G115 then flew to the NE of Thornhill by 2nm before executing a 180° R turn and descending to overfly Thornhill at 1424:38 at 2600ft on a WSW'ly track.

The G115 then executed a sharp R turn onto N, continuing descent and then disappearing from surveillance coverage approximately 1nm NE of the Microlight Site.

Between 1427:27 and 1428:11 a primary position indication symbol is seen to fly on a WSW'ly track slightly to the S of Thornhill.

By 1429:06 the G115 was climbing through 2300ft, away from Thornhill to the E, with full SSR being detected. The G115 climbed back to 3400ft before setting course back towards the Microlight Site where it descended again over Flanders Moss and out of surveillance coverage.

At 1437:06 the G115 was detected by SSR climbing through 2100ft, still displaying SSR code 2607, and routeing away from Thornhill to the E. The G115 SSR code changed to 7401 at 1439:00 indicating the pilot had established an ATS with Scottish Information.

The radar identity of the reporting M'light cannot be confirmed; however, it seems likely that, given the routeing and subsequent manoeuvring in the vicinity of Thornhill, the primary position indication symbol first observed ahead of the G115 was the reporting M'light.

The G115 pilot retained a SSR code indicating that he was in receipt of an ATS from Glasgow Approach; however, given the G115 pilot's report that he was in receipt of an ATS from Scottish Information at the time of the incident, no RTF recording from Glasgow ATC was obtained. Similarly there was no report of the incident by Glasgow ATC and it would seem unlikely that Glasgow ATC were monitoring the G115 as it manoeuvred in the vicinity of Thornhill.

The G115 executed manoeuvres O/H and in the vicinity of Thornhill and Flanders Moss. It is more than likely that during one of these manoeuvres the reported incident occurred. The theoretical base of area surveillance coverage in the vicinity of Thornhill is between 2100 and 2300ft and hence the reported incident cannot be described in further detail.

An Airprox occurred in the vicinity of Thornhill Microlight site when a G115 flew in the vicinity of the site at the same time as an inbound Microlight, which was being manoeuvred to land.

HQ AIR (TRG) comments that the Tutor pilot reports making an initial visual assessment that the site was inactive before proceeding with his PFL practice. Having become aware of the potential for that assessment to be wrong, he elected to go around, sighting the microlight in the process. Whilst a notified microlight site might at first consideration seem to be a good choice of location to execute a forced landing, the potential for such sites to be active despite appearances to the contrary makes them a less attractive site to practise such procedures.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a recording of the Scottish Information RTF and radar video recordings.

Board Members first discussed the way in which M/L sites are regarded by other pilots, in particular common preconceptions about the levels of site activity and extent of cct area. GA Members opined that modern M/L performance and economy of operation resulted in a situation where M/L A/D activity was often on a par with busy, licensed GA A/Ds. Whilst the latter benefited from an ATZ and prominent chart labelling, M/L site marking was less prominent, perhaps resulting in a subconscious level of assessment of the M/L site's activity level as 'low'. In addition, the CAA Flt Ops Advisor confirmed that M/L sites meet the ANO definition of 'Aerodrome'; as such M/L sites enjoy the protection of Rule 12 whereby pilots flying in the vicinity of a promulgated M/L site must either conform to the pattern of traffic or keep clear.

Members assumed the Tutor pilot's perception was that he was performing a PFL sufficiently N of the M/L site that he would remain clear of cct traffic. From the M/L pilot's reported downwind position this would seem to have been a misjudgement on the part of the Tutor pilot, not helped by the poor cross-cockpit view as he turned R in the PFL. Members opined that on the one hand, due to the flat low-lying ground, the Tutor pilot had chosen an ideal area in which to undertake a PFL; on the other hand this area was also used as a M/L site due to this same suitability. There was broad agreement that this was an excellent area to conduct a forced landing in the event of an engine failure but a less than ideal area in which to conduct a practice. It was also established that the M/L site was correctly promulgated and that there was no requirement for a NOTAM to be issued to notify the site as active.

In the absence of radar position data it was agreed that the Tutor pilot and M/L pilot flew into confliction in the vicinity of the M/L site but that both parties had maintained sufficient lookout such that they had seen each other and had taken timely and effective avoiding action.

AIRPROX REPORT No 2012121

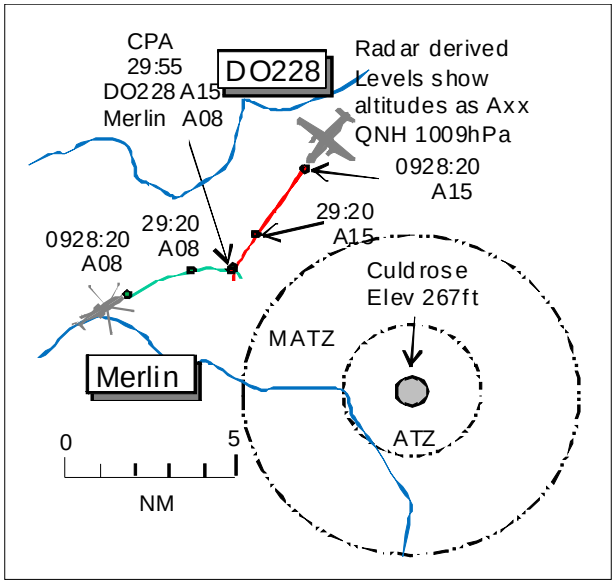
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the vicinity of a promulgated and active microlight site.

Degree of Risk: C.

AIRPROX REPORT NO 2012122

Date/Time:	14 Aug 2012 0930Z	
Position:	5009N 00524W (7nm NW Culdrose)	
Airspace:	Culdrose AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Merlin	DO228
Operator:	HQ Navy	Civ Comm
Alt/FL:	500ft	1800ft↓
	QFE (999hPa)	QNH
Weather:	VMC CLBC	VMC CLBC
Visibility:	10km	20nm
Reported Separation:		
	100-150ft V	400ft V/50m H
Recorded Separation:		
	700ft V/Nil H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MERLIN PILOT reports returning to Culdrose, VFR and in receipt of a BS from Culdrose Tower on UHF, squawking 7030 with Modes S and C. The visibility was 10km flying 100ft below cloud in VMC and the ac was coloured grey; lighting was not reported. When just outside the MATZ boundary about 6nm to the NW of Culdrose heading 090° at 120kt and level at 500ft QFE 999hPa, a light twin-engine ac was noticed about 0·25nm away just before it flew directly O/H from L to R by about 100-150ft. There was a thin band of cloud (50-100ft) covering 3 OKTAS and the ac appeared in one of the cloud gaps. He assessed the risk as medium.

THE DO228 PILOT reports a dual training sortie from Newquay, VFR and in receipt of a TS from Newquay on 133·4MHz, squawking 7400 with Modes S and C. The visibility was 20nm flying 100ft below cloud in VMC and the ac was coloured white/blue with nav and strobe lights switched on. A new pilot (FO) was in the LH seat and he was descending the ac slowly in order to remain VMC. About 8nm E of LND heading 220° at 140kt Newquay called a target, the Merlin, as traffic which was seen on TCAS at 10nm. He, the Capt, was aware of the Merlin's proximity throughout and could see there was no risk of collision. He monitored the TCAS TA and anticipated an RA that did not come so he left full control of the ac with the PF. They saw the Merlin at range 0·5nm and estimated they passed 400ft above and 50m from it at the CPA. He assessed the risk as none.

THE CULDROSE TOWER CONTROLLER was working in the VCR and Radar was unmanned. There were 2 ac on families' day flights out to a range of approximately 8nm and back again and the flights remained on Tower frequency throughout. It was during one of these flights that the subject Merlin flight called to report an Airprox when it was at the MATZ boundary, 5nm WNW of Culdrose. The pilot stated they had been overflown by approximately 100ft by an ac, possibly a DHC6 Twin Otter, but there was a thin layer of cloud between them and the other ac. The other ac was travelling in a S'ly direction. She noted the details passed and checked the Hi-Brite display and noticed a SSR return in the vicinity, identifying as a Newquay flight indicating 1600ft on Mode C. After speaking to a spare controller nearby, they liaised with Newquay and found out that the ac was a DO228 under a radar service. Also, the Newquay controller had called the Merlin to the DO228 crew who had reported visual with it. It was not confirmed that the DO228 was the ac involved in the Airprox. The Merlin crew reported at 500ft QFE 999hPa so if the DO228's Mode C was correct it would have put the ac 600ft above the Merlin. If there had been a light civilian ac in the vicinity at the time without a transponder he would not have been able to see it as the Watchman primary radar was on maintenance and they were operating SSR only.

SATCO CULDROSE reports the controller in the VCR was monitoring 122·1MHz [NATO Common] but not 134·05MHz [APP]. Newquay had contacted Culdrose ATC prior to the event and established Culdrose was open. After the alleged Airprox the Culdrose ATCO rang Newquay who informed them that Newquay ATC had called the Merlin to the DO228 flight and he had reported visual.

AIRPROX REPORT No 2012122

THE NEWQUAY RADAR CONTROLLER reports the DO228 was outbound to the S on a local sortie and under a TS at 1500ft. Culdrose was NOTAMed as closed and a further NOTAM stated LARS was not available. On observing the DO228's initial track he asked the crew where their route took them in relation to Culdrose and the crew replied "N and W of the MATZ". With this information and the observed track and despite the NOTAMs, Culdrose was telephoned from the assistant's position to offer the DO228 to them as there were 2 Culdrose squawks operating on the coast between Culdrose and Penzance Heliport. Culdrose ATC did not wish to work the DO228 but confirmed they could see it on their radar and that they had 2 Merlins operating on the coast; this was in keeping with what was shown on radar. He called the Culdrose traffic to the DO228 flight and explained that Culdrose was not able to provide a service but the traffic was believed to be a Merlin. Mode C showed the DO228 approximately 500ft above the Culdrose traffic. He called the traffic once again as the radar blips closed at which point the crew reported "visual".

ATSI reports that the Airprox occurred at 0929:55 UTC, 7nm to the NW of Culdrose and 23nm SW of Newquay, within Class G airspace, between a Merlin and a DO228.

The Merlin was returning to Culdrose after the completion of a local flight and was just NW of the Culdrose MATZ boundary in VMC conditions. The Merlin was in receipt of a BS from Culdrose Tower and had SSR code 7030 selected. Culdrose Radar was unmanned - the Watchman primary radar was on maintenance with SSR only available. Culdrose had issued 2 NOTAMs indicating that the airfield was closed and that LARS was not available.

The DO228 was operating from Newquay Airport on a VFR flight and was in receipt of a TS from Newquay Radar. The DO228 had SSR code 7400 selected.

CAA ATSI had access to area radar and Newquay Airport radar recordings, together with a written report from both ac pilots and both air traffic controllers. The area radar did not show the occurrence and Newquay radar recordings were used for analysis.

The METARs for Culdrose and Newquay were:

EGDR 140850Z 17006KT 9999 FEW014 SCT018 18/17 Q1008 WHT TEMPO SCT012 GRN=

EGDR 140950Z 15010KT 9999 VCSH SCT010 SCT016 18/17 Q1009 GRN NOSIG=

EGHQ 140920Z 16011KT 9999 SCT012 17/15 Q1009=

Two Merlin helicopters were operating locally from Culdrose Airport on short flights to the coast and return. The Newquay controller's written report indicated that there were 2 NOTAMs reporting that Culdrose was closed and also that LARS was not available.

The Culdrose Tower controller's report stated that there was only 1 controller in the Tower and that radar was unmanned.

The DO228 departed from Newquay Airport VFR at 0920 on a SW'y track, for an operational flight over the sea. At 0921:20 the DO228 flight contacted Newquay Radar and a TS was agreed. The DO228 crew reported operating at 1400ft.

At 0925:25, in response to a request from the Newquay controller, the DO228 pilot confirmed that the intended route would pass N of the Culdrose MATZ.

At 0925:50, the Newquay controller decided to contact Culdrose and check if they were interested in working the '(DO228)c/s', passing close to the N of Culdrose. Culdrose replied, "not at the moment" and advised of 2 Merlin helicopters running out to the coast and back again. Culdrose asked, "how close" and Newquay responded, "N of the MATZ", asking if Culdrose could see the traffic on radar. Culdrose advised of limited radar due to being SSR only but reported that they could see the DO228 and just had the 2 Merlins. From the radar recordings it would appear that the 2 Merlins were operating independently, some distance apart.

At 0928:20, the Newquay controller advised the DO228 flight, *"..traffic information right one o'clock range of six miles manouevring indicating eight hundred feet believed to be a Merlin helicopter. I've spoken to Culdrose they are not providing a LARS but er they described the only traffic they have in the vicinity as a Merlin."* The DO228

pilot replied, *"Roger that (DO228 c/s)....."*. The Newquay controller added, *"It's indicating 800ft now"* and the DO228 crew acknowledged, *"(DO228 c/s) looking out*."

At 0929:20, the Newquay controller updated the TI, *"(DO228 c/s) that previously mentioned traffic right one o'clock two and a half miles opposite direction indicating eight hundred feet."* The DO228 pilot replied, *"(DO228 c/s) looking but er not seen*."

At 0929:41, radar shows the 2 ac on converging/crossing tracks at a range of 1nm as shown in picture 1 below.

Picture 1 (0929:41)

At 0929:50 the DO228 pilot transmitted "*and we're now er visual with the traffic as we pass overhead.*" Radar at 0929:55 shows the DO228 at an altitude of 1500ft and the Merlin at 800ft, as shown in picture 2 below.

Picture 2 (0929:55)

The 2 ac initially maintained their respective levels as they diverged and shortly afterwards the Merlin began a descent. The Newquay controller advised, *"(DO228 c/s) limited traffic information from all around as you approach the edge of solid radar cover."* The DO228 pilot responded, *"(DO228 c/s) er we'd like to go feet wet and if you've nothing further for us we'll er go en-route."* The Newquay controller acknowledged with, *" (DO228 c/s) affirm ...."*

The written report from the Culdrose Tower controller stated that the pilot of the Merlin reported being overflown by another ac approximately 100ft above. The controller noted the details and then checked the ATM and noticed the 7400 return from the DO228. As the previous phonecall appears to have been conducted by a different controller it is unclear to ATSI whether or not the Culdrose Tower controller was aware of the presence of the DO228 prior to the report from the Merlin pilot.

AIRPROX REPORT No 2012122

At 0934:50, Culdrose contacted Newquay and indicated that one of the Merlin helicopters had reported an Airprox which had occurred 5min earlier. The other ac was believed to be a Twin Otter that passed 100ft over the Merlin and Culdrose asked if Newquay were aware of the Twin Otter. The Newquay controller initally reported the other ac as an Islander which Newquay had previously passed traffic details on, with the option for Culdrose to work the traffic. Culdrose acknowledged this and indicated that they were just trying to clarify the type of the other ac. The Newquay controller then checked and confirmed the ac invoved was in fact a DO228 and not an Islander.

The Merlin pilot's written report indicated that there was a cloud covering 100ft above and he had noticed a twin-engine ac as it flew directly above in a gap in the cloud.

Culdrose had issued 2 NOTAMs to promulgate the airfield as closed and also that LARS was not available. Despite these NOTAMs, Newquay decided to check with Culdrose who indicated that they did not wish to work the traffic but reported working 2 Merlin helicopters. It was noted that Newquay did not specify the type of ac when passing traffic details. Culdrose reported that radar was limited due to SSR only, but added that they could see the transit aircraft on radar.

The Merlin flight was in receipt of a BS from Culdrose Tower. Whether or not the Culdrose Tower controller was aware of the presence of the DO228 prior to the incident, under the terms of a BS there is no requirement to pass TI and the pilot is expected to discharge his responsibility for collision avoidance without assistance from the controller.

The DO228 flight was in receipt of a TS from Newquay Radar. CAP774, Chapter 3, Paragraphs 1 and 5, state:

'A Traffic Service is a surveillance based ATS, where in addition to the provisions of a Basic Service, the controller provides specific surveillance-derived traffic information to assist the pilot in avoiding other traffic. Controllers may provide headings and/or levels for the purposes of positioning and/or sequencing; however, the controller is not required to achieve deconfliction minima, and the avoidance of other traffic is ultimately the pilot's responsibility.

The controller shall pass traffic information on relevant traffic, and shall update the traffic information if it continues to constitute a definite hazard, or if requested by the pilot. However, high controller workload and RTF loading may reduce the ability of the controller to pass traffic information, and the timeliness of such information.'

For ac operating within Class G airspace, CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment…'

The Newquay controller passed the DO228 flight appropriate TI and updated the information until the DO228 pilot reported visual with the Merlin. Radar shows the vertical distance between the 2 ac was 700ft.

The Airprox was reported after the Merlin helicopter pilot, in receipt of a BS from Culdrose Tower, became concerned about the proximity of the DO228 as it passed 700ft O/H.

The Newquay controller recognised the potential conflict with traffic in the Culdrose area and liaised with Culdrose and then passed appropriate TI to the DO228 pilot, thereby assisting the DO228 in visually acquiring the traffic.

HQ NAVY comments that this Airprox occurred outside of the Culdrose MATZ during a period where the airfield should have been closed for block leave, but had been opened temporarily for VFR operations with 2 helicopters. The Newquay controller was aware that Culdrose was open and had ascertained that the controller was not able to work the LARS transit as they were operating tower only. The DO228 was 700ft above the Merlin, which was called in as TI. The Merlin was flying clear of cloud and in sight of the surface and did not see the DO228 until they were very close, although his perception was that they were closer than subsequently discovered. It was correct to NOTAM the LARS service as unavailable, however care must be taken when issuing a NOTAM stating that the airfield is closed when there is planned flying taking place, as this can cause confusion.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was clear that the Merlin crew was surprised by the appearance of the DO228 and, possibly as a result of this surprise, they perceived less vertical separation pertained as the ac crossed than was actually the case. This may have been because their 'mental model' was that the conflicting ac was a Twin Otter flying close-by whereas the traffic was a larger ac further away. Controller Members thought that had Culdrose given TI on the DO228 to the Merlin crew it would have improved the crew's SA and removed the 'surprise' element. Under a BS Culdrose ATC was not obliged to pass TI; the information passed by Newquay on the telephone was accepted by a different Culdrose controller so it was not clear if the Tower controller was aware of the DO228's presence. That said, in Class G airspace both crews were responsible for maintaining their own separation from other traffic through see and avoid. The DO228 crew had improved their SA through a TS from Newquay Radar and the TI they received had drawn their attention to the Merlin. Its position and subsequent flightpath was monitored on TCAS, the DO228 crew becoming visual at range 0·5nm and they were happy that there was no risk of collision. The recorded radar reveals 700ft vertical separation as the 2 ac crossed. Given these circumstances, the Board agreed that the Merlin crew had underestimated the separation and the benign incident could be classified as a pilot perceived conflict where normal procedures, safety standards and parameters pertained.

The Navy Ops Member was disappointed that the aerodrome had been NOTAM'd closed when it was active; however, the outcome was not affected as the Newquay controller was cognisant of the Culdrose activity from the 2 Merlins displayed on radar.

PART C: ASSESSMENT OF CAUSE AND RISK

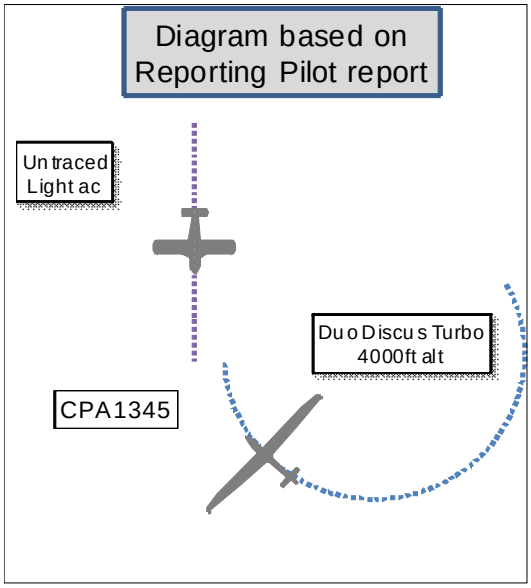
Cause: Pilot perceived conflict.

Degree of Risk: E.

AIRPROX REPORT No 2012123

AIRPROX REPORT NO 2012123

Date/Time:	10 Aug 2012 1345Z	
Position:	5207N 00125W	(7km NW Banbury)
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Duo Discus Turbo	Untraced Light A/c
Operator:	Civ Pte	NK
Alt/FL:	4000ft QNH (1027hPa)	NK
Weather:	VMC CLBC	NK
Visibility:	>20km	NK
Reported Separation:	200ft V/500m H	NK
Recorded Separation:	NR	



[UKAB Note(1): The Duo Discus Turbo is a high performance two seat motor-glider with a retractable 2-stroke engine.]

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DUO DISCUS TURBO PILOT reports gaining height whilst circling in a thermal, flying a white glider with no external lights. He was operating autonomously in VMC, under VFR, and listening out on 130.100Mhz [Glider common frequency]. The ac was not fitted with an SSR transponder. He reported that the ac was fitted with an ACAS (FLARM) and that it was operational. He was circling at 50kt and, as he turned on to an approximately N'ly hdg, he saw a single engine light aviation ac diving steeply beneath him, 'in line with his position'. He did not see the conflicting ac before it dived although he thought it would have passed close to him if it had not taken avoiding action. The danger of collision had passed by the time he saw the other ac so he continued circling, noting that the other ac continued on its way some distance below him.

He assessed the risk of collision as 'High'.

[UKAB Note (2): The Radar Analysis Cell was able to trace a pop-up contact in the reported position and at the time of the Airprox to a local A/D. The A/D was contacted but none of the pilots airborne at the time of the Airprox recalled seeing another ac in close proximity. Regrettably, it has not been possible to trace the pilot of the other ac.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Duo Discus pilot and radar video recordings.

A Civ Pilot Member observed that the Untraced Light Aircraft appeared to take vigorous avoiding action but that the pilot had, disappointingly, not felt the need to file an Airprox. All Members agreed that further effort was required into promoting the advantages of filing an Airprox but that, in this case, there was insufficient information to conduct any meaningful analysis of the event.

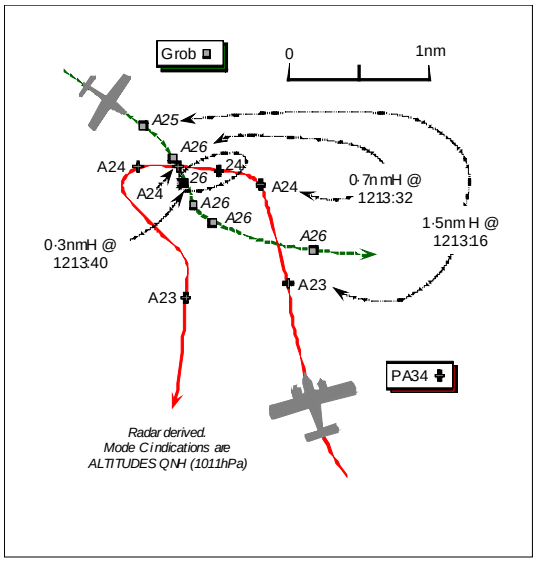
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Insufficient information to make an assessment.

Degree of Risk: D.

AIRPROX REPORT NO 2012124

Date/Time:	14 Aug 2012 1213Z	
Position:	5214N 00153W (10nm WNW of Wellesbourne Mountford - O/H Alcester)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob 109B	PA34
Operator:	Civ Pte	Civ Trg
Alt/FL:	2500ft	2500ft
	QNH (1010hPa)	QNH
Weather:	VMC CLOC	VMC CLOC
Visibility:	40km	>10km
Reported Separation:		
	Nil V/<0·25nm H	0·5nm H
Recorded Separation:		
	200ft V/0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB 109B (G109) PILOT reports he was in transit under VFR from Sleap to Wellesbourne Mountford at 80kt and in receipt of a BS from Birmingham RADAR on 118.050MHz. A squawk of A0403 was allocated. Mode C and elementary surveillance Mode S were on; TCAS is not fitted.

Established in a level cruise at 2500ft QNH (1010hPa) in VMC, heading 140° he was informed by RADAR of two ac in his vicinity and the ATS was temporarily upgraded to a TS at the instigation of the controller [this was 10min before the Airprox occurred]. He confirmed that he was visual with one ac - a faster PA38 in his 12 o'clock position flying in the same direction. He did not see the reported ac until just before his turning point O/H Alcester, where he intended to make a L turn for Wellesbourne Mountford. The reported ac, a white low-wing twin [the PA34] was also level at 2500ft ALT and first seen in his 10 o'clock position routeing N about 1nm away, but it then made a turn directly towards his aeroplane before turning to pass within 0·25nm astern with a 'high' Risk of collision.

He did not inform RADAR at the time as he did not want to alarm his passenger; the relative speed of the twin was frightening compared to his 80kt. If he had turned away from the twin he would have lost sight of it and it would have quickly caught them up. The pilot of the other ac was not in contact with Birmingham RADAR. His Grob is coloured white with blue stripes; the HISLs and landing lamp were on.

THE PIPER PA-34-200T (PA34) PILOT reports that in the days surrounding the Airprox, he had flown the same NAVEX twice and was not sure if the incident he recalls corresponds to the Airprox filed by the Grob pilot. He does not recall if he was under an ATS. SSR Modes A and C were on; TCAS is not fitted.

He reports that the VFR training flight with two students aboard was flown at 2500ft ALT and they were flying on a N'ly heading at 140kt in the vicinity of Alcester, when he noticed a 'plastic' single piston engine aeroplane, high in his 2 o'clock position about 2nm away. He alerted both students to the other ac and assessed there was not any risk of a collision, the student PF maintained his course whilst trying to identify Alcester. He decided to make a L level turn in order to positively identify their destination and also plan a diversion to Northleach roundabout. Both he and the backseat student maintained the traffic in sight, but 180° into the turn they realised that the pilot of the Grob, now in their 12 o'clock position, was taking some kind of avoiding action. As he had the Grob in sight at all times and the minimum separation was 0·5nm he did not feel either ac was in danger. Therefore, he did not deem it necessary to take avoiding action by asking the student to change his flight path. He might have turned away following the other pilot's actions; however, neither he nor his students are sure on this point. He assessed the Risk as 'none'.

AIRPROX REPORT No 2012124

THE BIRMINGHAM RADAR 1 CONTROLLER (RADAR) reports the Grob 109B pilot was under a BS in the FIR routeing from the NW on a SE'ly course. At one point there was another ac heading towards their CTR boundary and looked like it was going to infringe their CAS, so whilst taking precautionary measures against that contact she made a blind RT transmission to see if the other ac's pilot was listening on their frequency. Instead, the G109B pilot replied (the flight was on a similar squawk - A0403) so the controller thanked him for replying but advised it was a different ac that she was calling. The Grob pilot said he was N of Snitterfield and so thought it was his aeroplane that the controller had referred to; in case the Grob pilot was uncertain of his position, she advised the Grob pilot that he was actually 7nm W of Snitterfield and to look for gliders as he continued SE bound because Snitterfield was notified as active. Later, she advised there were other ac in the Grob's vicinity at a similar level and reminded the pilot to keep a good lookout but not just for gliders. No more specific TI was given as the flight was still only under a BS. No further comment was made by the Grob pilot nor was any request made for a change in ATS and she - the controller - believes it was during this time that the Airprox occurred over Alcester. From the point of first RT contact the Grob pilot was under a BS. However, she had allocated a squawk and temporarily upgraded the service to a TS earlier in the flight, when the G109 was further to the WNW, because there was traffic to affect the Grob and she had time available to do so; the ATS was then changed back to a BS with the agreement of the Grob pilot.

ATSI reports that the Airprox was reported by the pilot of the G109 when the ac came into proximity with the PA34 in the vicinity of Alcester at 2500ft ALT. The G109 pilot was on a private VFR flight from Sleap to Wellesbourne Mountford and in receipt of a BS from Birmingham RADAR on 118.050MHz. The PA34 was on a VFR training flight from Oxford and the pilot reports he does not recall if he was under an ATS at the time of the incident. The PA34 was squawking A4520.

ATSI had access to pilots' reports, report of the Birmingham RADAR controller, Unit report, recorded area surveillance and transcription of frequencies 118.050MHz (Birmingham RADAR) and 127.750MHz (Oxford APPROACH/RADAR).

The Birmingham METAR: 1220Z 18007KT 120V220 9999 SCT032 22/14 Q1010=.

The PA34 crew departed Oxford at 1153:00 to the NW, under a BS from Oxford APPROACH. The PA34 pilot reported climbing to altitude 2500ft and was instructed to report back when rejoin was required.

The G109 pilot called Birmingham RADAR at 1200:30 and requested a BS at 2500ft, which was agreed. The Birmingham controller passed the QNH (1010hPa), warned the G109 pilot that Snitterfield was notified as active and to keep a look out for gliders. At 1203:50, [10min before the Airprox occurred] Birmingham RADAR identified the G109 from the allocated SSR code A0403, some 16nm WSW of Birmingham. The G109 pilot's service was then upgraded to a TS by the controller and TI passed on converging traffic – not the PA34 - which the G109 pilot visually acquired. At 1204:10, the G109 pilot's ATS was reverted to a BS by the controller, with acceptance and readback by the pilot. The G109's allocated SSR code of A0403 was retained.

At 1205:10 the Oxford frequencies were split and the Oxford APPROACH controller broadcast that several ac, including the PA34, were to remain on 127.750MHz. There were no responses to the broadcast.

The Birmingham RADAR controller made a broadcast to an ac displaying an SSR code of A0243 at 1211:00. The G109 pilot responded [incorrectly] to this call, but was thanked for his vigilance and informed that his G109 was now 7nm W of Snitterfield. The Birmingham controller also warned, "*you need to keep a good look out for gliders nothing showing on radar though at the moment,"* to which the pilot replied that he would keep a good look out. At 1213:00, the G109 pilot was informed by RADAR, "…*there are..another couple of contacts seen in your current area same or similar level to yourself so do keep a very good look out as well just not just for gliders."* The pilot replied, "..*we're visual one….in our 12 o'clock and..keep looking out for the other one."* The PA34 pilot's Airprox report indicated that the crew had also visually acquired the G109.

Figure 1 below shows the Clee Hill radar picture at 1213:00. The PA34 then commenced a gradual drift to the R, crossing through the G109's 12 o'clock at a range of 2nm, R to L. The G109 maintained 2500ft and the PA34 descended to 2400ft.

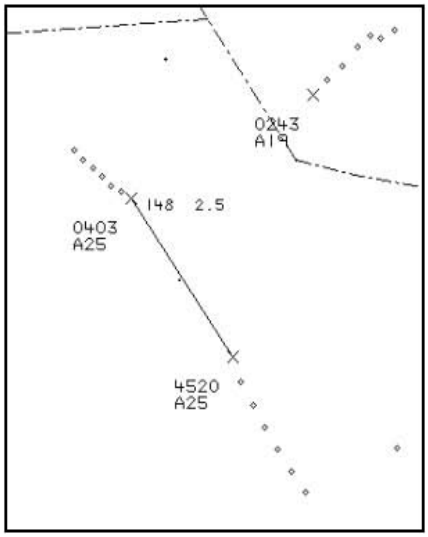


Figure 1: Clee Hill 1213:00 UTC

At 1213:16, the PA34, still in the G109's 12 o'clock has descended to 2300ft at a range of 1.5nm.

Figure 2 shows the Clee Hill radar picture at 1213:32. The distance between the two ac was 0.7nm and 200ft. At this time the recorded GS of the PA34 is 159kt; the G109 is 74kt.

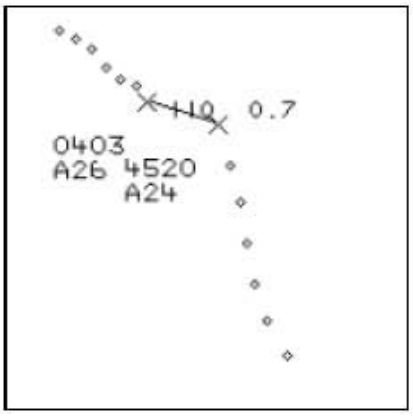


Figure 2: Clee Hill 1213:32

Minimum distance recorded by Clee Hill occurred at 1213:41 (Figure 3 below): 0.3nm/200ft.

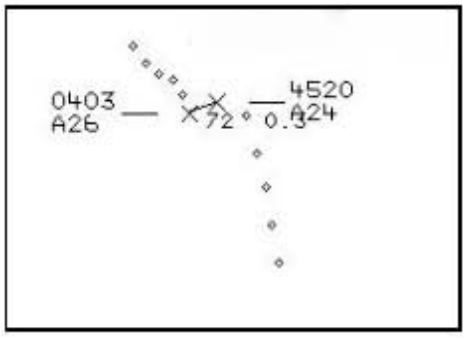


Figure 3: Clee Hill 1213:41

The PA34 then turned L behind the G109, which made a L turn (in the direction of Wellesbourne). Figure 4 below shows the Clee Hill radar picture at 1214:30; the PA34 is now 300ft below, in the G109's 5 o'clock at 1nm. The position of the ac at this time was just N of Alcester, some 10nm W of Wellesbourne Mountford in Class G airspace.

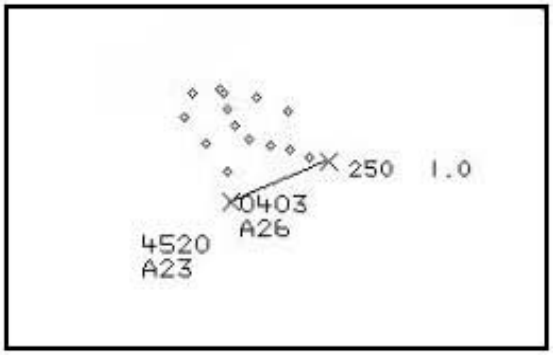


Figure 4: Clee Hill 1214:30

At 1214:50, the G109 pilot reported to Birmingham RADAR that he was approaching O/H Stratford and requested a frequency change to Wellesbourne. The G109's SSR code was changed to A7000 and the frequency change approved.

The PA34 crew called Oxford RADAR for rejoin at 1245:10.

Within Class G uncontrolled airspace, regardless of the ATS being provided, pilots are ultimately responsible for collision avoidance. Under a BS, advice and information useful for the safe and efficient conduct of flight will be passed. This may include general airspace activity information, e.g. the notified activity at Snitterfield.

Controllers with access to surveillance derived information may issue a warning to pilots if the controller considers a definite risk of collision exits. Whilst there is no evidence the Birmingham RADAR controller considered this to be the case, suitable information was passed to the G109 pilot to aid his awareness of the general airspace activity in his area. The G109 pilot acquired the PA34 visually at the time the controller passed this information.

The Airprox occurred in Class G airspace in the vicinity of Alcester when the G109 and PA34 came into proximity at an altitude of 2500ft. Both pilots were visual with each other's ac and the recorded separation was 0.3nm H/ 200ft V.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members had some difficulty reconciling the pilots' reports with the recorded radar picture. If both pilot's recollections were correct, a miss distance of 0.3nm and 200ft was reasonable in good visibility. That said, Member's could appreciate the Grob pilot's concern at the approach of the much faster PA34 in the absence of any indication that his ac had been seen. An experienced pilot Member noted that pilots operating with cruising speeds in the 150kt range need to be aware that the majority of traffic they encounter below 3000ft will be much slower with less capability to manoeuvre; therefore early and robust avoiding action is required. There was some doubt, however, because the PA34 instructor's reported first sighting of the 'plastic' aircraft in his 2 o'clock suggested that it was not the subject Grob that he had spotted; the radar recording suggests that this was a different ac, unrelated to the Airprox. If this scenario was correct, then the PA34 crew had not seen the Grob as they passed behind it, only spotting it after they had completed his 180° turn and after the Grob had made its left turn overhead Alcester. This was a credible scenario since the PA34 crew would have been biasing their lookout downwards to identify their turning point. However, the PA34 instructor reports having the Grob in sight throughout his own turn and seeing it turn away in a possible avoidance manoeuvre. Therefore the Board agreed by a majority that it was most likely that the PA34 pilot had seen the Grob at an early stage and that it was his relatively close approach that had caused the Grob pilot concern.

In discussing the risk associated with the incident Members noted that both aircraft were operating in Class G airspace where pilots are required to 'see and avoid' other ac. The Grob pilot was operating under a BS and therefore could not expect specific TI. He did, however, receive general warnings of contacts in his area and he first saw the PA34 at an estimated range of 1nm. The PA34 pilot, operating under a BS from Oxford, saw the Grob at an estimated range of 2nm. Given these sighting ranges the Board was satisfied that there was no risk of collision associated with the incident.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA34 crew flew close enough to cause the Grob pilot concern.

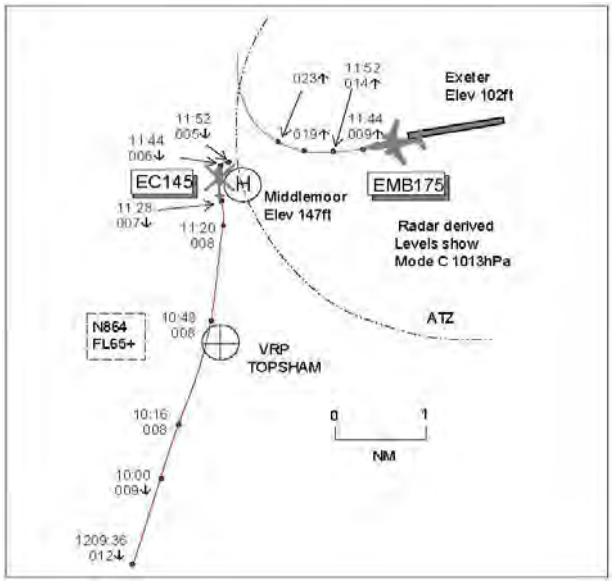
Degree of Risk: C.

AIRPROX REPORT No 2012125

AIRPROX REPORT NO 2012125

Date/Time: 16 Aug 2012 1212Z
Position: 5044N 00328W
(2·25nm WSW Exeter - elev 102ft)

Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	EMB175	EC145
Operator:	CAT	Civ Comm
Alt/FL:	↑	500-600ft↓
	QNH	Rad Alt
Weather:	VMC NR	VMC CLBC
Visibility:	NR	>10km
Reported Separation:		
	700ft V/minimal H	NR
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMB175 PILOT reports on departure from Exeter, IFR and in communication with Exeter Tower squawking with Modes S and C. They back-tracked RW26 and were advised by ATC that there was a light twin-engine ac carrying out a low approach and go-around. When ready for departure they were told the twin was entering a LH cct and take-off clearance was given. With the twin in sight and clear into the cct the take-off run was commenced. On rotation the PF noticed a helicopter routeing through the extended C/L and informed the PNF. The PNF was initially not visual with the helicopter and scanned inside to ascertain its location and relative altitude difference from the TCAS display. TCAS showed the helicopter roughly at the same level approximately 1-2nm ahead. On becoming visual the PNF instructed the PF to continue climbing straight ahead. With cct traffic to their L and the helicopter marginally R of C/L and considering their climbout performance at 150kt, he deemed the safest option was to maintain their climb angle and climb through the helicopter's level. He knew they would be able to separate their ac above the helicopter with no risk of collision. TCAS generated a TA which was acknowledged by both pilots, the PNF noting that the display showed the helicopter to be 700ft below with minimal lateral separation. He, the Capt, elected to file an Airprox because a TCAS TA was issued on departure below 1500ft on an ac that the crew had not been informed about which was a very serious issue. Had the ac had any performance issues, for example an engine failure that would have reduced the climb performance, any separation could not be guaranteed. The event caused distraction to the crew throughout the early stages of the climb. During the latter stages of the climb it was agreed that the crew would not discuss or think about the event until after they had landed at destination to prevent further distraction or error.

THE EC145 PILOT reports returning to a private site approximately 2·5nm W of Exeter, VFR and in receipt of a BS from Exeter Tower, squawking a discrete code with Modes S and C; TCAS 1 was fitted. The visibility was >10km flying 1500ft below cloud in VMC. As they were positioning onto finals a flight was cleared for take-off from RW26 which was told of their helicopter manoeuvring at their location, he thought. As far as he could remember the departing ac's pilot acknowledged the take-off clearance and traffic warning. The other ac took-off and was seen at a distance whilst he turned onto heading 190° reducing through 115kt for landing. The departing ac climbed out behind them, estimating it passed 1000-1500ft above, and there was never any danger of collision.

THE EXETER TOWER CONTROLLER reports the EMB175 flight backtracking RW26 for departure was given TI about a light twin making a low approach and go-around. At this time there were other ac in the cct pattern and a helicopter transiting the ATZ E to W to the S of the aerodrome [not the EC145]. Further traffic was the EC145 returning from a task from the SW, approaching a landing site 2·5nm W of the aerodrome. The landing site is on the climbout of RW26. Both ac were in sight of the controller and the EC145 descended into the landing site as the EMB175 climbed out.

ATSI reports that the Airprox was reported by the pilot of an EMB175 against an EC145 in the Exeter ATZ, Class G airspace, notified as a circle 2·5nm radius centred on RW08/26 from SFC to 2000ft.

The EMB175 was operating IFR on departure from Exeter to Glasgow and was in receipt of an Aerodrome Control Service fom Exeter Tower on frequency 119·8MHz.

The EC145 was operating VFR on a local flight from Middlemoor (which is situated on the western boundary of the Exeter ATZ) and was in receipt of a BS from Exeter Tower on frequency 119·8MHz.

CAA ATSI had access to written reports from the pilots of the EMB175 and the EC145 together with a report from the Exeter Tower controller, area radar recordings, RT recordings and transcripts of Exeter Tower frequency 119·8MHz and Exeter Radar 128·975MHz.

The Exeter METARs are provided for 1150 and 1220 UTC:

EGTE 161150Z 17014KT 9999 SCT020 18/16 Q1013= and EGTE 1220Z 17015KT 9999 SCT020 19/16 Q1013=

At 1153:20 the pilot of the EMB175 contacted Exeter Tower for push and start which was approved. At 1159:40 the EMB175 flight requested taxi instructions and was given taxi to holding point Charlie.

At 1203:20 the pilot of the EC145 contacted Exeter Radar 20nm to the SW at 1500ft on return to Middlemoor. A BS was agreed and the pilot of the EC145 was instructed to report with the city in sight.

At 1203:50 the Tower controller instructed the pilot of the EMB175, *"???? clears (EMB175 c/s) to Glasgow via Exmor November eight six four after departure right turn on track Exmoor climb flight level seven zero squawk five four three seven*". The crew replied, *"Clear to Glasgow via Exmor climb flight level seven zero squawk five four three seven…".*

At 1206:30 a training flight on final approach was given a go-around clearance to RW26 not below 500ft by the Tower controller.

At 1207:40 the Tower controller instructed the EMB175 to enter the RW via Charlie and to backtrack and line-up RW26. The pilot of the EMB175 was advised that a light twin would be making a missed approach to RW26 not below 500ft.

At 1208:00 the pilot of the EC145 reported visual with the city. The Exeter Radar controller gave TI to the EC145 on, "…*traffic about to depart runway two six or will be departing shortly two six for landing at Middlemoor contact Tower one one nine decimal eight*". The EC145 pilot replied, *"To Tower one one nine decimal eight copy the traffic (EC145 c/s)".*

At 1208:20 the pilot of the EC145 contacted Exeter Tower and advised that they were inbound to Middlemoor with about 5 to 6 miles to run. The Exeter Tower controller gave TI on the departing EMB175 as, *"…report final for Middlemoor the traffic backtracking runway two six for departure be routeing to the north and the left-hand circuit will be active"*. The EC145 pilot replied, *"Copy the traffic and we'll call you finals for Middlemoor (EC145 c/s)"*.

At 1209:40 the Tower controller informed the pilot of the EMB175 that the light twin making a missed approach would be turning into the LH cct and at 1210:30 the EMB175 flight was cleared for take-off.

At 1211:10 the EC145 pilot reported turning final for Middlemoor. The Tower controller advised the pilot, *" the traffic now just rolling runway two six surface wind at the airfield is one eight zero one five".* At 1211:29 the EC145 was 2·8nm WSW of Exeter Airport.

[UKAB Note (1): The EMB175 first appears at 1211:44, 1·1nm W of Exeter climbing through FL009 with the EC145 in its 12 o'clock range 1·6nm in a R turn through 070° descending through FL006. Eight seconds later at 1211:52 the EMB175 was 1·4nm W of Exeter indicating FL014 ROC >3000fpm with the EC145 still in its 12 o'clock range 1·1nm turning through 090° indicating FL005. On the next radar sweep the EMB175 is seen climbing through FL019 commencing a R turn to the N, the EC145 having now faded from radar.]

At 1212:10 the pilot of the EMB175 was instructed to contact Exeter Radar on 128·975MHz.

[UKAB Note (2): At 1213:10 Exeter Radar called the EMB175 flight and the crew replied, reporting passing FL52 climbing to FL70. Exeter Radar informed the flight that they were identified but with no traffic to affect the climb to FL70 the service was terminated and to contact Cardiff.]

The pilot of the EMB175 replied, informing Exeter Radar (1213:40) that they had received a TCAS TA against a helicopter on departure.

[UKAB Note (3): Radar acknowledged the call before the EMB175 crew asked, *"Can you tell us how close we got to that"*. Radar replied, *"Er I didn't see the actual levels I'm afraid but er the helicopter when I saw it was at three hundred feet descending into land at this site"* which the crew acknowledged.]

The written report from the pilot of the EMB175 stated that on rotation the pilot flying noticed a helicopter routeing through the extended C/L. The TCAS displayed the ac at roughly the same level 1-2nm ahead. The TCAS provided a TA which showed the helicopter 700ft below. The crew were concerned about receiving a TA on u

The written report from the pilot of the EC145 stated that the EMB175 took-off and climbed out behind the EC145.

The written report from the controller stated that both the EC145 and the EMB175 were in sight of the controller at the time of the reported Airprox.

Despite giving accurate and updated TI on the EMB175 to the pilot of the EC145, the Aerodrome Controller did not pass TI on the EC145 to the EMB175 crew. Although the controller had both ac in sight and could visually assess that there was no risk of collision, passing TI on the EC145 to the EMB175 would have improved the SA for the crew of the EMB175.

The Airprox was reported by the pilot of the EMB175 when the position of the EC145 caused distraction during the climbout from RW26 at Exeter.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members believed that had the Exeter ADC passed TI on the EC145 to the EMB175 crew this incident would almost certainly have not been filed. The EMB175 crew was distracted during their take-off, a critical stage of flight, when the EC145 was seen crossing ahead on the extended C/L of the RW. The EC145 pilot had been told about the departing EMB175, by Radar and again when contacting the ADC, as he transited to and then let-down to the private site on the Exeter ATZ boundary. Although TI would have heightened the EMB175 crew's SA, the issuance was a judgement call by the controller as the ADC was not obliged to pass it whilst providing reduced separation in the vicinity of an aerodrome when both ac were continuously visible to the controller. That said, all controller Members at the meeting agreed that they would have passed TI in these circumstances. Given the circumstances, Members agreed that the cause of the Airprox was that in the absence of TI, the EMB175 crew was concerned by the presence of the EC145.

The radar recording shows the EMB175 with a high ROC already 300ft above the EC145 when over 1·5nm lateral separation pertained. The EC145 pilot had seen the departing EMB175 at range as the helicopter was manoeuvred onto a S'ly track, into wind, for landing, estimating that it passed behind and well above with no risk of collision. The EMB175 crew had quickly assimilated the situation and continued their climb, judging their performance would remove the risk of collision. The Board concurred with both parties and, when these were combined with the ADC's application of reduced separation, was able to conclude that normal procedures, standards and parameters had pertained with any risk of collision effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

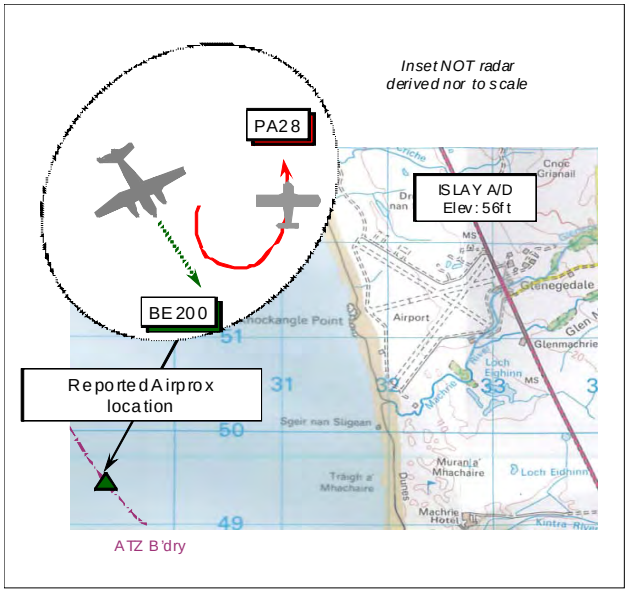
Cause: In the absence of TI, the EMB175 crew was concerned by the presence of the EC145.

Degree of Risk: E.

AIRPROX REPORT No 2012126

AIRPROX REPORT NO 2012126

Date/Time:	17 Aug 2012 1444Z	
Position:	5540N 00620W (2nm SW Islay A/D - elev 56ft)	
Airspace:	Islay ATZ/FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BE200	PA28R
Operator:	CAT	Civ Pte
Alt/FL:	700ft↓	700ft
	QNH (1004hPa)	QNH (1004hPa)
Weather:	VMC CLBC	VMC CLOC
Visibility:	10km+	10km+
Reported Separation:		
	300-400ft V/0·3-0·5nm H	Not seen
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BEECH BE200 KINGAIR (BE200) PIC reports he was the PF whilst inbound to Islay from Glasgow under VFR, squawking A7414; Modes C and S were on but TCAS is not fitted. They had been notified earlier by Scottish CONTROL that a PA28R was also inbound to Islay; he advised that his BE200's ETA at Islay A/D was 1443 and Scottish CONTROL informed them that the PA28R would arrive 2–3min later. Scottish CONTROL 'cleared' them to descend inbound Islay and switched them to Islay INFORMATION on 123·15MHz. They established contact with Islay INFORMATION, announced their estimated arrival time and distance out and that they planned to fly overhead the A/D and then turn downwind directly into a left hand visual cct to land on RW31. The PA28R pilot also made contact on the RT and reported to Islay INFORMATION an ETA at the A/D about 1min after his BE200. Islay INFORMATION understood that they would arrive close together and suggested that the PA28R pilot enter a holding pattern a minimum of 3nm W of the A/D, over the water, until their BE200 had landed; the PA28R pilot confirmed that he would do this. They reported E of the A/D with about 1min to run; he was already in visual contact with the RW and began the approach as previously announced. At about 2nm SW of the A/D heading 150° at 150kt, descending through 700ft QNH (1004hPa), in VMC, they 'discovered' the PA28R in their 10 o'clock in level flight at a slightly higher altitude, on a broadly N'ly course. The PA28R passed 300-400ft above his ac about 0·3–0·5nm away; no avoiding action was taken as the PA28R was heading the opposite way and above them; he was descending and so continued downwind and performed a normal landing on RW31. His ac is coloured white; the HISLs were on.

THE PIPER CHEROKEE ARROW PA28R (PA28) PILOT reports he was flying solo inbound to Islay from Elstree under VFR with scattered cloud around, but he was able to remain clear of cloud throughout the cruise at 5000ft and the descent into Islay; the visibility was excellent. Routeing from TURNBURY VOR/DME to Islay, approaching the A/D from the E at 110kt, squawking A7000 with Modes C and S on, he called Islay INFORMATION on 123·15MHz. The FISO informed him that the BE200 - on a scheduled service - was due O/H within 1min of his ETA and so he advised the FISO that he would be happy to head out to the W, past the A/D, to hold over the water about 3nm away to allow the BE200 to land ahead. The choice to allow the BE200 to land ahead was due to it being a scheduled service and the fact that his PA28 was burning far less fuel. The choice to go out over the water was due to the mountainous terrain around Islay that he wished to avoid, particularly as the cloud base over Islay was below some of the high ground to the E.

As he crossed over the shore to the SW of the A/D he encountered a low bank of cloud and so made an immediate hard turn to the L to remain clear of the cloud. After turning through 90°, level at 700ft, he reduced the bank angle of this L turn and executed two 360° orbits to the S of the A/D, but during this period he lost visual contact with the BE200. During the second orbit he drifted to the north and into the Islay ATZ and flew close to the BE200 that was

downwind for RW31; he did not see the BE200 and could not estimate the minimum separation. Subsequently, he joined the cct and landed.

After landing he visited the Tower and the FISO informed him that he had been close to the BE200, therefore, he filed an MOR some 48hr later setting out the above.

In hindsight, the situation could have avoided if:

Following his change of course as a result of encountering cloud, he should have informed the

FISO; however, he was pre-occupied avoiding both the weather and terrain.

He should have entered the cct directly upon arriving O/H the A/D and allowed the BE200 to land ahead, which would have allowed him to maintain visual contact.

The ac is coloured white/blue and the HISL was on.

THE ISLAY A/D FLIGHT INFORMATION SERVICE OFFICER (FISO) REPORTS he was working the BE200 inbound from Glasgow when the PA28 pilot called up at 1438 some 9nm E of the A/D at 3000ft ALT descending to 2000ft ALT, requesting landing and joining instructions. He passed the aerodrome information and traffic information on the BE200, which was acknowledged. The PA28 pilot estimated the A/D at 1442Z, whereas the BE200 crew's estimate was 1443Z.

At 1439 the BE200 pilot estimated he would be O/H at 2500ft ALT in 2½ min time, but was unsure where the PA28 was, so the FISO passed details of the PA28 to the BE200 pilot, whose intentions were to fly O/H the A/D, descend to 1000ft ALT and turn L into a visual cct to RW31. This was acknowledged and the BE200 crew were asked to report O/H. At 1441 he asked the PA28 pilot if had copied this information; the PA28 pilot acknowledged the call and reported visual with the other ac. The BE200 crew reported 1 minute out at 1441, but they were still unsure where the other traffic was, so he asked the PA28 pilot for an update on his position. PA28 pilot replied he was descending, 1000ft above the cloud base, 3nm SE of Islay and would hold S until the BE200 has landed. He confirmed that the BE200 crew had copied this information, which was acknowledged and their position given as 1nm due E of the A/D. Asking the PA28 pilot his intentions, the pilot replied that he would head out W over the water and hold 3 miles away until the BE200 had landed. This was acknowledged and further TI was passed to the PA28R pilot about an inbound air ambulance, to which the PA28R pilot replied that he would try to land between the traffic.

At 1442 the BE200 crew reported O/H with their intentions, which was to cct L to land on RW31; this was acknowledged. He [the FISO] was now visual with the BE200 and he advised its crew accordingly, who were also asked to report finals for RW31.

With the BE200 downwind L for RW31 at 1443, when asked to report finals for RW31, the crew advised they were still not visual with the other traffic – the PA28R. This was acknowledged and it was reiterated that the PA28 pilot was going to hold 3 miles to the W until the BE200 had landed, and then fly in to finals, which the BE200 crew copied. The BE200 crew reported they had a light ac in sight at 1444 and at this point he also saw the PA28, as it flew through some cloud from the W heading towards the O/H, passing approximately 200-400ft above the BE200. Both ac landed safely without further incident.

UKAB Note (1): The UK AIP at AD2 EGPI-5 notifies the Islay ATZ as a circle of 2nm radius centred on RW13/31 extending from the surface to 2000ft above the A/D elevation of 56ft amsl.

UKAB Note (2): This Airprox occurred outwith recorded radar coverage. The radar recording shows the two ac converging to a horizontal separation of 3·6nm, before the PA28R contact fades about 3min before the Airprox occurred.

UKAB Note (3): The Islay SPECIAL Wx report provided by the FISO is:

1438Z 25012kt; 50km Nil Wx; SCT @ 1100, SCT @ 1900; 17/15; Q1004; RW31.

AIRPROX REPORT No 2012126

ATSI reports that the Airprox was reported at Islay Aerodrome when the BE200 and PA28 came into proximity while the BE200 was making an approach to land on RW31.

The BE200 crew was operating VFR from Glasgow to Islay and in receipt of a BS from the Islay FISO on 123·150MHz. The PA28 pilot was operating VFR from Elstree to Islay and in receipt of a BS from the Islay FISO on frequency 123·150MHz.

CAA ATSI had access to written reports from the pilots of the BE200 and the PA28 and also from the Islay FISO together with RTF recordings. Although both ac can be seen on the area radar recordings on initial approach to Islay, neither ac was visible on radar at the time of the Airprox.

Islay METARs:

1420Z 15007KT 080V200 9999 BKN010 SCT024 18/16 Q1004=

1450Z 25010KT 200V260 9999 BKN011 SCT042 17/15 Q1004=

At 1432:00, the BE200 crew called Islay INFORMATION stating that they were 10 minutes from Islay and requested the latest Wx. The Islay FISO passed the Wx details and asked the BE200 pilot to report field in sight.

At 1438:20, the PA28 pilot advised Islay INFORMATION that he was 9nm E of Islay descending from 3000ft to 2000ft Islay QNH (1004hPa) and requesting joining instructions. The PA28 pilot was passed the A/D information, with TI on the BE200 inbound from Glasgow that was estimating Islay at 1442. The PA28 pilot acknowledged the TI and advised the FISO that his estimate for Islay was 1443.

At 1439:50, the BE200 pilot called again and advised the FISO that they were at 2500ft QNH and estimating the field in, *"..about 2 and a half minutes".* A BS was agreed and the FISO asked the BE200 pilot if he had copied the information on the PA28. The BE200 pilot replied that he was unsure of the position of the PA28 but that it seemed that both ac would arrive at the same time.

The FISO re-iterated the TI on the PA28 to the BE200 crew who replied that their intentions were, "*to go overhead the field..descending down to 1 thousand feet and then most likely a left..visual turn in for runway 3-1".* The FISO acknowledged this and asked the BE200 pilot to report O/H. At 1440:40, the FISO asked the PA28 pilot if he had copied the BE200 crew's intentions; the PA28 pilot replied that he had and that he was visual with the BE200.

At 1441:20, the BE200 crew transmitted to the FISO that they were 1 minute from the A/D and, "*still uncertain about the other traffic".* The FISO asked the PA28 pilot to transmit his position and altitude. The PA28 pilot transmitted that he had, "*descended 1 thousand feet just below the cloudbase about 3 miles south..east of Islay..we can just hold to the south until the Beech is clear"* at 1441:40.

The FISO checked that the BE200 crew had copied that and then asked the pilot of the PA28 what his intentions were. The pilot of the PA28 replied that, "*we'll head out to the west of the field over the water and..we can circle about 3 miles away until the Beech lands".* The FISO acknowledged this and advised the PA28 pilot of another ac inbound estimating the field at 1451.

At 1442:40, the BE200 crew advised the FISO that they had just passed O/H and were turning L inbound to land. The FISO acknowledged this and stated that he was visual with the BE200.

At 1443:20, the BE200 crew reported downwind L for RW31 and added that they were not visual with the PA28. The FISO advised the BE200 crew that the PA28 was intending to hold out to the W until they had landed.

At 1444:00, the BE200 crew reported that they had a light ac in sight to which the FISO replied, "*I have both of you visual".*

The BE200 pilot's written report states that he was expecting the PA28 to hold 3nm W of the A/D but as they were downwind, encountered the PA28 in their 10 o'clock between 0·3-0·5nm away and 300-400ft vertically above them, on a northerly heading.

The written report from the PA28 pilot states that he informed the FISO that he would head out W to 3nm from the A/D to allow the BE200 to land. As the PA28 crossed the coast the pilot encountered low cloud and entered a sharp L turn to maintain VMC. The turn took the PA28 back through the ATZ and close to the BE200 that was downwind (as reported by the BE200 – the PA28 pilot did not have visual contact with the BE200). In his report the PA28 pilot acknowledges that he should have informed the FISO of his change of plan.

The FISO's written report states that he expected the PA28 to proceed out W as the pilot had stated. When the BE200 crew reported that they had the PA28 in sight the FISO saw the PA28 heading towards the overhead from the W and believed that the PA28 had passed overhead the BE200 by 200-400ft.

The PA28 pilot expressed his intention to hold 3nm to the W of the A/D in order to allow the BE200 to land. The FISO passed appropriate TI and ensured that both the PA28 and the BE200 pilots were kept informed of each other's intentions as notified to the FISO.

When the PA28 pilot encountered low cloud he did not inform the FISO of his change of plan and therefore the FISO was unable to update the BE200 on the PA28 pilot's intentions.

As the FISO did not have both ac in sight until the Airprox occurred he was unable to pass accurate position information on the PA28 to the BE200 pilot.

The Airprox occurred when the BE200 crew was positioning downwind for RW31, approaching to land and the pilot became concerned about the proximity of the PA28, which the BE200 pilot expected to be 3nm to the W.

As the FISO was unaware of the change of the PA28 pilot's intentions he was unable to provide assistance to the BE200 in the form of updated TI.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the Islay RT frequency and a report from the ISLAY FISO.

The Board agreed with the PA28 pilot's analysis of the incident and its cause. Having offered to remain clear of the ATZ to allow the BE200 to land ahead of him, the PA28 pilot should have notified the FISO when he was forced to change his plans to remain clear of cloud. Of course, an orbit at 3nm from the A/D would inevitably mean the closest point of approach would be closer than 3nm and the BE200 pilot flying downwind at 2nm distance from the A/D might have expected to see the PA28 at close range. However, he would not have anticipated seeing the PA28 fly between him and the A/D. The Board agreed that the incident would not have occurred if both ac had conducted a standard overhead join but noted that the scattered cloud reported in the 1438Z Met Special may have precluded it. In assessing the role of the FISO, the Board agreed that he had done all that might be expected of him in ensuring both pilots had SA on the other ac and he could not have done any more in the circumstances to prevent the incident.

In assessing the risk the Board considered that, notwithstanding that the PA28 pilot did not see the BE200, the separation of 0·3-0·5nm and 300-400ft in VMC was sufficient to suggest that there was no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

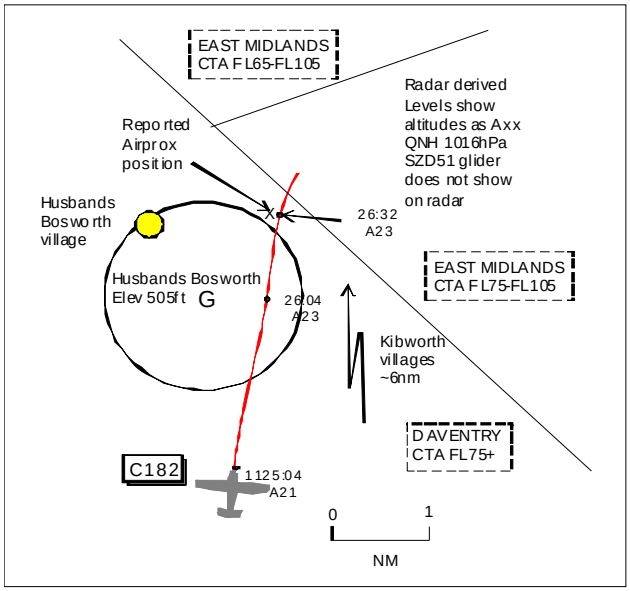
Cause: Whilst avoiding cloud, the PA28 pilot flew into conflict with the BE200 in the Islay ATZ.

Degree of Risk: C.

AIRPROX REPORT No 2012127

AIRPROX REPORT NO 2012127

Date/Time:	22 Aug 2012 1126Z	
Position:	5227N 00101W (1·1nm NE Husbands Bosworth - elev 505ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	SZD51 Junior	C182
Operator:	Civ Club	Civ Pte
Alt/FL:	2066ft	NR
	QFE (1000hPa)	QNH
Weather:	VMC CLBC	VMC HAZE
Visibility:	>10nm	NR
Reported Separation:		
	Nil V/100-150m H	Not seen
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SZD51 JUNIOR PILOT reports flying solo on a local sortie from Husbands Bosworth, VFR and not in communication with any ATSU. He had winch-launched and he proceeded NW'ly towards Husbands Bosworth village [1nm NW gliding site] to pick up thermal activity. He established in a thermal and drifted downwind to the Airprox position in almost constant thermal, circling. He then exited the thermal and established on a SW course at 2066ft QFE 1000hPa and 45kt to close distance to the airfield, to head upwind and possibly towards potential thermals. As soon as he was steady on a SW'ly course a high-wing single-engine light ac was spotted approaching from 90° port at the same level. This occurred a split second before the incoming ac performed a RH turn to avoid his glider, he thought, and it passed astern; he estimated separation as 100-150m at the CPA. The other ac then continued on a N'ly course. He assessed the risk as high.

THE C182 PILOT reports being unaware of the Airprox until contacted by RAC Mil post incident. He understood the Airprox occurred between Husbands Bosworth and Leicester airfields and he reviewed the GPS data log. The flight was en-route from Popham to Nottingham, VFR and not in communication with any ATSU. The Wx was VMC although visibility was reduced in haze and the ac was coloured white/green with strobe lights on. At the time of the Airprox he was on a N'ly heading, passing E of Husbands Bosworth as his passenger wanted to photograph the Kibworth villages [6nm NNE Husbands Bosworth and 4nm SSE Leicester], which required him to maintain his heading in order to pass to the W of the villages. He was very conscious that on this heading he would cross the Leicester ATZ so, as soon as he passed the villages he turned R 30° to in order to pass E of the ATZ. At no time did he see a glider, which he assumed was white and, being reported at his height, it would have been viewed against the slight haze present. He could only assume that his pre-occupation with avoiding Leicester, together with the lack of conspicuity of the glider, resulted in him not seeing it. He felt very strongly that unless some action was taken to improve the visibility of gliders (e.g. strobes, reflective strips etc) these situations will continue to happen.

UKAB Note (1): The UK AIP at ENR 5-5-1-3 promulgates Husbands Bosworth as a Glider launching Site centred on 522626N 00010238W where aero-tows may be encountered and winch launching takes place up to 3000ft agl, site elevation 505ft amsl.

UKAB Note (2): The radar recording does not capture the Airprox as the SZD51 Junior does not show at all. At 1125:04 a 7000 squawk is seen, believed to be the C182, 2nm SSE of Husbands Bosworth tracking 010° indicating an unverified altitude 2100ft QNH 1016hPa. The C182 continues on a steady track, passing 0·6nm E abeam the glider site 1min later at 1126:04 and now indicating altitude 2300ft. Just under 30sec later at 1126:32, as the C182 reaches the reported Airprox position (GPS coordinates plotted as 1·1nm NNE of Husbands Bosworth), the C182

is seen to deviate 10-15°to the R which may be the turn observed by the SZD51 pilot. The SZD51 pilot reported flying at 2066ft QFE 1000hPa, which equates to 2546ft QNH 1016hPa.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

The salutary lesson to be learnt from this incident is if you fly close to an active glider launching site you are likely to encounter a glider. Although there was no winch launch in progress, the C182 had flown very close to the Husbands Bosworth O/H and then passed close to the SZD51 Junior, which was manoeuvring post-launch near to the O/H. Best practice at the flight planning stage is to plan a route that gives aeronautical hazards a wide berth to mitigate the risk of an encounter. With the SZD51 Junior not showing on the recorded radar it was not possible to verify the actual separation and with the Glider passing unsighted by the C182 pilot the Board only had one viewpoint on the Airprox. Members were mindful of the difficulty of accurately assessing separation distances particularly when the other ac is sighted late and for only a brief period. The SZD pilot reported seeing the C182 out to his port side and watching it turn, apparently to avoid his glider, and pass behind by an estimated 100-150m. This turn appears to have been fortuitous, the C182 pilot reporting his passage N'bound towards villages to the NNE of Husbands Bosworth but not sighting a glider in the area. The slow moving glider would have been difficult to see against a backdrop of cloud but it was there to be seen for some considerable time prior to the CPA. In determining the cause, Members were torn between whether this had been a sighting issue or a conflict. In the end, the Board agreed that to capture the importance of avoiding gliding sites by wide margins it would be best to classify this encounter as a conflict in the vicinity of the Husbands Bosworth glider launching site.

Turning to the Risk, although the C182 pilot did not see the glider, the SZD51 Junior pilot saw the C182 at a late stage as it was approaching from abeam. Although the C182's turn was providential, the Board considered that the SZD pilot would have had time to take some avoiding action if the C182 had not turned away when it did. Taking all of these elements into account the Board assessed that safety was not assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

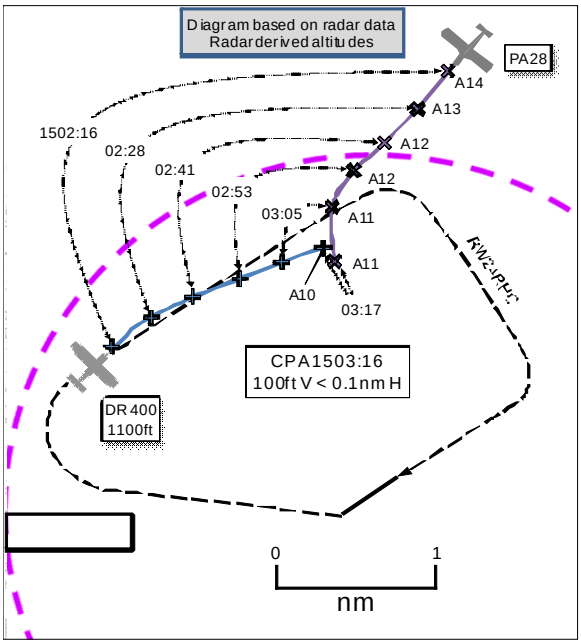
Cause:Conflict in the vicinity of Husbands Bosworth glider launching site.

Degree of Risk:B.

AIRPROX REPORT No 2012128

AIRPROX REPORT NO 2012128

Date/Time:	18 Aug 2012 1503Z (Saturday)	
Position:	5054N 00046W (Chichester/Goodwood A/D elev 110ft)	
Airspace:	Goodwood ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DR400	PA28
Operator:	Civ Club	Civ Pte
Alt/FL:	1250ft	1500ft
	QFE (1011hPa)	QNH (1014hPa)
Weather:	VMC CAVOK	VMC CLBC
Visibility:	>10km	10km
Reported Separation:		
	100ft V/0ft H	100ft V/100ft H
Recorded Separation:		
	100ft V/<0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DR400 PILOT reports flying his first solo flight in 5 years, having agreed with his instructor that he would complete some 'practice circuits' if he felt confident enough after his 'first solo'. He had undertaken PPL training previously, but not to completion. He was operating under VFR with a BS from the Goodwood FISO [Goodwood Information 122.450MHz]. The ac was coloured blue and white with navigation lights, strobe lights and landing light selected on. The SSR transponder was selected on with the VFR squawk and Modes 3/A, C and S. The ac is not fitted with an ACAS. He climbed on a W'ly heading [from T/O on RW24 RHC] and commenced a gentle climbing [R] turn to be at height 1200ft [QFE 1011hPa] as he commenced the DW leg. Almost immediately after his DW RT call, advising his intention of a 'touch and go', he heard another ac call DW [this ac was a C172 that had just joined crosswind and was positioning ahead in a shorter cct pattern]. As he was not visual with the ac and, concerned that it might be close to him, he maintained 'a very good lookout'. As he approached [the end of the DW leg] he saw a blue and gold PA28 at a range of 300-500m in his 10 o'clock position at almost exactly the same height, tracking at 90° to him. He watched the other ac descend slowly and pass about 100ft below him, disappearing under the leading edge of the L wing and emerging in a climb from under the trailing edge of the R wing. He believed the other ac had passed directly underneath him. He watched the conflicting ac climb above and behind him and then lost sight of it. He stated that [the FISO] tried repeatedly to contact the other ac, calling "aircraft to the north of Goodwood report your callsign", or words to that effect. The DR400 pilot decided that he would land, as he was far more stressed by the event than he had at first realised.

After landing he recounted the event to his instructor who stated that [the FISO] would speak to the pilot of the conflicting ac. The instructor did not feel he should formally report the incident.

He stated that the other ac entered the Goodwood ATZ at cct height without prior RT contact and that it crossed what is frequently either the DW or base leg over a well known local landmark. He considered the height and proximity of the conflicting ac to a known landmark within the cct pattern to be poor airmanship.

He assessed the risk as 'Medium'.

THE PA28 PILOT reports flying en-route from Fairoaks A/D to Goodwood A/D, operating under VFR with a BS from Farnborough Radar [125.250Mhz]. The blue and grey coloured ac had navigation lights and strobe lights selected on. The SSR transponder was selected on with Modes 3/A and C. Neither Mode S nor an ACAS were fitted. At the town of Midhurst, about 5nm N of the Goodwood ATZ, he called Farnborough Radar in order to change frequency to Goodwood Information. His request went unanswered and despite repeated calls he was

not able to re-establish two-way contact. He heard a pilot in another ac relay his call to Farnborough Radar but he did not hear a reply. As he was just about to enter the Goodwood ATZ, heading 209° at 90kt, he gave up calling Farnborough and switched to Goodwood. He then saw a Robin DR400 in his 1 o'clock position at a range of 60m and about 100ft above, travelling from R to L. He judged that neither he nor the DR400 pilot needed to alter course and he passed beneath the other ac.

He stated that passing Midhurst he was 'organised to speak to Goodwood' for joining instructions and that, had he not been distracted calling Farnborough, he would have received joining instructions and TI and have been able to 'leave greater passing clearance'.

He noted that when he left Goodwood later he could not contact Farnborough along the south coast. He managed to raise Farnborough East en-route to Fairoaks.

He stated that the ac radio was working fine and that Lydd Approach later confirmed that the transponder was also working properly. He could hear Farnborough Radar in conversation with other traffic.

He assessed the risk as 'Medium'.

THE GOODWOOD FISO reports that neither he, nor the other FISO on duty that day, recalled anyone telling them they were filing an Airprox report.

RW24 RHC was in use and the subject PA28 was expected into Goodwood that day. The FISO was talking to cct traffic when he noticed an ac entering the ATZ from the N, the pilot of which was not talking to him. He identified the ac through binoculars as one that had previously been based at Goodwood and assumed it was the subject PA28.

A school ac also saw the conflicting PA28 and made it known to the FISO, who made a couple of calls to the ac without response. The FISO informed the DW DR400 of the conflicting traffic, to which the pilot replied that he was visual. The FISO eventually made contact with the PA28 pilot, who stated that he had been trying to make two way contact with Farnborough to leave their frequency but could not make contact. The FISO suggested he leave the ATZ and rejoin the cct O/H and that he would contact Farnborough for him. This was acknowledged by the PA28 pilot.

The DW DR400 and the PA28 looked to come reasonably close but not close enough to warrant evasive action. The FISO did not recall whether the DR400 pilot took such action but he had several ac in the air and on the ground to watch and could not be certain. Nothing was said on the radio to that effect. He could not assess the PA28's height when it entered the ATZ.

ATSI reports that the Airprox occurred at 1503:16 UTC, 1.6nm N of Chichester/Goodwood A/D, within Class G airspace and inside the ATZ. The Goodwood ATZ comprises a circle radius 2nm, centred on the midpoint of RW14R/32L and extending to a height of 2000ft above aerodrome level (elevation 110ft).

The Robin DR400 (DR400) was flown by a solo student pilot, operating VFR from Goodwood A/D in the visual cct for RW24 RHC and in receipt of a BS from the Goodwood FISO. The Piper PA-28-161 (PA28) was operating on a VFR flight inbound to Goodwood from Fairoaks and was in receipt of a BS from Farnborough Radar.

Goodwood is promulgated as providing an AFIS within the published hours of operation. RW24 RHC was in use. The FISO workload was assessed as medium/heavy. The AIP entry for Goodwood, AD 2 EGHR AD 2.22 – Flight Procedures, states:

Fixed-wing circuit height 1200 ft or as directed by ATS.

Fixed-wing standard join is overhead at 2000ft. 'Straight-in' and 'base' joins are strongly discouraged when the circuit is active. ATS can advise on circuit status. Outside ATS hours or after sunset, overhead join is mandatory.

ATSI had access to RTF recording from Goodwood and Farnborough LARS(W), area radar recording and written reports from both pilots together with a written report from the Goodwood FISO. The Goodwood RTF recording

was voice activated and not continuous. A minor adjustment was made to the RTF time injection to align it with that of the radar recording.

In the absence of Goodwood weather, the METAR for Shoreham is provided:

METAR EGKA 181520Z 23008KT CAVOK 23/20 Q1015=

METAR EGKA 181450Z NIL=

METAR EGKA 181420Z 22009KT 9999 FEW008 22/19 Q1015=

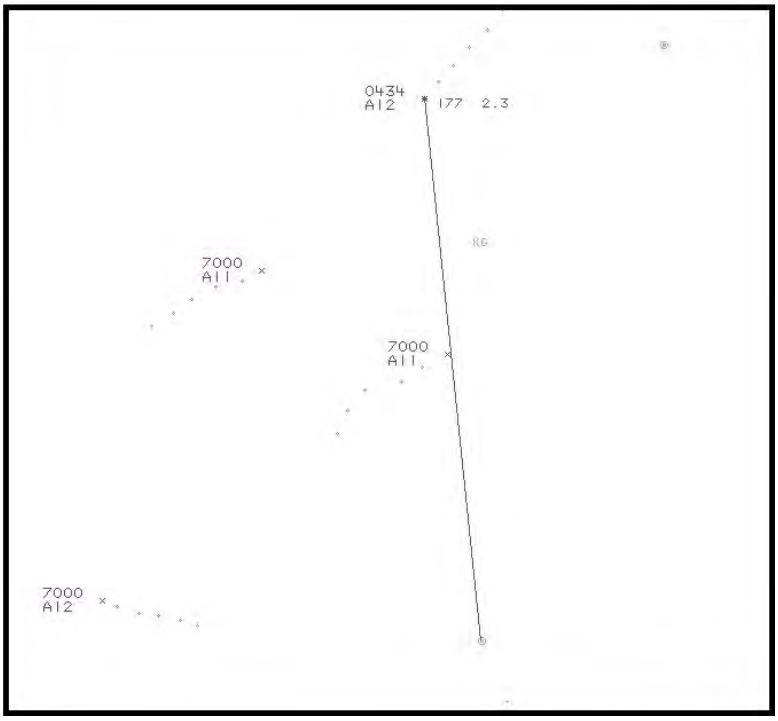
At 1443, the PA28 contacted Farnborough LARS(W) as it departed from Fairoaks. A BS was agreed and the PA28 was assigned a squawk. The Farnborough controller suggested not above 2400ft to remain clear of the London TMA. There was no further RT contact between the PA28 and Farnborough Radar. At 1455, radar showed the PA28 to be 13nm NNW of Goodwood at 2400ft.

The PA28 pilot's written report indicated that when approaching 5nm NW of Goodwood he attempted to contact Farnborough to change frequency. At 1500:47, the PA28 was 5nm NNE of Goodwood in a slow descent passing 2000ft.

At 1502:20, an ac reported to the Farnborough controller that the PA28 seemed to be calling Farnborough, requesting a change of frequency to the Goodwood frequency of 122.450MHz. The Farnborough controller asked this ac to relay a message approving the change of frequency and to squawk 7000. No further transmissions were heard from the PA28 or the relay ac on the Farnborough frequency. It was not clear if the PA28 pilot had received the relayed message. The PA28 was shown 3nm N of Goodwood at 1400ft.

At 1502:26, the DR400 pilot reported turning DW for a touch and go and was instructed by the FISO to report final with one ahead, a C172 that had just joined crosswind and was positioning ahead in a shorter cct pattern.

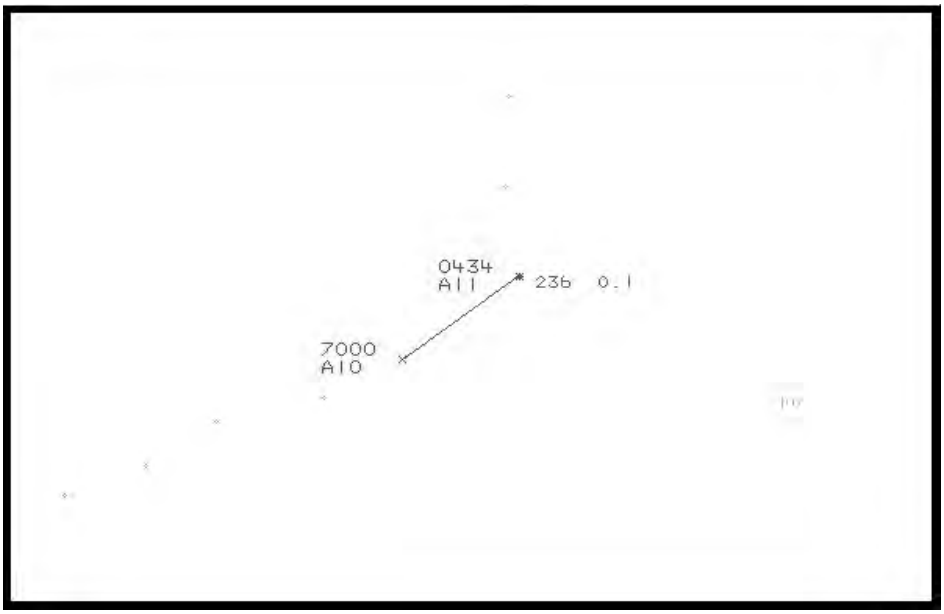
At 1502:57 the C172 reported tight DW, turning onto base leg in front of an ac [the subject PA28] turning onto base leg for RW24. The FISO acknowledged and reported sighting the southbound unknown ac. The PA28 was 2.3nm N of Goodwood, approaching the ATZ at 1200ft as shown in radar print 1.



Print 1 – 1502:57

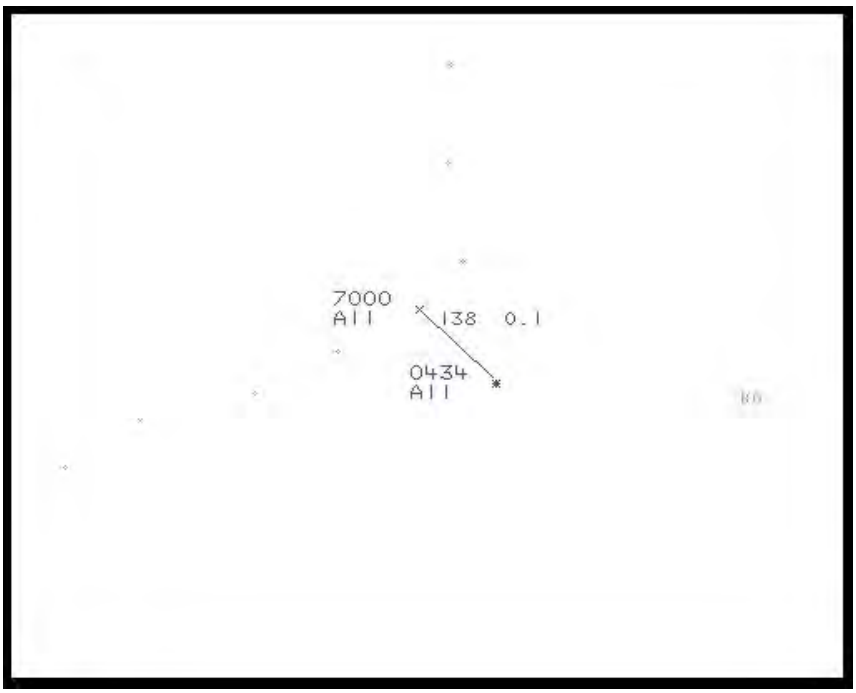
At this point the PA28 was on a reciprocal track to the DR400 at a range of 1nm. The Goodwood FISO transmitted, *"Aircraft to the north of Goodwood callsign please."* The DR400 pilot, who was N of the A/D responded and the FISO passed TI on the PA28, which the DR400 pilot reported in sight.

At 1503:14 radar print 2 (below) shows that the PA28 pilot had turned onto a S'ly track, inside the ATZ, and crossed 0.1nm ahead of the DR400.



Print 2 – 1503:14

Print 3 below, shows the DR400 passing 0.1nm behind the PA28 at 1503:18 and the CPA was considered to have occurred between radar sweeps at 1503:16.



Print 3 – 1503:18

The FISO, suspecting that the conflicting ac was one that had previously obtained PPR, transmitted again using the PA28 pilot's callsign and suggested that he exit the ATZ and come back to the O/H.

At 1503:46, the PA28 pilot responded, *"Yes I need to join the hold to change frequency with Farnborough they're not responding".* The FISO advised the PA28 pilot that he needed to remain outside the ATZ for a frequency change and before talking to Goodwood. The FISO suggested that the PA28 route N to exit the ATZ and if unable to contact Farnborough the FISO would phone Farnborough to advise them. The PA28 pilot turned L and commenced a climb to leave the ATZ at 2000ft before rejoining O/H.

The loss of two way communication with Farnborough together with the relayed message was likely to have been a contributory factor. The PA28 pilot reported that he was distracted by his inability to communicate with Farnborough LARS(W), but was aware that he was approaching Goodwood. It was not clear why he descended from 2400ft to cct height on a direct track into the ATZ, without first contacting Goodwood Information. The RoA, Rule 45 (4) states:

'If the aerodrome has a flight information service unit the commander shall obtain information from the flight information service unit to enable the flight to be conducted safely within the zone.'

The RoA Rule 12(a) states:

'..that the commander shall... conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed…'

The Airprox occurred when the PA28 pilot entered the Goodwood ATZ and cct pattern without first contacting Goodwood AFIS to obtain information. This resulted in the PA28 pilot flying into close proximity with the DR400 ac which was DW in the cct. The PA28 pilot was distracted by the loss of two way communication with Farnborough and this was considered to be a contributory factor.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings and a report from the FISO involved.

The Board commented unanimously on the actions of the PA28 pilot, particularly with respect to his airmanship and forethought. It was agreed that his pre-occupation with making contact with Farnborough had lead to him entering the Goodwood ATZ unannounced and that he had not made an effective plan to do so. Members opined that had he simply made a 'blind' call to the Farnborough controller, advising of his intentions to leave the frequency, and maintained height he could have remained clear of the Goodwood ATZ whilst establishing contact with the FISO. He would then have been in a position to effect a standard O/H join and probably have remained clear of Goodwood cct traffic. As it was, he descended to cct level and entered the ATZ, into conflict with cct traffic, without contacting the Goodwood FISO.

Several Members were of the opinion that there had been a high degree of risk and that safety margins were much reduced. Others took the view that the DR400 pilot had first seen the PA28 at a range of 300-500m and assessed that no avoiding action was necessary. The PA28 pilot saw the DR400 somewhat later but both pilots agreed that the vertical separation was 100ft and this was confirmed by the radar. Since both pilots had time and space to carry out at least a degree of avoiding action, should that have been necessary, but did not do so, the Members agreed by the narrowest of majorities that this incident did not warrant a risk category of B.

Finally, the Board commented on the misplaced advice from the DR400 pilot's instructor that he did not need to formally report this incident. Members were unable to reconcile that advice with the DR400 pilot's report and reiterated the need for open, honest and comprehensive submission of Airprox in order to enhance safety of flight.

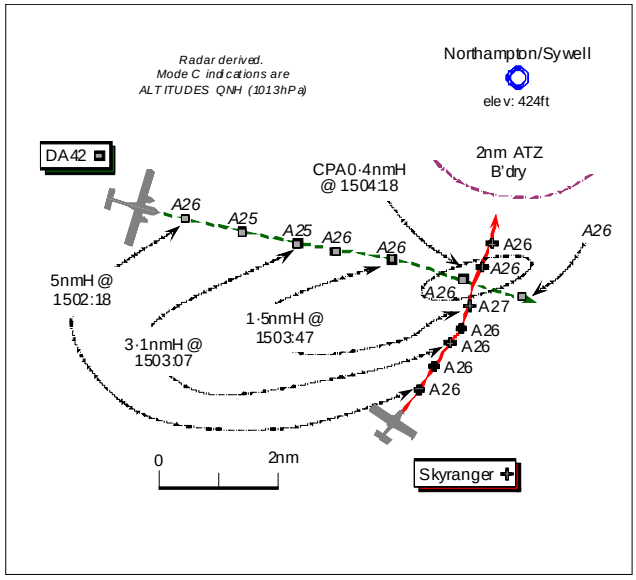
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot entered the ATZ without first obtaining information from the FISO, in contravention of Rule 45, and flew into conflict with the DR400 downwind.

Degree of Risk: C.

AIRPROX REPORT NO 2012129

Date/Time:	23 Aug 2012 1504Z	
Position:	5215N 00049W (3·6nm S of Sywell - elev 424ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Diamond DA42	SkyRanger ML
Operator:	Civ Trg	Civ Pte
Alt/FL:	2600ft	2600ft↓
	QNH (1013hPa)	NK
Weather:	VMC CLBC	VMC CAVOK
Visibility:	10km	>10km
Reported Separation:		
	Nil V/500m H	Not Seen
Recorded Separation:		
	Nil V/0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DIAMOND DA42 PILOT reports he was instructing a cross country VFR navigation exercise routeing from Coventry Airport to Tempsford disused A/D near St Neots at 135kt, before turning for Leicester A/D. They were flying in VMC some 1400ft below and 2000m horizontally clear of cloud with an in-flight visibility of 10km+ whilst in receipt of a BS from Coventry RADAR on 123·825MHz. SSR was selected on [A0260, an unvalidated and unverified Coventry conspicuity code] with Mode C; Mode S elementary surveillance and TCAS I are fitted.

Heading 105° approaching a position 4nm S of Sywell A/D in a level cruise at 2600ft QNH (1013hPa), he became visual with a red/white-coloured high-wing ac – the SkyRanger – about 1000m away converging in the 'classic' 2o'clock position and with no apparent relative movement in the canopy. Just as he pointed the SkyRanger out to his student PF, TCAS enunciated a TA and the student acquired it visually. Commenting to his student 'you need to take avoiding action', he expected his student to turn R to pass behind the SkyRanger , but his student took no action; by the time this was realised it was too late and the SkyRanger crossed ahead from R – L some 500m away at the same altitude with a 'medium' Risk of collision. An Airprox was reported to Coventry RADAR on RT. He thoroughly debriefed traffic separation following the flight. His ac is white in colour and the HISLs and nav lights were on.

THE SKYRANGER MICROLIGHT (ML) PILOT reports he was positioning for a standard O/H join at Sywell and in communication with TOWER, he thought, but actually SYWELL INFORMATION, on 122·700MHz. A squawk of A7000 was selected with Mode C; elementary surveillance Mode S is fitted.

Flying VFR in CAVOK at 60kt, heading 360°, at the time of the reported incident approaching the Sywell ATZ boundary from the S, he was descending he thought [Mode C shows the ac flying level] through 2600ft [altimeter setting unspecified] and he is sorry to report that he has no recollection of seeing the ac flown by the reporting pilot. He would like to think he might have seen the DA42 and considered it to present no risk; however, this is by no means certain.

His aeroplane is coloured red/white and the HISLs were on. He also noted that his recently fitted Mode S Transponder had been very useful in announcing his ac's position to the reporting ac's TCAS and might have averted a potential worse situation.

ATSI reports that the Airprox was reported in Class G uncontrolled airspace, 4nm S of Sywell A/D between a Diamond Twin Star DA42 and a Banks PA SkyRanger.

AIRPROX REPORT No 2012129

The DA42 was operating VFR on a flight from Coventry to Leicester and prior to the Airprox had been in receipt of a BS from Coventry RADAR on frequency 123·825MHz.

The SkyRanger was operating VFR on a flight from Finmere to Sywell A/D and was in contact with Sywell Information on frequency 122·7MHz, which is unrecorded.

The Coventry METARs

1450Z 26006KT 230V290 9999 FEW024 SCT037 19/12 Q1012=
1520Z 26007KT 230V290 9999 FEW024 SCT037 19/12 Q1012=

At 1501:18 the SkyRanger was 7·1nm SSW of Sywell on a NE'ly track indicating 2700ft altitude. The DA42 was 7·5nm NW of the SkyRanger , tracking E'ly, indicating 2600ft altitude and displaying a Coventry conspicuity squawk of A0260.

At 1503:40 the distance between the two ac had reduced to 1·9nm. The pilot of the DA42 requested a frequency change to Cranfield on frequency 122·850MHz. The Coventry RADAR controller instructed the pilot of the DA42 to squawk A7000 and to freecall Cranfield.

Between 1503:40 and 1504:26 the distance between the two ac continued to erode – the minimum distance between them was 0·4nm at the same altitude at 1504:18, just before the DA42 passed behind the SkyRanger.

At 1504:40 the pilot of the DA42 contacted Cranfield APPROACH.

The report from the pilot of the DA42 stated that the instructor saw the SkyRanger in the 2 o'clock position, converging. As the instructor was pointing this out to the student the TCAS gave a traffic advisory and the student acquired the SkyRanger visually. The instructor expected the student to turn right to avoid the SkyRanger and pass behind but the student took no action.

The report from the pilot of the SkyRanger stated that he had no recollection of seeing the DA42 although the pilot considered that it was possible that he saw the DA42 and considered it to be no risk.

The Airprox occurred in Class G airspace where the principles of see and avoid apply. The instructor and the student in the DA42 had sight of the SkyRanger before the Airprox occurred.

The DA42 had been in receipt of a BS from Coventry RADAR prior to the Airprox. Under a BS there is no requirement to monitor the flight and pilots should not expect TI to be provided.

At the time of the Airprox the DA42 crew was not in contact with an Air Traffic Service Unit.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The Airprox occurred in Class G airspace where the pilots in both aircraft had a duty to see and avoid other traffic. For their part, the crew of the DA42 had a responsibility to give way to the SkyRanger on their right. The DA42 instructor recognised this responsibility and told his student to take avoiding action but the student did not comply. Members recognised that instructors must allow students time to respond and expect them to make mistakes; in this instance it seemed likely that the instructor might have waited too long for the student to react. The Board noted that the DA42 crew were in the process of switching from Coventry RADAR to Cranfield APPROACH. Although the crew had been in receipt of a BS from Coventry APPROACH, a controller Member was concerned that they had not been issued a warning by Coventry before they were told to squawk 7000 and free call Cranfield. Nevertheless, the DA42 instructor spotted the SkyRanger at an estimated range of 1km in his 2 o'clock before his TCAS warned off with a TA. For his part, the SkyRanger pilot does not recall seeing the DA42 and Members speculated that his lookout may have been distracted by his preparation for joining the Sywell circuit. Notwithstanding that the DA42 instructor had spotted the SkyRanger before his TCAS generated a TA, Members agreed with the SkyRanger pilot's remarks about the utility and value of the Mode S transponder. In assessing

the Cause, Members considered that a late sighting by the DA42 crew and a non-sighting by the SkyRanger pilot might be justified. However, given the difficulty of spotting aircraft when there is little relative motion on a near collision course, the Board decided that the sighting at 1km was reasonable and the Cause was that the DA42 crew did not manoeuvre on sighting the SkyRanger.

In assessing the Risk, Members were satisfied that had the miss distance been less than the 0·4nm shown on recorded radar, the DA42 instructor would have been able to take control from his student and ensure there was no collision.

PART C: ASSESSMENT OF CAUSE AND RISK

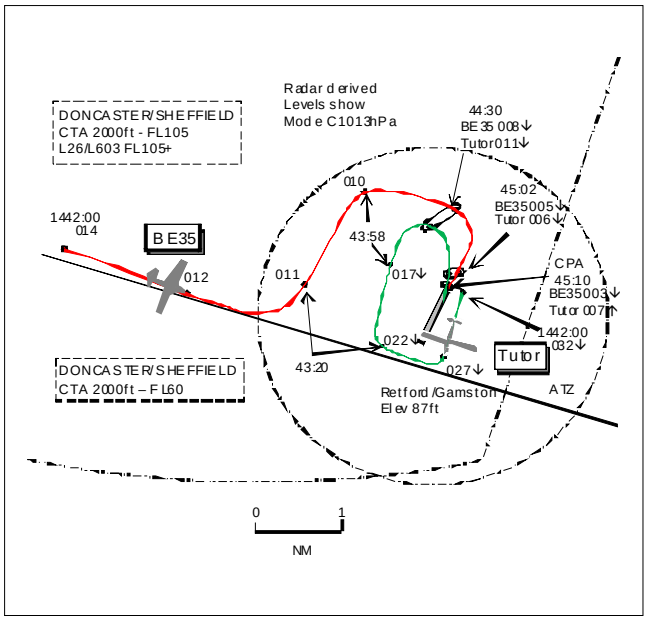
Cause: The DA42 crew did not manoeuvre upon sighting the SkyRanger.

Degree of Risk: C.

AIRPROX REPORT No 2012130

AIRPROX REPORT NO 2012130

Date/Time:	14 Aug 2012 1445Z	
Position:	5317N 00057W (0·5nm FIN APP RW21 Gamston - elev 87ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tutor T Mk1	BE35
Operator:	HQ Air (Trg)	Civ Pte
Alt/FL:	700ft↓	500ft↓
	QFE (1006hPa)	QFE
Weather:	VMC CLOC	VMC CLOC
Visibility:	40km	>10km
Reported Separation:		
	300ft V	150ft V/300m H
Recorded Separation:		
	100ft V/0·1nm H	
	Or 400ft V/Nil H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUTOR PILOT reports flying a dual local training sortie from Cranwell. The visibility was 40km in VMC and the ac was coloured white. After completing a missed approach from RW20 at Doncaster they had maintained a TS for a visual departure via GAM. The student was given a simulated engine malfunction, which he dealt with appropriately, and a PD to Retford/Gamston was arranged for a PFL. Doncaster asked them to maintain their transponder code to enable a return to service after the PFL. Gamston Radio gave the airfield details and traffic was heard leaving the frequency. The Tutor was positioned for 'High Key' RW21 RH cct at 75kt at about 3200ft on QFE 1006hPa. The RH cct suited the student's view of the procedure and as no IFR hood was in use the instructors view to the R was less obstructed than under normal I/F training. When the student called "High Key for low approach RW21" there was no cct traffic. The student called, "Low Key" at 1500ft, abeam the initial aiming point downwind and another ac's pilot was heard calling to join downwind. At 1300ft the student began the final turn and called, "(Tutor c/s) final". At 900ft they heard the previously mentioned traffic call "(BE35 c/s) R base" and this traffic appeared in their 7 o'clock low on a similar heading, just to the NW of Retford town and TAS sounded a proximity alert 'Traffic' with correct symbology; the audio warning was cancelled. Gamston Radio asked the BE35 pilot whether he was visual with the Tutor on final approach but there was no response initially so the Tutor pilot transmitted his position relative to the traffic, "Tutor in your 3 o'clock high". The Tutor was approximately 700ft QFE within 30° of the RW C/L and TAS sounded once more. The BE35 pilot transmitted, "Final I am landing RW21" and by now the Tutor was about 10° to the R of the RW C/L with the traffic in sight, just behind the port wing but about to go out of sight 300ft below. They initiated a go-around from their glide-approach, keeping to the R of the RW C/L (non-standard) to increase separation. He assessed the risk as medium.

THE BE35 PILOT reports inbound to Gamston from Netherthorpe, VFR and in communication with Gamston Radio on 130·475MHz, squawking 7000 with Modes S and C; TCAS was fitted. The Wx and flight conditions were good and the ac was coloured white/blue with strobes and anti-collision lights switched on. On departing the Netherthorpe cct for the short 9nm flight he established a SE'ly heading, remaining at 1000ft amsl to remain below Doncaster airspace. He configured the ac for a slow cruise as the flight was short and he was in no particular hurry. At about 6nm from Gamston he selected the Gamston frequency. He heard nothing on frequency so made his first call advising c/s, inbound from Netherthorpe and requesting cct and landing information. He was advised the RW in use was 21 with a RH cct and given a QFE, which he selected. On receipt of this information he called again enquiring if there was cct traffic; the reply was "affirmative". He was visual with the airfield and observed a light ac on the RW21 threshold starting its take-off run. A few seconds after the "affirmative" response he heard an ac's pilot transmit, "(Tutor c/s) High Key for PFL" to which Gamston Radio acknowledged "Roger". Although he deduced from this transmission that an RAF training ac was on frequency, he had no idea what "High Key" meant; neither did he assume that the PFL was intended on the airfield. In 42yr of flying he had never heard this

expression before. He positioned onto R base for RW21 and at 700ft and 90kt, shortly before turning final, he heard the Tutor pilot call, "(Tutor c/s) Low Key". From a subsequent discussion with the military instructor he understood the Tutor pilot recalled making a "final" call but he did not share this recollection. It was possible, though in his mind by no means certain, that the Tutor pilot called, "(Tutor c/s) Low Key to finals". He still had no idea that the military ac was in the cct with his ac. He called, "(BE35 c/s) R base turning finals" and at 700ft he turned on finals for RW21. He was fully configured for landing, gear down with first stage of flap at 90kt. Shortly after this turn Gamston Radio asked if he was visual with the Tutor ac to his R. He observed the Tutor as it appeared to be completing a RH turn, about 150ft higher and 300m away to his R. After landing he heard the Tutor pilot request his c/s and Gamston Radio advised that he had landed. After a second request, his c/s was given to the Tutor pilot. He assessed the risk as low. He commented that High Key and Low Key are not familiar civilian terminology. The Tutor instructor advised him that he was also trained as a civilian instructor and that these expressions are known and widely understood. He disagreed, having never heard them before and other experienced civil pilots also had no knowledge of these expressions. He believed that all military pilots should not use non-civilian RT terminology when operating at or near a civil airfield. He now understands the calls refer to circling PFL technique; however, civil pilots should be made aware of what is involved (non-standard cct pattern) if this procedure is flown at civil aerodromes. It might be prudent to ensure the cct is completely clear before commencing. His ignorance of the terminology/procedure caused him to assume that whilst a PFL by a military ac on frequency was underway, the Tutor pilot would maintain a good lookout and not compromise other traffic in the cct. He had no clear recollection of the Tutor pilot's "finals" call and had he heard such a call he would have reacted differently. The "Low Key" or possibly "Low Key to finals" call preceded his call "R base turning final"; he was not aware that a flight calling finals first had priority to land - only the lower of the ac closest to the threshold has priority. He had no idea that the Tutor intended to position on a circling finals approach to land on the active RW; it could have been positioning into a field off airfield, consistent with keeping clear of the active cct. Although his ac has been TCAS equipped for 5yr, he is always suspicious as to its accuracy when in the cct as indications can be erroneous and misleading; on this occasion he did not recall a TCAS alert.

ATSI reports that the Airprox occurred at 1445:08 UTC, at Retford/Gamston aerodrome, on short final for RW21, within Class G airspace and inside the Gamston ATZ. The Gamston ATZ comprises a circle radius 2nm, centred on the midpoint of RW03/21 and extending to a height of 2000ft above aerodrome level (elevation 87ft). Gamston Aerodrome is situated to the SE corner of the Doncaster Class D CAS, below the Doncaster CTA which has a base of 2000ft. Gamston is promulgated as providing an Air Ground radio (A/G) within the notified hours of operation. Gamston were using RW21 RH cct. There are no specific flight procedures for ac joining the cct.

The Tutor flight was operating VFR on a training detail and was conducting a PD to Gamston, with a simulated engine malfunction. The Tutor flight was in communication with Gamston Radio (A/G). The BE35 was operating VFR on a flight from Netherthorpe to Gamston at an altitude of 1000ft and was also in communication with Gamston Radio (A/G).

CAA ATSI had access to area radar recording, written reports from both pilots.

The Gamston QFE was 1006hPa and the Wx for Doncaster is provided:

METAR EGNJ 141420Z 18006KT 160V220 9999 SCT043 24/14 Q1011=

The Tutor flight had been in receipt of a RCS from Doncaster Radar and, after the completion of an ILS and missed approach to Doncaster RW20, was departing to the S. As part of the training detail the Tutor pilot simulated an engine malfunction and requested a PFL at Gamston. Doncaster Radar transferred the flight to Gamston Radio but requested that the Tutor retain the Doncaster squawk 6174 in preparation for the Tutor's climb out and departure from Gamston.

At 1441:03 radar shows the Tutor inside the Class D airspace, at a position 1·8nm N of Gamston at FL033 (converts to a height of 3100ft, using QFE 1006hPa with 1hPa equal to 27ft rounded to the nearest 50ft). The BE35 is 6·7nm W of Gamston at FL013 (height 1100ft), squawking 7000.

The Tutor pilot reported that he had contacted Gamston Radio and was passed the airfield details, with RW21 RH and QFE 1006hPa. The Tutor pilot reported hearing another flight leaving the Gamston frequency and the Tutor then positioned for RW21 RH, for 'High Key' at approximately 3200ft. (High Key is military specific phraseology).

AIRPROX REPORT No 2012130

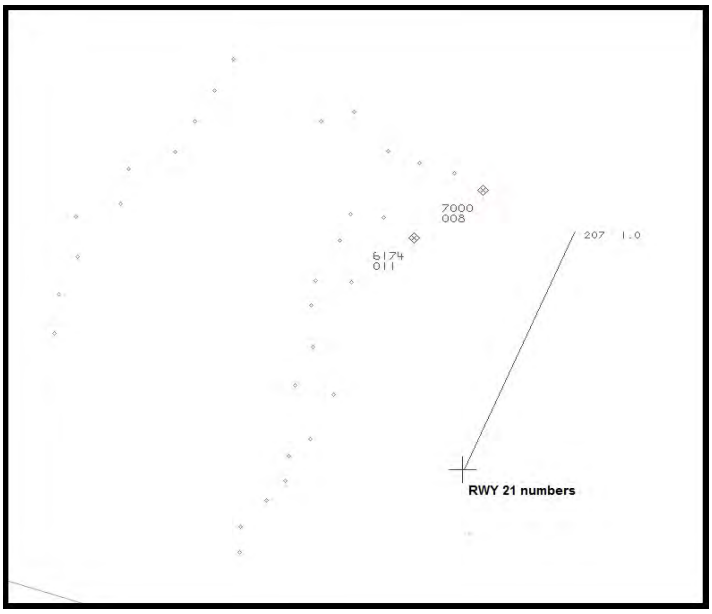
The BE35 pilot reported that on initial contact with Gamston he was advised RW21 (RH) and was passed the QFE and was advised that there was cct traffic. The BE35 pilot indicated that he had observed a light ac starting its take-off run on RW21 and shortly afterwards heard the Tutor pilot reporting "High Key for PFL".

The Tutor pilot indicated that when he called "High Key" (O/H) for a low approach to RW21 RH, the cct was clear. At 1442:00, radar shows the Tutor approaching the Gamston O/H on a S'ly heading and commencing a descent. The BE35 was 4·3nm WNW of Gamston at FL014 (height 1200ft).

The BE35 pilot's written report indicated that he was unfamiliar with the term 'High Key' and wasn't sure if the PFL was intended O/H, or away from the airfield. The BE35 continued towards a R base for RW21.

At 1443:20, the Tutor is shown to be crosswind passing FL022 (height 2000ft) with the BE35 positioned 1·1nm NW of the Tutor and joining downwind at FL011 (height 900ft).

The Tutor pilot indicated that at 1500ft, when at 'Low Key' (downwind), another ac (BE35) was heard calling on frequency to join downwind. (Low Key is military specific phraseology). At 1443:58, radar shows the 2 ac downwind, with the Tutor on a short cct pattern and the BE35 on a normal cct 1nm NW of the Tutor and just commencing a R turn onto base leg. The 2 ac continued to base leg and at 1444:32 are shown in radar print 1 below. The GS of the BE35 was 106kt and the Tutor 80kt.



The Tutor pilot's written report indicated that Gamston Radio had asked the BE35 pilot if he was visual with the Tutor on final approach, with no initial response. The Tutor pilot indicated that he transmitted, *'Tutor in your 3 o'clock high'*. The Tutor pilot indicated that the BE35 was about to go out of sight 300ft below his port wing.

[UKAB Note (1): The radar recording at 1445:02 shows the 2 ac on short final, the Tutor at FL006 and the BE35 100ft lower at FL005, lateral separation 0·1nm. The CPA occurs on the next sweep 8sec later, the radar returns merge with the Tutor now climbing through FL007 and the BE35 descending through FL003. On the next sweep the BE35 has disappeared from radar with the Tutor continuing its climb on a SSW'ly heading.]

The 2 ac were in communication with Gamston Radio (A/G) and were not in receipt of an ATS. The Airprox occurred inside the Gamston ATZ within Class G airspace and pilots are ultimately responsible for collision avoidance using the 'see and avoid' principle.

With the cct clear, the Tutor pilot commenced a PFL approach from the O/H. At this point the BE35 was 4·1nm W of the airfield. The RoA Rule 12(a) states:

'..that the commander shall... conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed…'

The Tutor was already established crosswind in the cct, albeit on a short pattern glide approach, when the BE35 pilot reported downwind. However the BE35 pilot was confused by the use of the military specific phraseology, 'High Key' and 'Low Key'. The Foreward to CAA CAP413, paragraph 1.2.2 and 1.2.3, state:

'Chapter 10 of this Manual details Military Specific Phraseology for specific use by military ATCOs and military aircrew. The RTF described in Chapter 10 is complementary to NATO STANAG 3817. It is also complementary to the remainder of CAP 413, as it either differs from civil phraseology or there is no equivalent civil phraseology, e.g. in the case of arrestor system procedures.'

[UKAB Note (2): Chapter 10 Para 3.10 Flameout/Engine Failure – Aerodrome Phraseology does show RT exchanges for High and Low Key but there is no explanation/diagram of cct position associated with the phraseology.]

As the 2 ac continued in the cct, neither of the 2 pilots saw each others ac until they had established on final approach.

The Tutor was descending from inside CAS from 3000ft may have been above the normal scan of the BE35 looking for traffic in the standard cct pattern which lies below CAS. Equally the BE35 was always below the Tutor and may have been below the visible scan of the Tutor pilot.

The Airprox occurred when the BE35 flight joined the visual cct at Gamston and flew into close proximity with the Tutor ac. The PFL procedure using military specific phraseology caused a mis-understanding and was considered to be a contributory factor.

HQ AIR (TRG) comments that the Tutor pilot resolved the confliction in a safe and professional manner. It is good to note the benefit of TAS even in a visual cct pattern in alerting crews to potential conflicts. However, it is disappointing that the BE35 pilot distrusted his TCAS to such a degree. It is also disappointing that having visually acquired the Tutor inside him in the circuit he did not ask his intentions, or respond to the Tutor pilot's call, and did not realise that he was cutting in below an ac ahead of him in the pattern. Whilst the BE35 pilot did not recognise the military terminology within CAP413, one might expect that this would have prompted a question as to its meaning. An amendment to the CAP to illustrate the 'High Key' (O/H) and 'Low Key' (abeam the threshold) positions, is of little use if civilian pilots are not obliged to read the whole document. Military pilots should be aware of the very limited functions provided by a 'Radio' c/s in terms of the service being provided.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings and reports from the appropriate ATC and operating authorities.

It was clear that the BE35 pilot was unfamiliar with the military RT phraseology used by the Tutor pilot. Civil controller and pilot Members agreed that civil pilots operating at civil aerodromes would normally not be exposed to military RT and hence would not assimilate the meaning of the "High Key" and "Low Key" phrases. When the Tutor pilot called "High Key" at 3000ft the ac would have been above approaching BE35 pilot's visual scan; his focus would have been looking for other traffic joining either through an O/H join or directly through a crosswind join at cct height. The BE35 pilot joined through the downwind position on a normal cct whereas the Tutor was tight-in to the RW on the dead-side and high on its PFL cct pattern. By joining the cct downwind, one Member questioned whether the BE35 pilot had to conform to the pattern established by the Tutor or vice-versa, or whether neither ac had established a cct pattern (priority) ahead of the other. On radar, it seems the BE35 was in the downwind position as the Tutor was high crosswind and turning high downwind. Later, as the Tutor pilot called "Low Key" the BE35 was late downwind and then turning R base leg before both ac turned towards final approach. Members wondered why the BE35 pilot did not question/query the Tutor pilot on the RT at the time in an attempt to understand the flight profile being flown. With only A/G in operation, the onus was on both pilots to integrate themselves safely into the cct. Had there been full ATC with positive control of the visual cct, Members were sure that this incident would not have occurred. Military pilot Members opined that when the Tutor pilot called "High Key" there was nothing else in the cct and if it had been a military aerodrome, the pilot would have expected priority for the PFL procedure. Civil pilot Members opined that when the equivalent civil PFL was carried out, the pilot conducting the PFL would give way to all other traffic as the PFL pattern did not conform to that flown by normal cct traffic. The CAA Strategy and Policy Advisor informed Members that there was no phraseology for civil PFLs

within CAP413 and this anomaly would be highlighted to the CAA Phraseology Working Group. Both pilots used different phraseology for position reporting into and around the visual cct. Members agreed that the Tutor pilot's use of military RT and procedures at a civil airfield had denied the BE35 pilot the SA normally afforded through RT exchanges to assimilate and visually acquire other traffic and this had caused the Airprox.

Turning to risk, the BE35 pilot had not seen the Tutor before being given the 'heads-up' by the A/G operator whilst establishing on final approach. From his perspective, at this late stage, he had priority since his ac was lower than the Tutor, which was perceived to be forcing its way in ahead. The Tutor pilot did not see the BE35 downwind and crossing ahead as he descended between High and Low Key and was alerted to its presence by his TAS, which enabled him to see it behind and to his L below. After A/G's transmission to the BE35 pilot, the Tutor pilot had reinforced his relative position with another broadcast as the 2 ac both turned onto final approach. The disparate speeds flown by both ac had led to the BE35 rapidly catching-up the Tutor as they converged which led to the Tutor pilot executing a go-around as the BE35 was about to disappear under his port wing. Although this had had the potential for becoming a very serious incident, the actions taken by the Tutor pilot were enough to allow the Board to conclude that any risk of collision had been effectively removed.

Members noted that the BE35 pilot was suspicious of the accuracy of his TCAS equipment. Although this suspicion is justified with regards to the azimuth (relative bearing) element, which is known for its inaccuracy particularly a short range, this should not translate across to the vertical separation element. TCAS collision avoidance algorithms are designed to provide information and guidance based on Mode C reporting to generate TAs and subsequent RAs and is accurate.

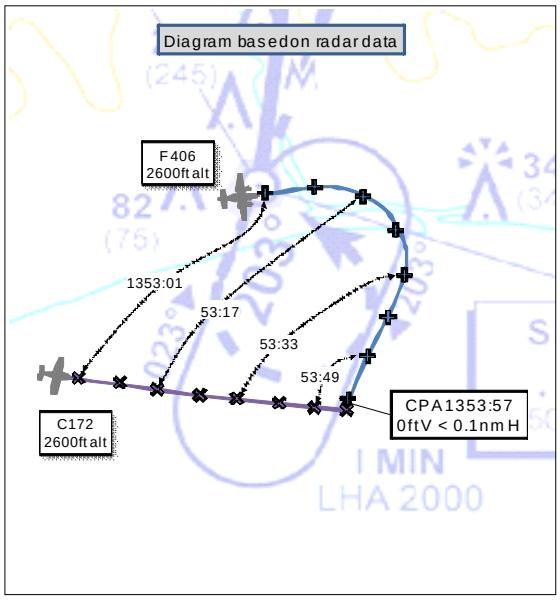
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict caused by the use of military RT and procedures at a civilian airfield.

Degree of Risk: C.

AIRPROX REPORT NO 2012131

Date/Time:	23 Aug 2012 1354Z	
Position:	5047N 00016W (Shoreham NDB Hold)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Cessna F406	Cessna 172
Operator:	Civ Trg	Civ Pte
Alt/FL:	2500ft QNH(1014hPa)	2700ft QNH(1014hPa)
Weather:	VMC CLBC	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:	50ft V/50m H	100ft V/50m H
Recorded Separation:	0ft V/<0.1nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA F406 PILOT reports conducting an instrument training sortie, operating in VMC under IFR with a PS from Shoreham ATSU [123.150MHz]. He was sitting in the L seat with an IR Examiner occupying the R seat. Screens were not fitted. The white ac had navigation, beacon and strobe lights selected on, as was the SSR transponder with Modes A, C and S selected. The ac was not fitted with an ACAS. He was starting the NDB(L)/DME RW20 approach to Shoreham A/D and carried out a sector 3 procedure (direct entry) to the hold, turning onto the outbound leg. Approximately 30sec after passing abeam the [SHM] beacon, on the 203° outbound radial, heading 210° at 140kt and altitude 2500ft [QNH 1014hPa], he saw a white, high-wing, Cessna type ac which flew straight across his track from R to L, approximately 50-100ft above him and at a range of no more than 100m. He disengaged the A/P and took 'aggressive avoiding action', descending and turning to the R. He stated that the other ac did not make RT contact with Shoreham ATSU despite flying straight through the IAP. He opined that, where possible, it would be better to utilise A/Ds which had radar coverage and with IAPs inside CAS, particularly on busy, good weather days. He also suggested that 'PPL/VFR users should be re-educated about IAPs', specifically that if they intend to fly adjacent to A/Ds with IAPs they are 'strongly recommended, when flying within 10nm of the aerodrome to contact the aerodrome ATSU' as is clearly marked on the legend of CAA aeronautical charts.

He assessed the risk of collision as 'High'.

THE CESSNA 172 PILOT reports transiting from Chichester/Goodwood A/D to an A/D in Germany, operating under VFR in VMC. He was in receipt of a BS from 'Farnborough Radar' on 125.250MHz, he thought. The red and grey ac had navigation, beacon, strobe and landing lights selected on, as was the SSR transponder. The ac was not fitted with an ACAS. After passing the Littlehampton VRP, he set course for the SFD VOR, following the 280° radial, and maintaining lookout for other traffic due to the vicinity of Shoreham A/D. He was heading 100° at 120kt, level at altitude 2700ft [QNH 1014hPa] over the sea, when his passenger warned him of an ac rapidly approaching from the L. He saw a twin-engine, low-wing ac at a range of about 1000m, about 100m below, in a climb, which seemed to be on a collision course. He considered avoiding action for 1 or 2sec but decided to maintain height and heading as 'anything else did not appear to be appropriate'. He stated that it was the other pilot's responsibility to avoid a collision. Shortly thereafter, the other ac abruptly made a R turn and crossed behind his ac, at the same level and at a distance of 50-100m. He reported the incident on the radio.

He assessed the risk of collision as 'High'.

AIRPROX REPORT No 2012131

[UKAB Note(1): RoA, Rule 9 (Converging) states:

…

(3) …, when two aircraft are converging in the air at approximately the same altitude, the aircraft which has the other on its right shall give way.

The RoA, Rule 8 (Avoiding aerial collisions) states:

'(1) … it shall remain the duty of the commander of an aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft.']

THE FARNBOROUGH LARS(E) CONTROLLER reports that he was the LARS(N) and (E) controller when [the C172 pilot] was handed over to him from Farnborough LARS(W). The frequency was very busy and [the C172 pilot] took a long time to call. When he did, the controller issued a squawk code, passed the QNH and agreed a BS. Five minutes later, between Shoreham and Seaford, [the C172 pilot] reported that an ac had flown quite close to him. The controller asked him if he was filing, to which he replied, 'No, I just thought I should tell you'. The controller then confirmed with him that he was under a BS and that TI is not provided.

THE FARNBOROUGH LARS(W) CONTROLLER reports that he was informed of the Airprox on 6th September and that the only recollection he had of the event was that the sector was very busy and he had to ask another ac to relay a message to [the C172 pilot] to change frequency to Farnborough LARS(E) [123.225MHz].

ATSI reports that an Airprox was reported 2.8nm SSE of Shoreham A/D at altitude 2400ft in Class G airspace when a Reims Cessna F406 (F406) came into conflict with a Cessna 172S Skyhawk 2 (C172).

Background

The F406 was operating under IFR, conducting the NDB approach to RW20 at Shoreham and was in receipt of a PS from Shoreham APP [123.150MHz].

The C172 was operating under VFR on a flight from Goodwood to an A/D in Germany and was in receipt of a BS from Farnborough LARS(W) [125.250MHz]. At the time of the Airprox, Farnborough LARS(W) had lost communications with the C172 pilot.

CAA ATSI had access to written reports from the pilots of both ac and the Farnborough LARS(W) and LARS(E) controllers, together with area radar recordings and RTF recordings.

The Shoreham METARs are provided for 1320 and 1350 UTC:

METAR EGKA 231320Z 21011KT 9999 FEW016 19/14 Q1014=

METAR EGKA 231350Z 22010KT 9999 FEW016 19/14 Q1014=

Factual History

At 1331:20 the F406 pilot contacted Shoreham approach at 3400ft at Selsey for a hold and NDB/DME approach to RW20. He was given a delay of approximately 10min for joining clearance. The pilot replied that he would operate in the vicinity of Selsey up to 5000ft until he received an onward clearance.

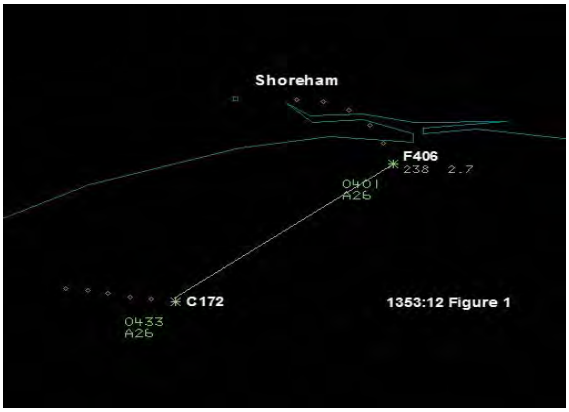
At 1345:00 the C172 pilot contacted Farnborough LARS(W) when S of Chichester at 2400ft. A BS was agreed and the pilot was given a squawk of 0433.

At 1349:00 the F406 pilot was cleared to proceed to the Shoreham NDB at 2500ft and given no delay for the NDB/DME approach for RW20, together with the Shoreham IFR squawk of 0401. At 1350:00 the F406 was 6.0nm WSW of Shoreham, tracking towards the NDB at 2600ft. The C172 was 1.3nm behind the F406, tracking E.

At 1350:00 the C172 pilot was instructed to report his squawk to LARS(E) [123.225MHz]. There was no response from the pilot. Between 1350:00 and 1353:00 the Farnborough LARS(W) controller made several attempts to re-establish contact with the C172 pilot without success.

At 1353:12 the F406 pilot had crossed over the SHM NDB and was in a R turn, tracking S at 2600ft. The C172 was 2.5nm SSW of Shoreham tracking E, also at 2600ft (see Figure 1 below).

At 1353:45 the F406 was tracking SSW, joining for the NDB procedure while the C172 was tracking E, 0.9nm WSW of the F406 (see Figure 2 below).



The 2 ac continued to converge and at 1353:57 were both at 2600ft, 0.1nm apart (CPA). At 1354:01 the F406 was at 2400ft and had crossed 0.2nm behind the C172.

At 1354:00 the Farnborough LARS(W) controller asked another ac to relay the change of frequency to the pilot of the C172. At 1354:30 the relay was completed and at 1354:40 the pilot of the C172 read back the frequency change.

The report from the Farnborough LARS(W) controller stated that the sector was very busy and his only recollection of the incident was of having to ask another ac to relay the frequency change to Farnborough LARS(E) to the pilot of the C172.

The F406 pilot's report stated that, whilst 5nm SSE of Shoreham, a high winged ac flew straight across his track from R to L, at approximately 50-100ft above, at a range of no more than 100m. The crew of the F406 were in VMC and the pilot took 'aggressive avoiding action'.

The C172 pilot's report stated that he first saw the F406 at approximately 1000m, to the L and 100m below, climbing. The C172 pilot considered avoiding action but decided to maintain height and heading as 'anything else did not appear to be appropriate. It was up to the other pilot to avoid a collision'. The C172 pilot observed that the F406 abruptly made a R turn and crossed behind him at a distance of 100m or less.

Analysis

Both ac were operating in class G airspace and the pilots were equally responsible for collision avoidance. The C172 pilot had right of way.

The C172 pilot was in receipt of a BS from Farnborough LARS(W). Under a BS there is no requirement to monitor the flight, although TI may be passed if a definite risk of collision exists. At the time of the Airprox the controller had lost contact with the C172 pilot.

The F406 crew were in receipt of a PS from Shoreham APP. It is published on the United Kingdom 1:250,000 and the 1:500,000 Aeronautical Charts that Shoreham has an Instrument Approach Procedure (IAP). Also published on both charts is the advice that 'pilots who intend to fly to or route adjacent to aerodromes with IAPs are strongly recommended when flying within 10nm of the aerodrome to contact the aerodrome ATSU'. The C172 pilot did not

contact Shoreham, therefore Shoreham were unaware of his presence and were unable to pass TI to the F406 pilot.

Conclusion

An Airprox occurred in Class G uncontrolled airspace, 2.8nm S of Shoreham A/D when a C172 and a F406 flew into close proximity with each other.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board first considered the actions of each pilot. Members opined that the nature of the F406 pilot's sortie along with the provision of a PS may have lulled him into a false sense of security with regard to deconfliction from other airspace users. It was felt that the provision of 'a service' could sometimes result in an assumption of separation. Members noted that, unlike CAS, the responsibility for collision avoidance in class G airspace ultimately rested with the pilots, whether in receipt of ATSOCAS or not. The Board agreed with the F406 pilot's conclusion about the advantages of radar-based ATSs and/or the protection of CAS for instrument training, especially on good weather days; Members noted that whilst VFR charts indicated A/Ds with IAPs, information regarding the position of IA holds was not included and realistically could not be, due to map clutter constraints. The Board also considered the practicality of pilots contacting A/Ds with IAPs. ATC Members pointed out that this practice would greatly increase controller workload, should a hand-over be required, but that free-calling would help to alleviate the problem; pilot Members also pointed out the increase in cockpit workload in either case. Members were unanimous in their opinion that the issue was essentially one of planning and that pilots would be well advised, in the first instance, to route further than 10nm from A/Ds with IAPs. In parts of the country where this was not practical, it was felt that pilots should request appropriate service provision and where that was not available to be ready to establish timely contact with the A/D. In this case the C172 pilot was not in contact with any ATSU at the time of the Airprox and so could not have received TI. The NATS Ltd Advisor noted that the F406 was displaying the Shoreham IA conspicuity code and that Farnborough controllers had been reminded that this information can be used to good effect. The CAA SRG Advisor noted that the Farnborough LARS(W) controller was task-centred on transferring the C172 pilot to LARS(E), rather than providing TI on the F406 or suggesting a handover or free-call to Shoreham.

The C172 pilot saw the F406 in good time and assessed that there was a collision risk. He also correctly assessed that he had right of way and decided to maintain course and height, which he did throughout the Airprox. In considering this, Members were at a loss to understand why he apparently took no avoiding action. Whilst Rule 9 afforded him right of way, both pilots were equally responsible for collision avoidance and he was well-placed to increase his conspicuity by wing-rocking or to break the collision geometry by climbing or descending. His lack of action significantly increased the risk to both ac involved and prompted the Board to consider whether there was a common misunderstanding of the VFR regulations. Some pilot Members opined that the VFR regulations were written in an age when ac possessed significantly lower performance and greater commonality of speed and that they were not well framed for today's aviation environment. Members agreed that it would be wise always to assume that the other pilot had not seen one's own ac until positive actions prove otherwise.

The pilots shared equal responsibility to see and avoid and although the C172 pilot appeared to take no action, it was the late sighting by the F406 crew which caused the Airprox. The Board considered that the F406 pilot saw the C172 at about the last available opportunity and as a result had to manoeuvre aggressively to avoid it. Consequently, safety margins were reduced much below normal.

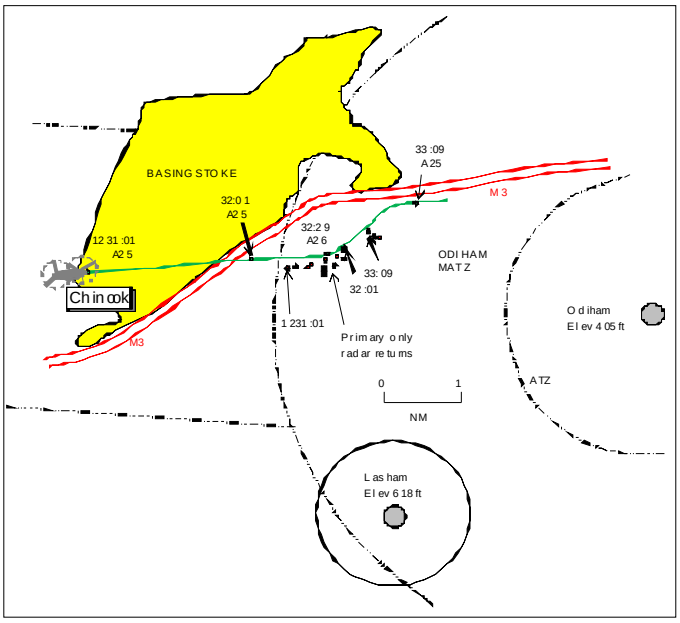
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the F406 crew.

Degree of Risk: B.

AIRPROX REPORT NO 2012132

Date/Time:	28 Aug 2012 1232Z	
Position:	5115N 00103W (4nm WNW Odiham - elev 405ft)	
Airspace:	MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Chinook	Grob103 Glider
Operator:	HQ JHC	Civ Pte
Alt/FL:	2500ft QNH (1014hPa)	2300ft QFE
Weather:	VMC CLBC	VMC CLBC
Visibility:	>10km	>10nm
Reported Separation:	250-300m H	100ft V/2nm H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHINOOK PILOT reports flying a dual advanced training sortie from Odiham, in receipt of a TS from Odiham Approach on 234·35MHz and squawking 3640 with Modes S and C. The visibility was >10km flying 500ft below cloud in VMC and the ac was coloured green with HISLs, nav and both landing lights all switched on. After completing IF GH, the helicopter was routeing back towards Odiham for several instrument approaches by the PF in the RH seat under a visor. The transit was commenced at 2500ft QNH and the crew were informed by ATC that the unit was operating SSR only. Whilst 4nm W of Odiham heading 090° at 90kt and receiving vectors, a glider was seen slightly high in their 1 o'clock range 400m, and believed to be converging from the R. The QHI gave avoiding action and the helicopter was turned and descended away from the glider, estimating it passed 250-300m clear to their R. ATC were informed of the high-level of gliding activity and the sortie was continued without further problems. He assessed the risk as medium.

THE GROB103 PILOT reports flying a local sortie with a passenger from Lasham, VFR and in communication with Lasham on 131·25Mhz. The visibility was >10nm flying 800ft below cloud in VMC and the ac was coloured white. When over the M3 on the E side of Basingstoke at 2300ft QFE heading 180° towards Lasham at 50kt, he became aware of a Chinook in the vicinity, about 5nm away at about 2000ft. Their glider was obviously between the helicopter and Odiham on its track so he increased his speed by increasing his ROD. After a short while it was obvious that the Chinook was maintaining its course so, as a safety measure, he made a steeply banked quarter turn to the S to flash his wings before continuing. This obviously had the desired effect as the Chinook was seen to bank immediately sharply L before passing well to the N and slightly below. It was difficult to estimate the separation accurately (reported as 100ft vertically and 2nm horizontally) but the helicopter was noticeable but never large enough to be a threat. The P2 did not notice the Chinook until he explained why he had made the turn. He assessed the risk as low.

THE ODIHAM APPROACH CONTROLLER reports he identified the Chinook climbing out and applied a reduced TS with appropriate limitations operating SSR only. The Chinook carried out GH including operation below the base of radar cover and he applied BS as appropriate. When the flight called for recovery he identified the ac, applied a TS and limited the service as before. The Chinook crew asked for an SRA but were told that this was not available owing the Watchman Radar being U/S so the crew asked for a PAR azimuth only. He telephoned the Tower controller and discussed using the SRA procedure minima and all other liaison calls as required. When the ac was about 4nm W of Odiham he passed a control instruction; however, the crew did not respond but he noticed the ac manoeuvre and decided not to say anything. The crew then told him that they were avoiding a glider and he informed the crew that he could not see anything on radar and to report ready for vectors. Post incident

he spoke to the Chinook crew who understood the implications of ATC operating SSR only and they stated that it was a white glider against a white background.

BM SAFETY POLICY & ASSURANCE reports this Airprox occurred between a Chinook being vectored for an IFR recovery in receipt of a reduced TS, ATC operating SSR only, and a Grob103 glider operating VFR. The Watchman radar at Odiham was unserviceable at the time of the Airprox. Consequently, given the Grob103's lack of electronic conspicuity, APP was unable to provide TI to the Chinook pilot, breaching the ATM related safety barrier, leaving "see and avoid" as the sole remaining barrier.

UKAB Note (1): The Odiham METARs were: - EGVO 281150Z 22011KT 9999 SCT030 20/12 Q1014 BLU NOSIG= and EGVO 281250Z 20013KT 9999 BKN028 20/13 Q1014 BLU NOSIG=

UKAB Note (2): The radar recording does not capture the incident. At 1231:01 the Chinook is seen 7·5nm W Odiham tracking 085° at altitude 2500ft QNH with an intermittent slow-moving primary only return 2·5nm ahead tracking NE'ly. The primary only return then appears to manoeuvre about 3·75nm NNW of Lasham before fading at 1232:01, 1·25nm ahead of the Chinook. At 1332:29, as the Chinook passes close to the point where the primary response faded, the Chinook is seen to turn L about 40° onto a NE'ly track for approximately 30sec before turning R back towards Odiham. A primary only return reappears at 1233:09 in approximately the same area before it faded, about 0·75nm WSW of Chinook.

HQ JHC comments that this is prime example of the difficulties of operating in the vicinity of Odiham ATZ, at a very busy time, without a serviceable Primary Radar. It is recognised that the crew were flying under simulated IF conditions with one pilot being under an IF visor, which would have reduced the overall quality of the lookout. ATC were unable to provide TI on an unseen ac and collision avoidance was the pilot's responsibility. The Chinook pilot took avoiding action when he came into conflict with the glider and this Airprox is a firm reminder to aircrew to be extra vigilant when operating in Class G airspace without primary radar cover.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members noted that the movement of primary returns captured by recorded radar did not correlate to the Grob 103 pilot's reported track during the evolution of the incident. Also, Members were initially not entirely confident that the reported glider was the ac involved owing to the disparate separation distances reported. However, the geometry and 'timeline actions' were cohesive and did give the Board more confidence that the correct parties had been identified. Without the benefit of primary radar, Odiham ATC was unable to improve the Chinook pilot's SA on possible conflicting gliders operating within the MATZ. A gliding pilot Member remarked that the incident occurred in August when Lasham would be busy owing to the good soaring Wx conditions and that pilots should expect to see gliders operating below cloud thermalling. The MAA Advisor commented that there has been a good long-term relationship between Odiham and Lasham but he questioned the wisdom of civil ac flying inside the MATZ without radio. Another glider pilot Member noted that Lasham was inside the Odiham MATZ and opined that whilst encouraging GA pilots to call Odiham was sensible, it would be unworkable for glider flights, even if RT equipment was fitted, as the number of flights airborne on a normal day could easily exceed the workload capacity of the ATSU, which would be exacerbated during competitions. Mass launches during competitions are notified via NOTAMs and thankfully Airprox incidents like these are a rare occurrence. The Mil Training pilot Member questioned whether, with Odiham ATC using SSR only, it had been a good idea for the Chinook crew to be carrying out simulated I/F with a pilot under a visor when it was a known good gliding day and where perhaps all pilots should have been 'eyes-out' looking for traffic. As it was, the Grob 103 pilot saw the Chinook, he estimated 5nm away, and attempted to move his ac out of the helicopter's flight path. When the Chinook continued to close, the pilot manoeuvred his glider to make it more conspicuous which apparently succeeded as the Chinook pilot saw it and executed an avoiding action L turn away and a descent. With the Chinook flight required to give way and a reported first sighting distance of 400m, and 300m separation at the CPA, Members considered if this had been a late-sighting; the Grob 103 pilot reported separation as 2nm at CPA. Owing to such a discrepancy in separation distances, which Members could not resolve, the Board elected to classify the incident as a conflict in the Odiham MATZ. With both pilots discharging their responsibilities to see and avoid within the Class G airspace of the MATZ, the Board concluded that any risk of collision had been effectively removed.

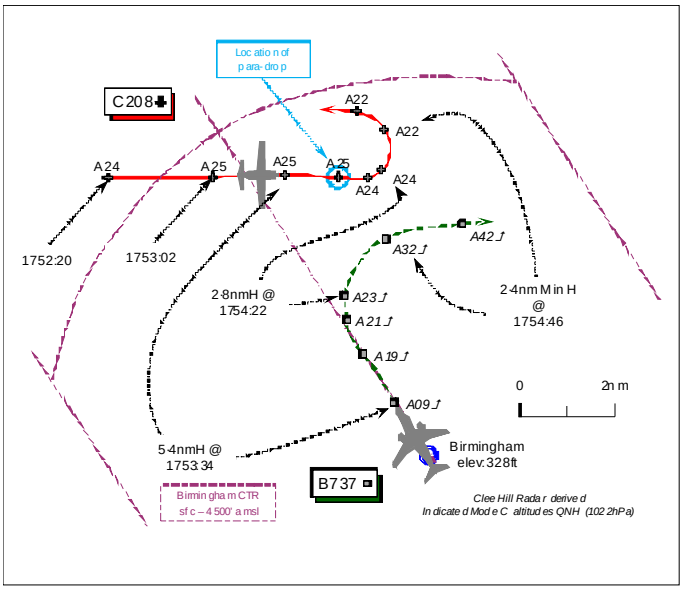
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the Odiham MATZ.

Degree of Risk: C.

AIRPROX REPORT NO 2012133

Date/Time:	1 Sep 2012 1754Z (Saturday)	
Position:	52 33.10N 001 48.08W (6nm N of Birmingham - elev 328ft)	
Airspace:	Birmingham CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-800	Cessna C208B
Operator:	CAT	Civ Comm
Alt/FL:	2000ft↑ QNH (1022hPa)	2500ft QNH (1022hPa)
Weather:	VMC CLBL	VMC No cloud
Visibility:	>10km	>10km
Reported Separation:	200ft V/2.5nm H	NR
Recorded Separation:	2·4nm Min H/1000ft V 100ft V @ 2·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BOEING B737-800 (B737) PILOT reports that he was departing Birmingham under IFR on a DTY 5D SID. Before take-off TOWER notified the crew of VFR traffic 10nm NW of the Airport flying to Sutton Coldfield, which is about 5nm on extended centreline of RW33. His flight was then cleared for take-off from RW33 to follow the SID.

Climbing through about 1000ft Birmingham QNH (1022hPa) the reported traffic – the C208 - was observed on TCAS about 5nm ahead. Heading 328° at 200kt passing about 2000ft QNH whilst in receipt of a RCS from APP on 118.05MHz and approaching 2DME IBM, the closing distance between his ac and the VFR C208 was reducing considerably it was now showing as proximate traffic and >200ft above his ac. The projected SID track on the navigation display was taking his B737 within 2.5nm of the position of the proximate traffic, which was still routeing towards the SID track. Taking into consideration their ac's projected routeing and the position of the VFR traffic, which at this stage was still showing above the B737's current altitude, he considered that a loss of separation and a TCAS RA were highly likely and to avoid the C208 he immediately instructed the 1st Officer PF to turn R onto a heading of 090°; they had no visual contact with the C208. ATC was informed and the response from the controller was that the traffic was in sight and that they had been made aware of it. However, the B737 crew had not been given any information that the C208 would 'infringe' the SID routeing. Neither a TA nor RA was enunciated by TCAS.

Minimum separation was 2.5nm horizontally/200ft vertically and he assessed the Risk as Medium. He stated that the crew's workload was high during his ac's initial climb/acceleration and flap retraction. An Airprox was reported to ATC on RT.

THE CESSNA C208B PILOT reports she was conducting a parachute drop to a drop-zone (DZ) at Sutton Coldfield some 5½nm N of the N end of Birmingham's RW33, offset to the R of the RW centreline by 1½nm. [UKAB Note: RW15/33 has a length of 8526ft - 1·40nm.] A Parachute Display Notification had been issued by London Control (Swanwick) - SWN PDN 053A/2012.

Whilst in receipt of a RCS from Birmingham APP on 118.05MHz, she had been given clearance to fly to the display site. Operating VFR at 100kt, she was informed by APP that the B737 would turn R after take-off and, as the B737 crew knew she was holding level, she thought at 2000ft in the area noted above but actually at 2500ft Birmingham QNH, she believed that the B737 crew would have no problem keeping safe height separation (by climbing) above her ac. On the RT the B737 pilot was reminded by APP that he had already been warned about the VFR traffic – her C208, which he could see on his TCAS. The C208 co-pilot, with a 'frozen' ATPL and currently a flying

instructor, was listening out on the RT and watched the B737 fly past above them and climbing. The co-pilot could not accurately judge the B737's altitude or the separation but heard ATC give the B737 crew the warning about VFR traffic – the C208 - and heard all further RT exchanges between APP and the B737 crew. The Risk was assessed as 'none'.

THE BIRMINGHAM AERODROME CONTROLLER (ADC) reports there was a steady flow of inbound and outbound IFR traffic to RW33. At 1751 RADAR rang on the landline when, at the same time, the B737 crew reported ready for departure on the RT. As it was a tight gap he asked the B737 crew if they were ready for an immediate departure, which they were and the flight was lined-up on RW33 via E1. RADAR 1 advised him of VFR traffic - the C208 - 11.5nm NW of the Airport at 2500ft routeing to Sutton Coldfield – 355°/7nm; he advised RADAR that he would pass TI to the departing B737 crew. He then told the B737 crew there was VFR traffic to the NW of the airfield by 10nm at 2500ft going to Sutton Coldfield. The B737 pilot just replied 'thank you'. At 1752, with landing traffic at 3.5nm from touchdown, the B737 crew was cleared for T/O with a wind check. The B737 pilot read back the take-off clearance and said 'goodbye'. The C208 was 9nm NW at 2400ft. The B737 was airborne at 1753 by which time the C208 was routeing E through the climb-out, but further S than he had anticipated. However, he knew RADAR had passed TI. Nothing further was said to the B737 crew as there was other traffic to attend to and there is an 'automatic' frequency change on the SID to RADAR's frequency. The B737 crew said nothing else to TOWER, but did tell RADAR they were turning onto a heading of 090° because of the VFR traffic.

THE BIRMINGHAM RADAR 1 CONTROLLER (RADAR) reports light to moderate traffic conditions prevailed when he was called on the RT by the C208 crew, airborne from Halfpenny Green to carry out a parachute drop at Sutton Coldfield. The flight was identified and cleared to enter CAS not above 2500ft under their own navigation. When the C208 was about 10nm NW of the Airport TI was passed to the ADC together with the flight's intentions, which had been pre-notified. The duty RW was RW33 and as the C208 was approaching Sutton Coldfield TI was passed on the departing B737, which would be turning S at 3nm and climbing. He updated the C208 crew when the B737 was airborne and 500ft ALT. The departing B737 crew called passing 2000ft ALT and initiating a R turn to avoid the VFR traffic, which had now commenced a LH orbit. The departure was then transferred to LTC.

ATSI reports that an Airprox was reported by the B737 pilot on departure from Birmingham Airport RW33, when it came into proximity with the C208 at altitude 2000ft.

The B737 departed Birmingham for an IFR flight to E Europe and had been in receipt of an Aerodrome Control Service from Birmingham TOWER on 118.3 MHz before changing frequency to Birmingham RADAR on 118.050MHz.

The C208 departed VFR from Wolverhampton to undertake a parachute display at a location near Sutton Coldfield and was in contact with Birmingham RADAR on 118.050MHz. The parachute display was subject to a Parachute Display Notification and the C208 had been afforded Priority Category Z, i.e. a non-standard flight not having priority over normal flights.

The drop zone was 5.6nm on a bearing of 341° from the upwind end of Birmingham's RW33 and was situated within the Class D Birmingham CTR (surface to altitude 4500ft). The drop zone was 1.1nm SSE of Sutton Coldfield town centre.

The Birmingham Approach RADAR controller was providing Approach Control Services with the assistance of SSR data from the Clee Hill Radar.

ATSI had access to pilot reports from the B737 and C208, the Birmingham TOWER and RADAR controllers' reports, the ATC unit report, recorded area surveillance and transcripts of the TOWER and RADAR frequencies.

The Birmingham METAR:1750Z 21008KT CAVOK 19/12 Q1022=

The C208 departed Wolverhampton at 1744:00 (UTC) and took-up an easterly track climbing to 2600ft LTC Midland QNH (1022hPa). The C208 crew called Birmingham RADAR and at 1747:50 was instructed to standby and remain outside CAS, which was acknowledged. At 1748:40, RADAR instructed the C208 to squawk A0401. RADAR identified the C208 and requested the crew's requirements. These were given as, "…*a parachute display at Sutton Coldfield going there at 2 thousand 5 hundred feet."* RADAR responded, "*Roger you can route Sutton Coldfield not above 2 thousand 5 hundred feet Q N H 1-0-2-2."* This was read-back by the C208 pilot.

AIRPROX REPORT No 2012133

The C208 entered CAS at 1750:46 at 2400ft (within the Class D Birmingham CTA-1 1500-4500ft) on an easterly track 13nm NW of Birmingham Airport.

At 1751:11, RADAR called TOWER and the line remained open for 20sec as, at 1751:30, TOWER instructed the B737 to line-up on RW33. RADAR then spoke to TOWER at 1751:34 stating, *"do you see that [C208 C/S] northwest he's the parachute [ac] going to Sutton Coldfield VFR 2 point 5."* Tower replied*, "OK I've [B737 C/S] to depart … I'll just give him traffic."*

At 1752:00, TOWER passed TI to the B737, "*There's VFR traffic to the northwest of the field by 10 miles at the moment 2500 feet going to Sutton Coldfield*", which was acknowledged by the B737 crew, *"thank you".* The B737 crew was cleared for take-off at 1752:10.

From the position at which the B737 commenced its take-off roll (runway 33 via E1), the DZ was 10° R of the B7

The B737 was flying a Daventry 5D SID. This requires ac to:

'climb straight ahead to I-BM D2 or 500ft QFE whichever is later, then turn right to intercept DTY VOR R318 by DTY D26, then continue to DTY VOR. Aircraft are required to cross DTY D18 at 5000ft or above (approx. 4.8%) and cross DTY D9 at 6000ft'. Unless otherwise instructed departing aircraft are to contact Birmingham Radar on 118.050MHz as soon as practicable after passing 2000ft QNH.

At 1752:20, RADAR instructed the C208 crew, "*no further right than your present track there is traffic rolling now to depart runway 3-3 it's a 7-3-7 will be climbing through your level."* This was acknowledged by the C208 crew, *"okay thanks we'll..look out".* Figure 1 below shows the Clee Hill radar picture at 1752:20. The DZ is marked with a cross to the E of the line depicting Birmingham's RW15/33 extended centreline.

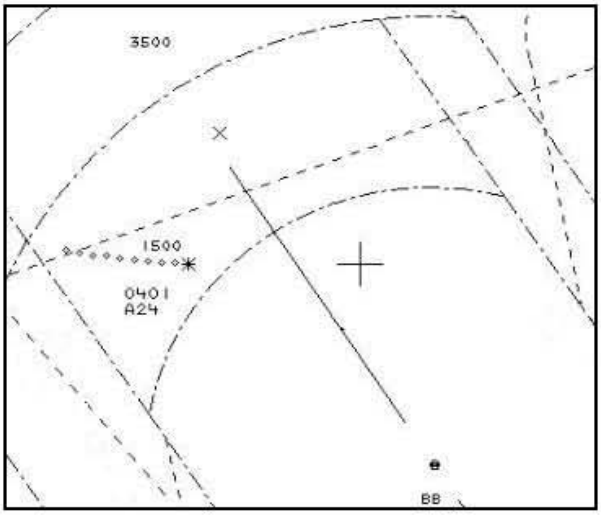


Figure 1: Clee Hill 1752:20

At 1753:00 RADAR updated the C208 crew about the B737, "*the traffic 7-3-7 is just lifting off now and he'll be turning..right at a range of 3 miles when he's airborne climbing through your level report visual."* The C208 was now inside the Birmingham CTR at 2400ft QNH, 7.8nm NW of the Airport (See Figure 2 below)

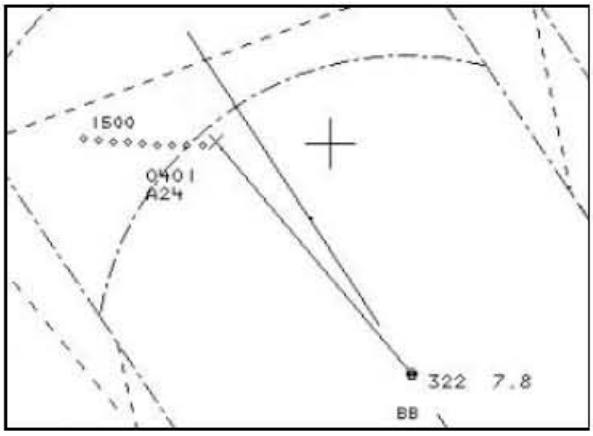


Figure 2: Clee Hill 1753:00

RADAR updated the C208 crew again at 1753:30, as the C208 flew through the RW33 climb-out 7nm from the Airport (Figure 3), "*the traffic's now just passing through 5 hundred feet in the climb,"* to which the C208 crew replied, "*we're watching the traffic we have him in sight."*

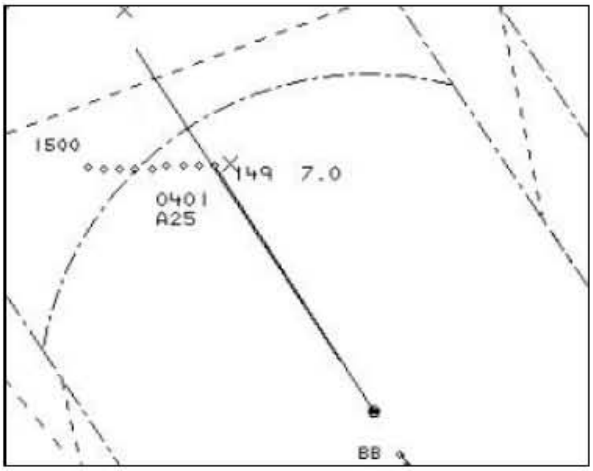


Figure 3: Clee Hill 1753:30

The B737 first 'painted' on the Clee Hill Radar at 1753:34 (Figure 4) as it passed altitude 900ft. The B737's initial rate of climb was in excess of 3000ft/min.

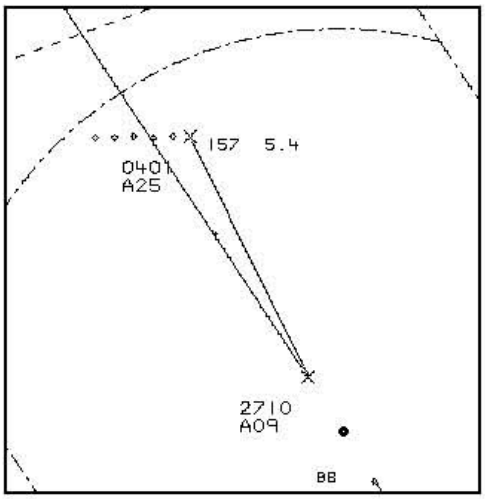


Figure 4: Clee Hill 1753:34

At 1754:00, RADAR informed the C208 crew that the B737 would be turning R shortly and the C208 crew requested, *"okay and I'd like to orbit here"* (Figure 5), whereupon RADAR instructed the C208 crew, *"roger orbit left".*

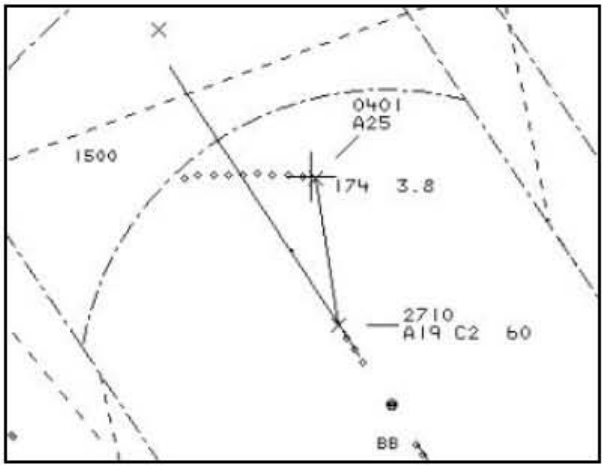


Figure 5: Clee Hill 1754:00

The B737 crosses I-BM D2 at 1754:06, at 2000ft ALT from where it commences a R turn. The B737's ROC had decreased to 1248ft/min. The C208 crew's DZ was 3.5nm from the B737's position at this time.

The B737 crew called RADAR at 1754:10, "*..turning onto heading 0-9-0 to avoid..proximate traffic at our level 2 and a half miles."* RADAR responded, "*Roger… that's the VFR traffic orbiting left you're cleared..right turn and climb to 6 thousand feet."* The B737's ROC had now reduced to 512ft/min. By 1754:24, the B737crew's R turn could be seen to be taking effect (Figure 6), as was the commencement of the C208's L orbit. The ac were indicating 2300ft and 2400ft ALT respectively with the C208 in the B737's 12 o'clock 2.8nm.

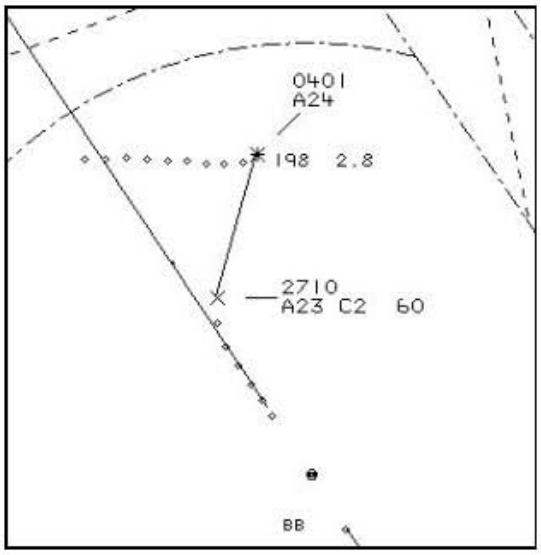


Figure 6: Clee Hill 1754:24

On the next update of the surveillance replay, the B737 is shown climbed through 2600ft ALT, 300ft above the C208, which had descended to 2300ft ALT in its L turn. Lateral distance between the two ac had reduced to 2.7nm. The B737's ROC had increased to over 2000ft/min. Minimum lateral separation occurred at 1754:46, as the two ac turned away from each other with the C208 in the B737's 10 o'clock range 2.4nm, with 1000ft vertical distance between the two ac (see Figure 7).

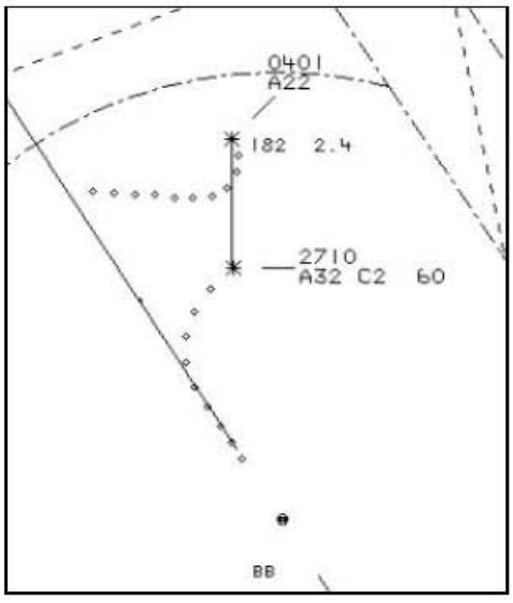


Figure 7: Clee Hill 1754:46

The B737's rate of turn after passing I-BM D2 was approximately 20° every 8sec between 1754:06 and 1754:48 and it was established on the heading of 090° by 1755:04.

At 1754:50, the B737 crew reported to RADAR, "*that traffic was quite close to us we didn't get an R-A off it but I'm very surprised we didn't."* RADAR acknowledged this call replying that the C208 crew had reported visual with the B737 and that traffic had been called. The B737 was then transferred to London CONTROL at 1755:10. The

distance between the two ac continued to increase and the C208 crew went on to complete their display before leaving CAS.

As notified in UK AIP ENR 1.4, TI will be provided to IFR flights on conflicting VFR flights. This was fulfilled by the TOWER controller passing TI to the B737 crew about the C208. Additionally, VFR flights will be provided with TI on IFR flights in order to enable VFR pilots to effect their own traffic avoidance and integration. This was fulfilled by the Birmingham Radar controller passing TI to the C208 crew. Under both sets of flight rules an ATC clearance is required for flights in Class D airspace and ATC instructions are mandatory.

Comparison of the track published by Birmingham Airport for RW33 departures via DTY and the B737's actual track showed that, between crossing I-BM D2 at 1754:06 and the point of minimum lateral distance from the C208 at 1754:46, the B737's track followed the published track profile. Selection of a heading of 090° by the B737 crew did not take effect until after the CPA.

Although the minimum lateral distance between the two ac was 2.4nm, the C208 had flown directly over its planned DZ at 1754:00 (Figure 5 above), ahead of the B737. As it flew over the DZ, the C208 was 1.69nm NW of the track about to be flown by the B737, as shown in Figure 8 below.

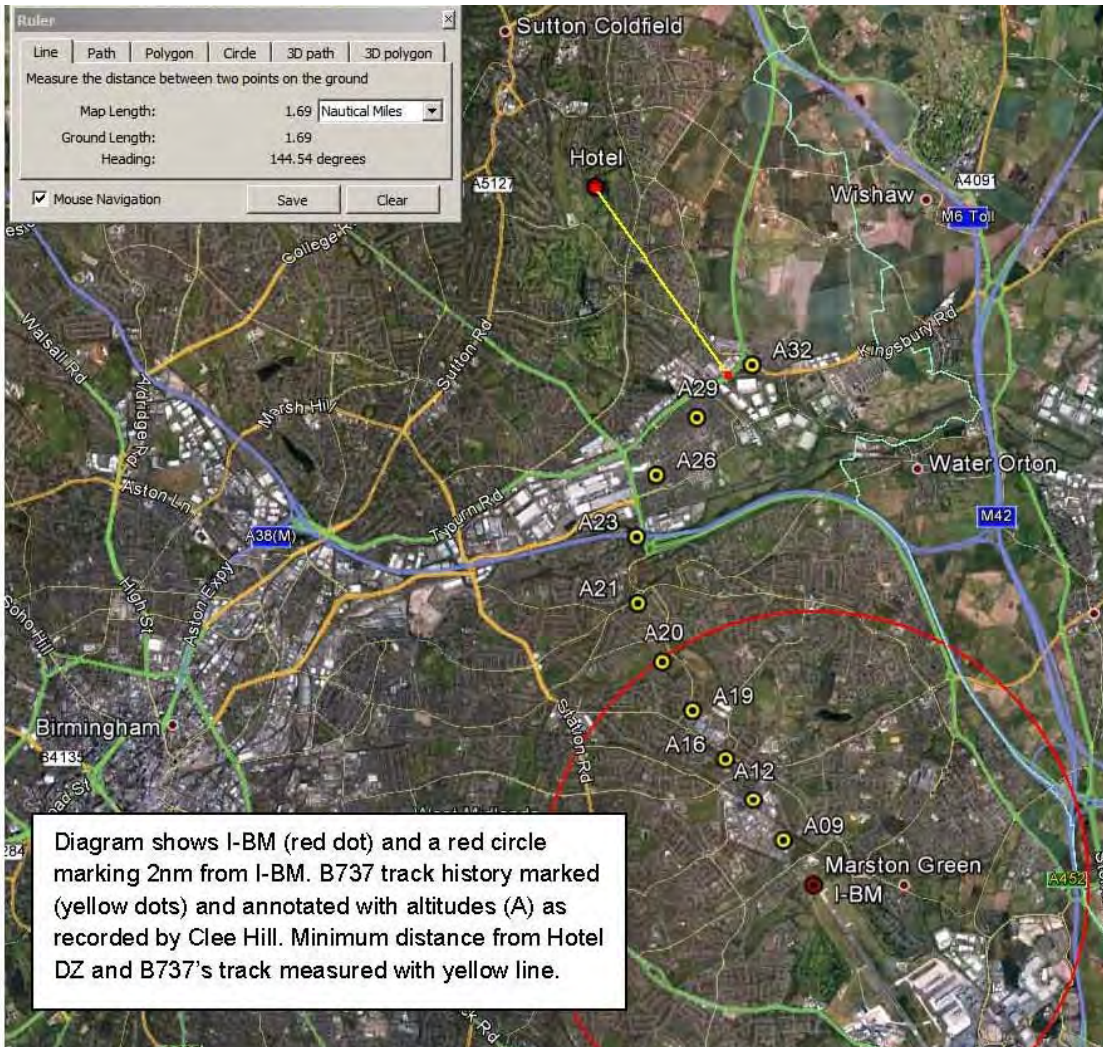


Figure 8

Prior to take-off the B737 crew was informed that the C208 was 10nm to the NW of the Airport routeing towards Sutton Coldfield. The B737's pilot report indicates that at the time of writing the pilot understood that Sutton Coldfield was at a position 5nm on the extended centreline of RW33. Whereas, the actual position to which the C208 was routeing was 10° R of the B737's take-off starting position at a distance of 6.75nm. It is not known how

the B737 crew assimilated the TI they had been given prior to take-off; nor what their expectations were with regard to their interaction with this traffic on departure. As the B737 passed through 900ft ALT (Figure 4) the C208 had passed through the B737's 12 o'clock at 5.4nm and was on a track that appeared to converge with the B737's intended track.

The Manual of Air Traffic Services Part 1 (CAP493) Section 3 Chapter 4 paragraph 3.1 states that:

ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to 'see and avoid' each other.

The RADAR controller took steps to limit the flight path of the C208 by instructing it to fly no further R. As the C208 overflew the DZ the RADAR controller again took steps to minimise the interaction of the two ac by instructing the C208 to orbit L. However, as the B737 was not yet on the RADAR controller's frequency the B737 crew would have had no information upon which to update their assimilation of how the two ac were going to interact. Radar derived information indicates that the B737 crew reduced their ROC through 1900ft to 2600ft ALT, which may have been part of their decision making processes, ultimately leading to a selection of heading 090°. Therefore it is likely that, although all requirements for the provision of TI and necessary instructions were met, the TI given was insufficient for the B737 crew to complete their initial climb-out on the SID without believing they were flying into conflict with the C208.

Further to the incident controllers at Birmingham were briefed that enhanced TI (such as range and bearing of the traffic) for the purposes of improving pilots SA, together with information to IFR flights that potentially conflicting VFR flights had visually acquired their ac, would assist in the successful integration of traffic flying differing flight rules.

The requirements for the provision of TI to VFR and IFR flights in Class D airspace were fulfilled by ATC; however, the TI provided to the B737 was insufficient to prevent the B737 crew from believing that a conflict was occurring and then electing to fly a heading off the SID.

UKAB Note: NOTAM H4349 promulgated the parachute display within 2nm radius of 5233N 00148W (Sutton Coldfield), 1745 – 1815UTC, from the surface to 10,500ft amsl subject to ATC clearance.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

The Board noted that the para drop had been planned, coordinated and notified correctly and that the C208 had been cleared to enter CAS. A pilot Member observed that the DZ was notified to the B737 crew as Sutton Coldfield. The actual DZ was S of the town, which is largely indistinguishable from all the other joined-up conurbations to the NW of the airport. He opined that the reference to a town name was poor practice since it relied on the pilots being familiar with the local geography; range and bearing should be used instead. That said, the B737 crew did not request further information when they were given TI on the C208 including the reference to Sutton Coldfield; they simply responded, 'Thank you'. Members noted that in other Airprox in Class D airspace, pilots operating under IFR have been unaware that they will not be deconflcited from VFR traffic unless they request it from ATC. Another option prior to take off is to delay the take-off until satisfied that there will be no conflict with the VFR traffic. However, in this Airprox the B737 crew had already been asked whether they were ready for an immediate departure and would have been aware of the ac at 3.5nm on the approach to land. This awareness of landing traffic and routine commercial scheduling requirements would likely have influenced the B737 crew's decision not to delay. Once airborne the B737 crew became concerned by the proximity and flight path of the C208 as observed on their TCAS. Pilot Members emphasised that the lateral depiction on TCAS displays are not reliable but the vertical element is accurate and can be trusted. Although the B737 crew elected to turn R based on their assessment of the C208's track seen on TCAS, their ground track did not deviate from the SID profile. Ironically however, by reducing their rate of climb, possibly with the intention of gaining visual contact with the C208, the B737 was closer to the C208 when it climbed through its altitude than would have been

the case with a normal climb profile. A controller Member observed that if the B737 crew had been informed that the C208 pilot had them in sight, they would have been less concerned.

The Board considered that the ATC plan was sound and complied with existing regulations and practices. It might have been helpful if the C208 pilot had planned to enter CAS from the N rather than to cross the extended centreline. A pilot Member emphasised that in the event of an engine failure during or shortly after takeoff, standard operating procedure for twin-engine airliners is to climb straight ahead. Pilots and controllers should remain cognisant of this contingency when planning events in the proximity of airports. As it was, the C208's flight path and orbit were managed by the APP to remain clear of the SID and the ac were 2.8nm separated as the B737 climbed through the C208's altitude. Taking all these factors into consideration, the Board concluded that the Airprox was a perception issue caused by the C208's cleared flight path causing the B737 crew concern.

The Board was unanimous in agreeing that there had been no risk of collision but there was a difference of opinion about the Risk classification. A pilot Member considered that the B737 pilot's intended early turn away from the C208 using TCAS azimuth information was not in accordance with normal practice. However, a large majority of Members were satisfied that normal safety standards and procedures pertained: Risk Category E.

PART C: ASSESSMENT OF CAUSE AND RISK

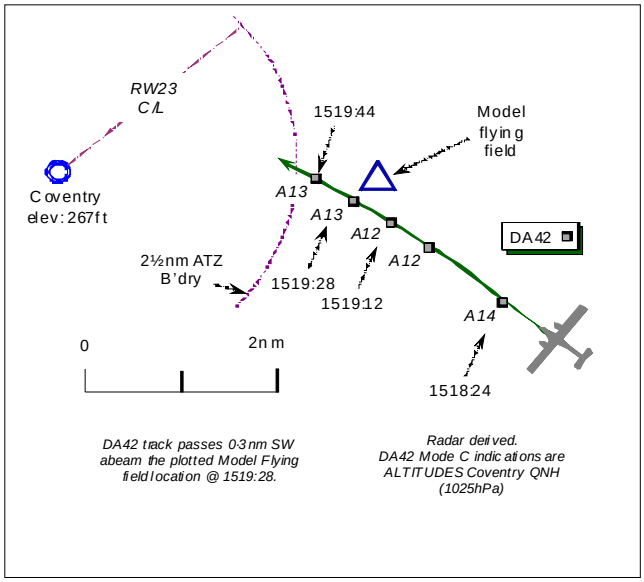
Cause: The cleared routeing of VFR traffic in the Class D Birmingham CTR caused the B737 crew concern.

Degree of Risk: E.

AIRPROX REPORT NO 2012134

Date/Time: 3 Sep 2012 1519Z
Position: 5221N 00123W
(3½nm E of Coventry A/D - elev 267ft)

Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DA42	Model Glider
Operator:	Civ Trg	Civ Club
Alt/FL:	1300ft	900ft
	QNH (1025hPa)	agl
Weather:	VMC No cloud	NK NK
Visibility:	>10km	20km
Reported Separation:		
	100ft V/100m H	200ft V/50m H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DIAMOND TWINSTAR DA42 PILOT reports he was inbound to Coventry from Sywell flying dual on a VFR examination flight and was in contact with Coventry TOWER on 118·175MHz. A squawk of A7010 was selected with Modes C and S on; TCAS is not fitted. Routeing in from Draycott Water heading 300° at 130kt, level at 1300ft QNH (1025hPa) and cleared to join L base for RW23, about 3nm from the threshold he caught sight of a 'target' in his 1o'clock about ½nm away (he was seated in the RHS). He subsequently realised it was a model glider of 2-3m wingspan with red wingtips, nose and tail, climbing through their level; the model then rolled and descended below his ac so no avoiding action was taken and they passed the model glider about 100m away and 100ft below his ac with a 'low' Risk of collision. TOWER was advised and a warning was given to the pilot of the following ac, who also sighted the glider. His aeroplane is coloured white; the HISLs were on.

THE CHAIRMAN OF THE MODEL AIRCRAFT CLUB reports that the following information was obtained from an interview with the pilot of the model glider and the Chairman's own sighting of the occurrence. There were other club members present who also saw the occurrence.

The 3m wingspan radio controlled (RC) model glider was being flown from the Club's flying field turning level at a height of about 900ft in a 100ft radius circular thermal pattern at about 10kt. A fixed wing ac – the DA42 - was observed approaching the flying field at a height assessed to be lower than the model glider. The DA42 continued flying straight and level on a heading towards Coventry Airport while the glider pilot maintained his height and flight pattern; no avoiding action was taken as the model glider pilot considered it was safer to stay above the approaching aircraft. The DA42 was at a height of about 700ft; however, from their position on the ground it can be difficult to estimate height. Minimum separation was estimated to be 50m horizontally and 200ft vertically. The model glider is coloured day-glo orange; no lighting is fitted.

The model glider pilot has been advised that in this situation, it would have been more sensible to fly his model glider away from the approaching ac at 90° to the other ac's flight path.

Club Members have been reminded of the requirements of the ANO with respect to small ac.

UKAB Note (1): The ANO 2009, Article 166 - Small unmanned aircraft stipulates:

(1) A person must not cause or permit any article or animal (whether or not attached to a parachute) to be dropped from a small unmanned aircraft so as to endanger persons or property.

(2) The person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.

(3) The person in charge of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.

[sub-paragraph (4) applies to small unmanned ac of a mass of more than 7kg, however, the subject model glider's mass was less than 7kg.]

UKAB Note (2): The UK AIP at AD2 – EGBE notifies the Coventry Aerodrome Traffic Zone (ATZ) as a circle radius 2·5 nm centred on RW05/23, extending 2000ft above the A/D elevation of 267ft amsl.

ATSI reports that the Airprox was reported at 1519:40 in Class G airspace, 3nm E of Coventry Airport, outside the ATZ, by a DA42 pilot when the ac came into conflict with a model glider while the DA42 was positioning towards left base at about 1300ftALT.

The DA42 was operating VFR on a training flight from Coventry to Sywell and was in receipt of an Aerodrome Control Service from Coventry TOWER on 118.175MHz.

The model glider was being operated from Wolston model aircraft flying field. Page AD 2-EGBE-1-7 from the UK AIP entry for Coventry Airport states:

'Pilots are warned of radio controlled aircraft activity from a private site approximately 3nm east of Coventry airport, 0·5 miles southeast of Wolston village.'

ATSI had access to area radar recordings together with written reports from the pilot of the DA42, the operator of the model glider, the Coventry TOWER controller and RT from Coventry TOWER.

The Coventry METARs:

1520Z 26006KT 230V300 9999 CAVOK 23/11 Q1025=

1550Z 27007KT CAVOK 23/11 Q1025=

At 1518:20 the DA42 pilot contacted Coventry TOWER and was instructed to join L base for R/W23 and given a squawk of A7010.

At 1519:40 the DA42 pilot reported to TOWER that they had just had an Airprox with a model glider. TOWER then passed TI on the model glider to a following ac.

The report from the pilot of the DA42 stated that while joining left base for RW23 he saw traffic in his 1 o'clock at a range of 0.5nm that turned out to be a model glider, which climbed through their level and then rolled and descended through the level of the DA42.

The report from the Coventry TOWER controller stated that the DA42 had reported an Airprox with the model glider on frequency.

Radar recordings did not show the presence of a primary return that could be attributed to the model glider.

The model aircraft site is notified in the Coventry section of the UK AIP so it would not be unexpected for model aircraft to be operating there.

The DA42 pilot was in Class G airspace and was therefore primarily responsible for his own collision avoidance.

Radar recordings did not show any information relating to the model glider and therefore the exact geometry of the encounter cannot be determined.

The Airprox occurred in the vicinity of Coventry Airport when a DA42 came into proximity with a model glider.

TOWER was unable to provide assistance to prevent the Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The CAA Flt Ops Advisor briefed Members that, although Article 166 of the ANO implies that model aircraft will give way to manned aircraft, clarification is required to the Right of Way rules. The MAA Advisor noted that any clarification should consider applicability to larger military Unmanned Air Vehicles of the type that are currently limited to segregated airspace. The Board noted that in this Airprox the model glider was operating legitimately above 400ft since it weighs less than 7kg and is sufficiently large that it would be visible to its pilot at 900ft agl. Although the AIP entry for Coventry airport warns pilots about the location of the model flying site, it does not provide any indication of the altitudes at which pilots might encounter models. A controller Member suggested that the model fliers might telephone Coventry ATC whenever they are planning to fly above 400ft agl. The DAP Advisor recommended clubs to request the publication of NOTAMs for large club meets and flying events.

The DA42 pilot reports that the glider passed beneath his aircraft while the model aircraft pilot and other observers believed the glider was above the DA42. Since the model is not visible on recorded radar the Board could not resolve these disparate reports. However, it seemed clear that assessing the models altitude by eye alone would be very difficult. Therefore the Board agreed with the advice offered to the model glider pilot by the Chairman of the club. It would have been more sensible for the model glider pilot to turn away from the approaching DA42. The Flt Ops Advisor concurred, noting that British Model Flying Association guidelines recommend model pilots to maintain clear air – horizontal separation - when another aircraft is seen.

Noting all of the factors above, Members agreed that this had been a conflict close to the boundary of the Coventry ATZ and in the vicinity of a promulgated model flying site in which the sightings by the DA42 pilot and the model pilot had been sufficient to prevent the risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

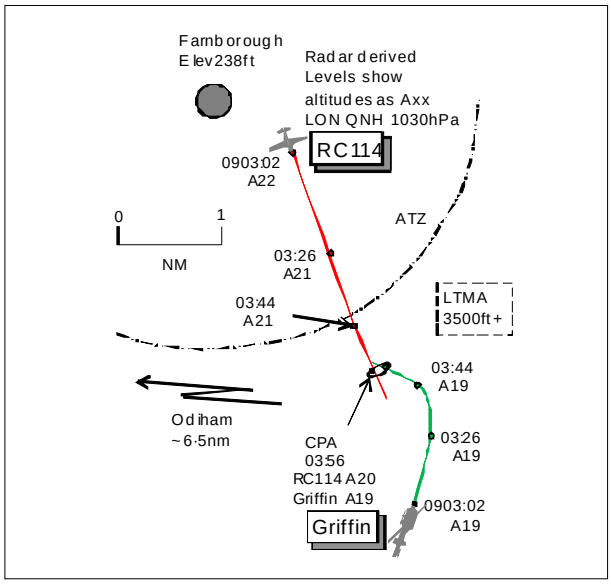
Cause: A conflict close to the boundary of Coventry ATZ and in the vicinity of a promulgated model flying site.

Degree of Risk: C.

AIRPROX REPORT NO 2012135

Date/Time: 31 Aug 2012 0904Z
Position: 5114N 00044W (8nm E Odiham - elev 405ft)

Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Griffin	RC114
Operator:	HQ Air Trg	Civ Pte
Alt/FL:	1500ft	2100ft
	QFE (1015hPa)	QNH (1028hPa)
Weather:	VMC CLBC	VMC CAVOK
Visibility:	40km	NR
Reported Separation:		
	300m H	Not seen
Recorded Separation:		
	100ft V/0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GRIFFIN PILOT reports flying a local sortie from Odiham and in receipt of a TS from Odiham Approach on 234·35MHz, squawking 3650 with Modes S and C. The visibility was 40km clear below cloud in VMC and the helicopter was coloured black/yellow with nav lights and upper and lower HISLs switched on. The ac was being flown on instruments from the RH seat without using an instrument training visor. The ac Cmdr was conducting lookout as safety pilot from the LH seat assisted by a crewman seated in the RH side of the cabin. The ac was vectored to intercept the LOC for the ILS RW27 at 1500ft QFE 1015hPa. When on a closing heading 300° at 110kt traffic was called to the NW at 2nm tracking S. All 3 crewmembers looked for this traffic but were unable to see it. The ac was manoeuvred in a rate 1 turn to the L to intercept the LOC, QDM 271°. During this turn, flying out of sun, the traffic was called again, this time NE by 0·5nm tracking S which directed the Cmdr and crewman to search for the traffic in their 4 o'clock; the HP then looked out into the forward arc. On returning eyes to the front the Cmdr and HP simultaneously saw the traffic just R of the 12 o'clock at a range of 300m at the same level. The HP rolled-out of the turn and flew behind the traffic by 300m; however, a collision would not have occurred had the ac not been manoeuvred. The conflicting traffic was a white-coloured low-wing monoplane with retractable u/c which did not appear to manoeuvre in response to seeing their ac, he thought. He assessed the risk as medium.

THE RC114 PILOT reports en-route from Wycombe Air Park to Le Touquet, VFR and in receipt of a BS from Farnborough on 125·25MHz, squawking an assigned code with Modes S and C. The Wx was CAVOK and the ac was coloured white with strobe lights switched on. They transited the area heading 132° and 135kt at 2100ft QNH 1028hPa. During the flight some TI was received from Farnborough and some traffic (fixed wing and rotary) was observed but no Airprox took place; the second pilot also agreed.

THE ODIHAM APPROACH CONTROLLER reports training on the bandboxed positions of Approach and Director. The Watchman primary radar was U/S and he was using SSR only with radar services reduced to all flights in accordance with CAP413. The Griffin was in the radar pattern on a reduced TS approximately 8nm from Odiham bearing 110°. The ac was heading N when he was about to turn it onto a heading of 310° to intercept the LOC. The flight was instructed to fly at 1500ft QFE and its Mode C confirmed that it was at the assigned height. The Farnborough ATZ was very busy with at least 5 squawking contacts and he spotted a track on the SE edge of the ATZ indicating 1400ft on Odiham QFE tracking S [the RC114]. He immediately called the traffic to the Griffin flight stating it was, "traffic NE, 2·5nm, tracking S, similar height". He turned the Griffin onto 310° to intercept the LOC and updated the conflicting traffic to the crew stating, "traffic now NE, 0·5nm, tracking S, similar height". The pilot replied stating he had seen the ac as it passed approximately 300yd away. The pilot asked if the reduced TI he was under meant ATC could not see the other ac. He replied that he could see the other ac on SSR only and the reduction was not a reason for not sighting the Farnborough ac. He opined that there were more contacts than normal in the vicinity of Farnborough and their ATC had been informed at least 5min prior to the incident that the

Griffin was inbound in the Director's pattern profile yet they did not call Approach to give information on the conflicting traffic tracking through the pattern at a similar height.

BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred between a Griffin being vectored for an ILS at Odiham in receipt of a TS from Odiham APP and an RC114 in receipt of a BS from Farnborough Radar.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The Griffin was being provided with a reduced ATS as the Watchman PSR was U/S. APP was operating in the bandboxed APP and DIR position, was endorsed as a DIR but training in the APP position. APP was being screened by another controller, who was himself undergoing a screen standards check. The APP trainee described their workload as high to medium, though they did not describe the task complexity.

The incident sequence commenced at 0901:26 as APP turned the Griffin "…*left heading 0-1-0 degrees"* onto the Radar Training Circuit (RTC) base leg, which was acknowledged by the Griffin pilot. At this point, the Griffin was 7·8nm SE of Odiham, 6·2nm S of Farnborough and 9·3nm SSE of the RC114, heading E at 1500ft Odiham QFE (1950ft Farnborough QNH). The RC114 was tracking SE'ly, indicating 2200ft Farnborough QNH (1750ft Odiham QFE). APP was providing ATS to the Griffin within the RTC, an un-related CH47 departing Odiham IFR to the NW and an unrelated RW of unknown type transiting IFR to the W.

Between 0901:50 and 0902:27, APP was engaged in a landline conversation with Middle Wallop to hand over the unrelated helicopter, of unknown type, transiting IFR to the W. At 0901:54, the Griffin can be observed on the radar replay to have steadied on heading 010°, 8·2nm SSE of the RC114. Between 0902:32 and 0902:48, APP liaised with Odiham Talkdown, briefing them on the intentions of the Griffin. During this exchange, at 0902:44, lateral separation between the RC114 and the Griffin reduced to 5nm.

Between 0902:49 and 0903:15, APP was engaged in an exchange of RT with an additional, unrelated helicopter that had departed Odiham in receipt of a BS. At 0903:20, APP instructed the Griffin to, "*turn left heading 3-0-0 degrees, report localiser established*" which was acknowledged by the Griffin's pilot. At that point, the RC114 was 2·6nm NW of the Griffin indicating 2100ft QNH (equating to 1650ft Odiham QFE), continuing to track SE'ly. Immediately after the Griffin pilot's acknowledgement, APP provided them with accurate TI on the RC114, stating, "*traffic north-west, 2 miles, tracking south, similar height*", which was acknowledged.

The Guidance Material to CAP774 Chapter 3 Para 5 states:-

'*Controllers shall aim to pass information on relevant traffic before the conflicting aircraft is within 5 NM, in order to give the pilot sufficient time to meet his collision avoidance responsibilities and to allow for an update in traffic information if considered necessary.*'

The Guidance Material to CAP774 Chapter 3 Para 6 states:-

'*When providing headings/levels for the purpose of positioning and/or sequencing or as navigational assistance, the controller should take into account traffic in the immediate vicinity, so that a risk of collision is not knowingly introduced by the instructions passed.*'

APP stated in their DASOR that they provided TI to the Griffin flight immediately after they identified the conflicting RC114 on their surveillance display; mentioning that the Farnborough ATZ was 'very busy with at least 5 squawking contacts'. Only the RC114 could be observed on the radar replay within the Farnborough ATZ. Three additional, unrelated, ac could be observed on the radar replay within 7·5nm of the Farnborough O/H, beneath the base of CAS and in receipt of an ATS from Farnborough. Odiham's SSR feed is provided from NATS' Pease Pottage and, occasionally, Heathrow radars. The base of PSR and SSR radar coverage provided by NATS' mosaic radar picture in the Farnborough O/H was assessed as part of this investigation and determined to be approximately 489ft and 505ft respectively.

At 0903:38, the Griffin can be observed on the radar replay turning on heading 300°. At 0903:42, APP updated the TI on the RC114 to the Griffin flight describing it as, "*previously reported traffic, north-east, half a mile, tracking south, same height*" which was acknowledged; however, the RC114 was 1nm NW of the Griffin, maintaining its altitude and track. At 0903:51, the Griffin's pilot reported "*visual*" with the RC114 which was 0·5nm NNW of the

Griffin indicating 2000ft (equating to 1550ft Odiham QFE); the Griffin was indicating 1900ft (equating to 1450ft Odiham QFE).

The CPA occurred at 0903:56 as the Griffin passed 0·1nm NE of the RC114, with 100ft vertical separation indicated. The Griffin's pilot has reported however, that the ac were co-altitude at the CPA.

BM SPA discussed the Airprox with the controller conducting the standards check; they related that, due to the continuous nature of the exchange of RT between 0903:20 and 0903:33, the late initial provision of TI by APP and the separation remaining at 0903:33, they had little opportunity to affect the incident. Based upon their information, it is possible that the intervention that they were able to make in the limited time available was what precipitated APP's updated TI at 0903:42.

Notwithstanding that 'a pilot is expected to discharge his collision avoidance responsibility without assistance from the controller' (CAP774, Chptr 3 Para 4 refers), given APP's workload, it is reasonable to suggest that an earlier opportunity existed to provide more timely TI to the Griffin on the RC114. Moreover, although APP's description of the RC114's position as NE, rather than NW, is a typical human error, it occurred at a critical point in the incident sequence and caused the Griffin's crew to focus their visual scan in the wrong area, believing that the RC114 would pass behind them. Finally and critically, the incident was caused by APP's instruction to the Griffin at 0903:20, which introduced the 'risk of collision' between the Griffin and the RC114. This suggests that APP was either unable to perceive that the heading of 300° would conflict with the RC114, that they had not detected the confliction at the time that the instruction was passed, or did not understand the intent within the Guidance Material to CAP774 Chapter 3 Para 6. The timing of the TI immediately after the turn instruction suggests that the controller had not detected the confliction prior to that point, which may be suggestive of a breakdown in their visual scan.

ATSI reports that the Airprox was reported by the pilot of a Griffin when it came into proximity with a RC114 8nm E of Odiham at height 1500ft.

The Griffin flight was on a training exercise, making an approach to Odiham, and the pilot reported in receipt of a reduced TS from Odiham.

The RC114 flight was on a VFR flight from Wycombe Air Park/Booker to Le Touquet, France and was in receipt of a BS from Farnborough LARS (W) on 125·250MHz.

The Farnborough LARS (W) controller was providing combined Approach and LARS (W) services with the aid of surveillance equipment and had no recollection of either of the ac when the Airprox was notified to the unit. The controller noted that no Airprox was filed on the RT or by telephone.

ATSI had access to the reports of both pilots, the Farnborough controller's report, the Odiham controller's report, recorded area surveillance and transcription of frequency 125·25MHz Farnborough LARS (W).

Farnborough METAR was: EGLF 310850Z 34008KT 310V010 CAVOK 12/04 Q1030=

At 0857:00 the RC114 flight called Farnborough LARS (W) and was requested to standby. At 0858:40 the RC114's message was passed, giving a routing via MID – LYD to Le Touquet. The RC114 reported at 2000ft on 1030hPa. A BS was agreed and the flight was requested to squawk 0435. The RC114 was on a direct track to MID.

At 0900:40 the RC114 pilot requested, "*do you wish me to avoid the Odiham overhead?"* The RC114 was 5nm N of Farnborough at 2100ft. At 0901:00 the Farnborough controller informed the RC114 flight, "*you're going to avoid the Odiham overhead there's the Farnborough overhead in your 12 o'clock you are clear to transit that."* The RC114 was observed to amend its track slightly to the L before routeing O/H via the threshold end of Farnborough RW24 at 2100ft. There were no further transmissions between the RC114 flight and Farnborough LARS (W) until 0911:20 when the RC114 flight passed MID and requested QSY to Farnborough LARS (E).

At 0903:02 as the RC114 cleared the Farnborough aerodrome boundary at 2200ft there was an ac displaying Mode A code 3650 in the RC114's 12 o'clock range 3·7nm crossing R to L. This was the Griffin, which was at 1900ft.

Figure 1 below shows the Pease Pottage radar picture at 0903:26. The RC114 (#0435) is on track MID and the Griffin (#3650) was now slightly through the RC114's 12 o'clock at 2·1nm, altitude 1900ft.

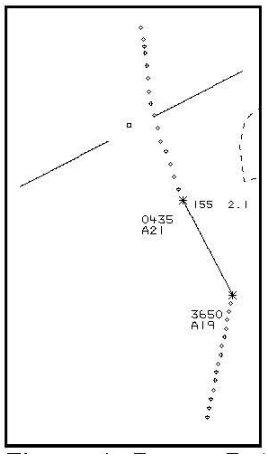


Figure 1: Pease Pottage 0903:26 UTC

At 0903:44 (Figure 2) the Griffin had begun to turn left towards the track of the RC114. Distance between the 2 ac was 0·9nm and 200ft.

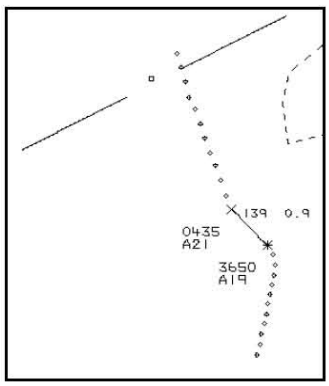


Figure 2: Pease Pottage 0903:44 UTC

At 0903:56 the ac were 3nm SSE of Farnborough at the CPA. The Griffin was now 0·1nm abeam the RC114 and 100ft below (Figure 3). The Griffin then passed behind the RC114 by 0·3nm (Figure 4). The Griffin pilot report indicates that the crew became visual with the RC114 as the Griffin turned to intercept the LOC. The RC114 pilot's report does not specifically note that the Griffin was sighted visually.

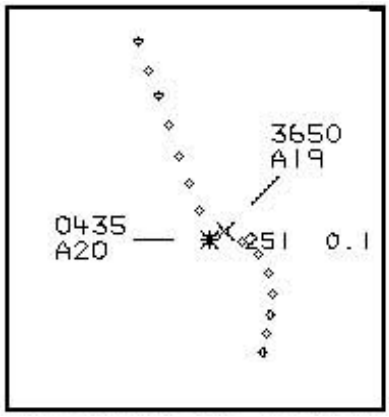


Figure 3: Pease P. 0903:57 UTC

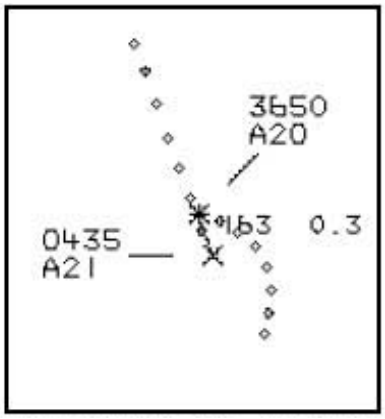


Figure 4: Pease P. 0904:02 UTC

Both ac were in Class G uncontrolled airspace where the responsibility for collision avoidance rest solely with the pilots of each ac.

The RC114 was in receipt of a BS under which pilots should not expect any form of TI from a controller. A controller with access to surveillance-derived information shall avoid the routine provision of TI on specific ac. Identification of an ac in receipt of a BS, e.g. by allocation of a specific SSR code, does not imply that any subsequent monitoring of the flight will take place.

The Airprox occurred in Class G uncontrolled airspace 3nm SSE of Farnborough at altitude 2000ft when the Griffin turned into proximity with the RC114. Minimum distance between the 2 ac was recorded as 0·1nm/100ft. The RC114 was under a BS from Farnborough LARS (W).

HQ AIR TRG comments that the Griffin crew discharged their responsibility to see and avoid the RC114. Their decision to operate under a TS, and to dispense with any IF screens was sensible. Only operating under a DS would have provided more protection in this instance by requiring the controller's first response to detecting the RC114 in conflict to be to provide a deconfliction turn. In the event, having apparently turned the Griffin into a conflict the subsequent inaccurate TI delayed acquisition of the conflict. Air Cmd recently required all units to consider mandating use of a DS for their ac, where practicable, when operating in the radar cct under ATC vectors.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

A CAT pilot Member noted that the RC114 pilot had reported receiving TI from Farnborough whilst under a BS. However, pilots are sometimes under the misapprehension that they are under a radar surveillance service when they are issued a squawk code and told they are identified and a BS is agreed; this is not the case. Pilots under a BS are responsible for collision avoidance through see and avoid and should not expect to receive specific TI but may receive a traffic warning if the controller sees a potential conflict and believes that a risk of collision exists. The HQ Air Trg Member informed the Board that the RAF Flight Safety suggestion of making a DS the default service to traffic in the RTC was rejected by units as impractical. The BMA SPA Advisor added that the FOBs for most units specify that traffic arriving and departing IFR will be given a TS. A Military controller Member added that in busy AIAAs with several adjacent aerodromes it would be impossible to vector an ac in a RTC under a DS and maintain deconfliction minima. In this case, the Griffin was receiving vectors for an ILS under a TS. However, the L turn issued by DIR onto 300° towards the ILS LOC turned the Griffin into conflict with the RC114 and this had caused the Airprox. It appears that DIR only noticed the RC114's presence at this time and this triggered the passing of TI to the Griffin crew. As the ac closed the updated TI passed by DIR was erroneous which delayed the Griffin crew from visually acquiring the RC114. It was only when the ac were about 0·5nm apart that the Griffin crew saw the conflicting ac and were able to stop their turn so that they passed 0·1nm behind the RC114. It was unclear from his report whether the RC114 pilot saw the Griffin. Taking all of these elements into account, the

Board concluded that the actions taken by the Griffin crew had been enough to remove the actual collision risk but the safety of the ac had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

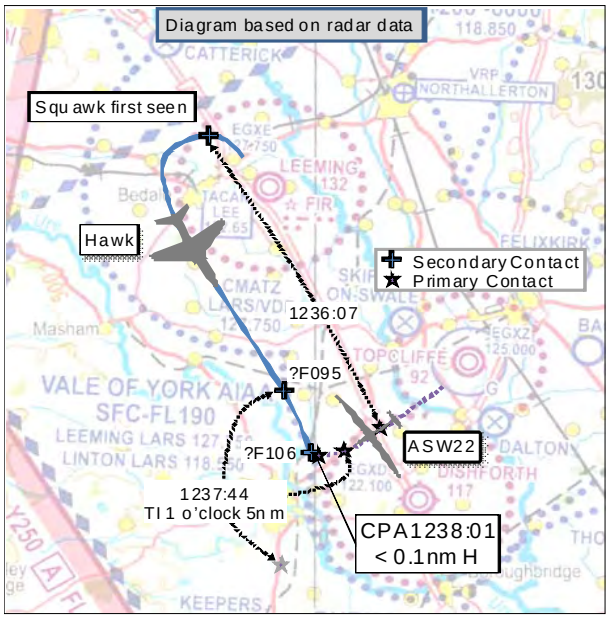
Cause: Odiham DIR vectored the Griffin into conflict with the RC114.

Degree of Risk: B.

AIRPROX REPORT No 2012136

AIRPROX REPORT NO 2012136

Date/Time:	4 Sep 2012 1238Z	
Position:	5409N 00130W (8nm S RAF Leeming)	
Airspace:	Vale of York AIAA (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Hawk TMk1	ASW22 Glider
Operator:	HQ Air (Ops)	Civ Pte
Alt/FL:	FL095	9000ft↑ (NK)
Weather:	VMC CAVOK	VMC CAVOK
Visibility:	50km	>20nm
Reported Separation:	300-500ft	500ft V/0ft H
Recorded Separation:	NK V/<0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK TMk1 PILOT reports that he departed from Leeming RW34R with a L turn on to 160°, accelerating to 300kt [climbing to FL190]. He was operating in VMC under VFR with a TS from Leeming APP [386.575MHz]. The black coloured ac had strobe lights selected on along with the SSR transponder Modes 3/A and C. The ac was not fitted with Mode S or an ACAS. Passing FL060 TI was given on a Tucano, L 11 o'clock at 8nm at FL075. On passing FL070 he became visual with the Tucano in his L 11 o'clock at 3nm, as ATC called an update on its position. The Tucano turned towards him; he 'wing waggled', turned away to the R and continued to visually monitor the Tucano. He stated that this was 'probably at the expense of forward lookout'. Very shortly thereafter, ATC gave him TI on a primary radar contact in his right 1 o'clock at range 5nm with no height information. Before being able to take avoiding action, he saw a glider directly ahead, co-alt, at approximately '½ a mile' range. He manoeuvred in the vertical and passed an estimated 300-500ft above the glider. The point of minimum separation occurred about 15sec after the previous TI was given. No manoeuvre was observed from the glider which continued on a W'ly heading. An Airprox was immediately reported to Leeming ATC and the sortie continued without incident.

He assessed the risk as 'High'.

THE ASW22 GLIDER PILOT reports flying in wave after climbing from altitude 3500ft to 11000ft [QNH 1019hPa] over RAF Topcliffe. He was operating autonomously in VMC under VFR in a white glider with no external lights. The ac was not fitted with an SSR transponder or an ACAS. He stated that he was not in contact with Topcliffe radar as he was above their MATZ and in class G airspace. He flew NW over RAF Leeming and had descended to altitude 9000ft approximately 5nm W of Leeming. He did not feel the need to contact RAF Leeming as he was so far above their MATZ, but he did set the radio to frequency 133.375MHz [Leeming Zone] to 'listen in on any activity'. He heard civilian traffic 'flying low down', but no military traffic and was unsure in any case whether he would hear military traffic on that frequency. He then saw the 'light of an ac climbing rapidly towards him, below and slightly under his R wing'. He lowered his R wing to present a larger profile of his glider to the oncoming ac. He also selected full negative flap to 'drop the glider down' some 30-50ft and to increase speed. The oncoming ac was a black Hawk which rolled over the top of him and continued its flight S. He thought that this was purely a military manoeuvre as he knew there were activities to the E of the North Yorkshire Moors that day. The pilot did not feel at risk, in fact he rather enjoyed the personal display of skill and ability shown by the [Hawk] pilot. He stated that in retrospect, given that an Airprox had been filed by the other pilot, it was a more sobering situation.

He observed that, with hindsight, it would have been better to contact 'Leeming Control' and advise them of his location, height, heading and intentions. He stated that because he has an RT license it would have been legal

for him to do so but that this is not a mandatory requirement for glider pilots flying cross country and that perhaps it should be. He also observed that any mandated requirement to communicate would need to be balanced against the need to concentrate on keeping the glider airborne, particularly in light or poor soaring conditions.

After further consideration he assessed the risk of collision as 'High'.

THE LEEMING APPROACH CONTROLLER reports that he was on duty during the hour 1200- 1300, with a low workload. At approximately 1240, during the handover [of the subject Hawk] to LJAO NW, [the Hawk pilot] declared an Airprox. The Hawk pilot was climbing for a POL- WALLASEY crossing, departing Leeming on a LH turn heading 160°, climbing FL190. There were also 2 tracks manoeuvring approximately 8nm S of Leeming.

He passed TI on traffic in the Hawk's L 11 o'clock position, range 7nm, FL070 descending, a possible Tucano. He called the traffic again as it was approaching '3-4 miles' range. Further TI was passed on traffic in the Hawk's 12 o'clock position at approximately 5nm range, slow moving with no height information, a possible glider. He then commenced his handover to LJAO NW. Towards the end of the handover the Hawk pilot called an Airprox, describing that he had visually acquired a glider approximately 10-15sec after the controller had called the track on his nose, and that he had climbed rapidly, passing FL100, avoiding the glider by about 200-300ft. The controller collected further information from the Hawk pilot before handing him over to LJAO NW.

He assessed the severity of occurrence as 'High'.

THE LEEMING SUPERVISOR reports that he was the ATCO I/C working Leeming TC(LARS) during the 1200-1300 lunch period. At approximately 1240 he heard the TC(RA) Controller inform LATCC(Mil) that the pilot of the ac he was handing over had just called an Airprox. Moments earlier he had heard the TC(RA) Controller pass TI to the Hawk pilot on traffic believed to be a Tucano which was working autonomously. He also heard the TC(RA) Controller call a possible Glider to the Hawk pilot before he commenced his radar handover to LATCC(Mil). All the relevant details were obtained from the Hawk pilot by the TC(RA) Controller before the handover was initiated again.

BM SAFETY MANAGEMENT reports that this Airprox occurred on 4 Sep 2012 between a Hawk departing Leeming in receipt of a TS from Leeming APP and an ASW22 glider operating VFR.

Through analysis by the Radar Analysis Cell, it was determined that the Airprox was not captured on NATS radars; consequently, this investigation has been based upon the reports of the aircrews and ATCOs involved.

[UKAB Note(1): The UKAB was kindly provided with a radar recording from Durham/Tees Valley A/D which clearly depicted the Hawk TMk1 and a number of primary contacts in and around the Topcliffe area. One of these contacts travelled SW and was coincident with the Hawk return at the time of the reported Airprox. It is therefore assumed that this contact was the subject glider. The diagram is based on radar data from this source.]

The Hawk pilot reported VMC with in excess of 50km visibility in nil Wx and no cloud. APP reported their workload and task complexity as low, with only the Hawk on frequency.

At 1236:58, APP passed TI to the Hawk pilot on an unrelated Tucano, updating this TI at 1237:28. At 1237:44, APP passed TI to the Hawk pilot on, "*further traffic, right 1 o'clock, 5 miles, similar direction, no height information, slow moving, possible glider*" which was acknowledged. The Hawk pilot reported that 'before being able to take avoiding action [Hawk C/S] spotted a glider on the nose, co-altitude, at approximately ½ a mile'. The point of minimum separation occurred about 15sec after the first TI was given to [Hawk C/S] and therefore it was assessed that it could not have been the primary radar contact called at 5nm but additional traffic not seen on Leeming radar.

The ASW22 glider is of modern fiber-reinforced composite construction and as such would have a minimal RCS, thus significantly affecting the ability of the Watchman PSR to detect it. In this instance, the ASW22's minimal RCS, combined with its lack of electronic conspicuity, rendered APP unable to provide TI to the Hawk pilot and breached the ATM related safety barrier leaving "see and avoid" as the sole remaining barrier.

HQ AIR (OPS) comments that there has been a significant amount of liaison between the military airfield operators in the Vale of York and the local gliding community, with the aim of reducing the number of Airprox in this location. Nevertheless, without the use of electronic conspicuity measures by the gliders it is almost impossible for Air

Traffic Controllers to provide TI on Gliders, due to their lack of radar conspicuity, unless RT position reporting is utilised; indeed, the ASW22 pilot admits that he should have used his RT license to contact LEE APP and appraise them of his position in the O/H of a busy training establishment. However, the lookout scan of the Hawk pilot was also compromised as he concentrated on the Tucano (that was no longer a threat), rather than the unseen Glider ahead of him.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board considered that the Hawk pilot's probable lack of lookout in the forward sector at the critical time and the glider pilot's reticence to use his radio were both important links in the causal chain that resulted in this Airprox. However, Members expressed concern with the underlying lack of coordination between the Hawk pilot's home Station and the local and very active gliding community. A civilian pilot Member noted that in his discussion with the Chairman of the largest local gliding club it became apparent that the club was engaged in active and rewarding liaison with another local RAF Station, but not the Hawk pilot's home Station. He also noted that this lack of coordination was particularly frustrating when gliders were using wave lift as the location and duration of the wave lift area could be accurately forecast and hence effective deconfliction achieved. A military pilot Member stated that military meteorological briefing information would now include wave lift location and the Board understands that the Hawk pilot's home Station is currently pursuing increased coordination with the local gliding community.

Civilian pilot Members also discussed the use of RT by glider pilots. It was noted that many gliders are fitted with radio and that 5 frequencies are allocated by the CAA for glider operational usage. These frequencies are specifically allocated such that an RT license is not required in order to use them. Members opined that this resulted in the highly undesirable situation where glider pilots had used a radio for a number of years and could be in a position to influence safety of flight, e.g. by notifying position and intentions on a local Zone frequency, but did not do so because the lack of an RT license prevented them from legally using a frequency other than those allocated. The Board noted that the effort and cost of obtaining an RT license, when there was no mandated requirement to obtain one, was an effective deterrent to glider pilots. In this particular case, the glider pilot did have an RT license and could have used the radio to notify his intentions but Members opined that he did not do so due to a lack of understanding of the likely patterns of military traffic activity in the area. Other civilian pilot Members also highlighted a perceived lack of understanding from ATS providers when responding to glider pilot RT calls. This typically manifested itself in ATC requests to the glider pilot to maintain at or not below a given level. Thus effective coordination required education of pilots and controllers as well as effective use of available technology. The CAA pilot Advisor stated that work was underway to address issues of glider pilot RT usage already commented on, and to include wider concerns such as MATZ and Class D airspace crossing.

Turning to the pilots' actions, the Board noted that the Hawk pilot was required to give way to the glider iaw RoA Rule 9 (Converging), para (a), 'flying machines shall give way to airships, gliders and balloons'. This he did, albeit his late sighting resulted in avoiding action in order to give way. The glider pilot was commended on his actions with many Board Members expressing the opinion that the control inputs he used to change the glider's aspect and flight path were instrumental in the Hawk pilot's visual detection and hence the effective avoiding action.

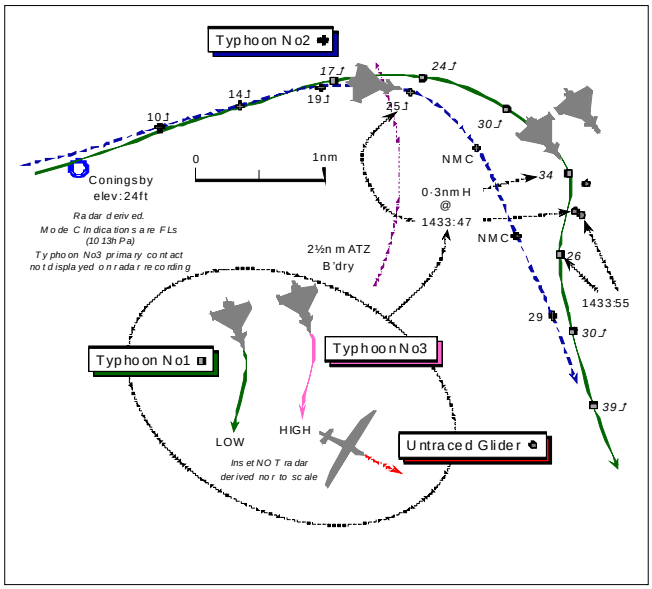
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the Hawk pilot.

Degree of Risk: C.

AIRPROX REPORT NO 2012137

Date/Time:	5 Sep 2012 1433Z	
Position:	5305N 00003W (4nm E of Coningsby - elev 24ft)	
Airspace:	Lincolnshire AIAA (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Typhoon FGR4x2	Untraced Glider
Operator:	HQ Air (Ops)	NK
Alt/FL:	[3500ft]↑ RPS	NK
Weather:	VMC CLOC	NK
Visibility:	20km	NK
Reported Separation:	<2500ft H	NK
Recorded Separation:	<0·3nmH (1805ft H)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe TYPHOON FGR4 PILOT (TYPHOON NO1) reports leading a formation of three Typhoons on an escort sortie profile climbing out from Coningsby, VFR, prior to the formation splitting for GH. As they climbed out his wingman - Typhoon No2 - was 1nm in trail, with the escorted ac - Typhoon No3 - in company off the No1's port wing. They were in receipt of a BS from Coningsby DEPARTURES (DEPS) on Stud #3 and the assigned squawk was selected by Nos 1 and 2 with Mode C and S on; TCAS is not fitted. [A squawk for the No3 had been requested and assigned by DEPS but was not displayed at the time of the Airprox.]

About 3nm E of Coningsby, in a climbing R turn through 160° about ½nm horizontally clear of cloud with an in-flight visibility of 20km, at an unspecified altitude the pilot of Typhoon No3 observed a glider circling underneath a nearby cloud in the flightpath of the formation at a range of about 3000ft and called the formation to 'break right'. Typhoon No3 broke high and R, whilst he as Typhoon No1 broke low and R; the No2 Typhoon in 1nm trail was unaffected. The No3 Typhoon pilot had assessed that the leading element of the formation was in direct confliction with the white glider, and that immediate evasive action was required. The Risk was assessed as 'high' and an Airprox was reported to DEPS on RT.

LATCC (MIL) RADAR ANALYSIS CELL (RAC) has been unable to trace the reported glider, the identity of which remains unknown.

THE CONINGSBY DEPARTURES CONTROLLER reports he had been on watch in the DEPS position for less than 2min when he was notified that, after a formation approach to RW07RH, the Typhoon Combine (on an Escort Recovery Sortie profile) – comprising Typhoons Nos 1 & 2 escorting Typhoon No3, would depart VFR to the S climbing out to FL150.

When the Typhoon formation climbed out, he asked what form of ATS was required; the lead pilot replied initially that a TS was required followed by their intention to climb to FL150, but there then followed a revised request for a BS, which was applied, together with a climb to FL150. The lead Typhoon pilot then described how the formation would later split for GH to the S of Coningsby and requested a separate squawk for the No3 Typhoon, which was allocated. This was followed by a transmission 'break right'. The lead Typhoon pilot then passed the position of an Airprox with a glider, about 3nm E of Coningsby at about 3500ft RPS. On looking into that area, a very small primary contact could be seen tracking N with no SSR; he estimated the minimum horizontal separation as 1nm. The formation then executed a split and continued with their sortie.

THE CONINGSBY ATC SUPERVISOR reports that when the Typhoon formation returned for QRA escort training, he briefed the APP, DIR and DEPS controllers on what the leader required and then proceeded upstairs to the

VCR to ensure the ADC was fully briefed on the formation's intentions. After the formation departed the visual cct, he was informed by APP on the landline that an Airprox had occurred and the position of the glider contact. He pointed out an apparently stationary contact to the ADC and to warn any further Coningsby departures. This was the third glider in the airspace surrounding Coningsby on this day, as confirmed by the pilots of other ac; none of the glider pilots had called any of the ATC units in the area; however, all were outside the Coningsby ATZ and in this case above the Coningsby MATZ.

UKAB Note (1): Coningsby METARs:

1350UTC 34008KT 9999 FEW040 19/07 Q1027 BLU NOSIG
1450UTC 02010KT CAVOK 19/07 Q1027 BLU NOSIG

BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred 4nm E of Coningsby, between a formation of 3 Typhoon ac in receipt of a BS from Coningsby DEPS and an untraced glider operating VFR.

The Typhoon's avoiding action was detected on recorded NATS area radars after 1433:47. This investigation has relied upon the DASORs of the aircrews and controllers involved and the DEP RT and landline transcript.

Immediately after the lead Typhoon pilot queried DEP at 1434:06, as to whether they were, "*aware of the glider we just passed*", the controller replied, *"negative"*, whereupon the Lead Typhoon pilot reported at 1434:11, *"OK you've got a glider our position north 1 mile at 3 thousand 5 hundred feet, gliding just at the base of the cloud".* The controller reports 'looking in that area and seeing a very small primary contact…tracking north', [advising the lead pilot at 1434:24, *"..there's a small primary contact showing".*] Subsequent investigation with the unit determined that this contact was small, faint and intermittent and displayed little track movement. Moreover, the Unit has stated that the Coningsby ASR often displays small amounts of primary clutter on the surveillance display, particularly close to the AD. In this instance, the Unit determined that there was nothing to differentiate the glider's faint and intermittent contact from routine clutter. Consequently, given that the glider lacked electronic conspicuity and had not contacted the unit, APP was not able to detect the confliction and pass a warning to the Typhoon formation.

SATCO Coningsby has stated that an agreement has been reached between military ADs in Lincolnshire to advise each other of known glider activity. Moreover, when able, one of the Coningsby ADC's responsibilities is to visually scan the local area, cued by information from the Hi-Brite VRD, to visually acquire gliders. In this instance, the combination of the glider's colour scheme and the Wx conditions breeched this additional safety barrier.

UKAB Note (2): This Airprox is not illustrated clearly by the LATCC (Mil) radar recording. Only the No1 and No2 Typhoons are evident on the recording as the formation departs the Coningsby visual cct eastbound. The non-squawking No3 is not evident as a primary track at all during the period of the Airprox. A single primary return is evident at 1433:47, 0·3nm ahead of the No1 Typhoon just moments before the lead pilot's avoiding action R turn and descent is apparent as the No1's Mode C reduces from 3400ft to 2600ft (1013hPa) over a period of 8sec (one sweep). The No1 passes W of the primary contact which then fades. The Airprox is then reported on the RT by the lead Typhoon pilot at 1434:06.

HQ AIR (OPS) comments that this is the second Airprox in recent months between a military ac and a glider in the vicinity of a military A/D. Gliders are notoriously difficult to see and if they wish to soar in airspace adjacent to any A/D then basic airmanship should dictate that they do all that they can to inform an ATS provider of their intention so that a warning to other airspace users can be passed; they should not rely on being observed by the on-board systems of fast-jet ac, which are not optimised to detect gliders. Equally this serves as a reminder to military aircrew that lookout must remain a top priority; it currently remains the most effective defence against Airprox with soaring ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the Typhoon pilot, transcripts of the relevant RT frequency, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The BM Safety Policy and Assurance Advisor briefed the Board that there was an engineering investigation being conducted into the performance of the Coningsby Watchman primary radar. However the radar was judged to be useable and the difficulty of detecting gliders is well known. The Board agreed that it would be harsh to criticise Coningsby ATC for not detecting the glider and warning the Typhoon flight. The gliding Member advised the Board that this was a busy area for gliders but staying further away from the MATZ would be good airmanship. Another experienced gliding Member noted that the absence of a report from the glider pilot made it difficult to apply appropriate balance to the investigation. It was impossible to tell whether the glider pilot had seen the Typhoons; if he had been concerned he would probably have filed a report but the absence of a report could mean either that he didn't see the Typhoons or that he was unconcerned. It was likely that if the glider pilot had heard the Typhoons he would have been alarmed and submitted a report. The incident did illustrate an important lesson: gliders routinely orbit underneath convective cloud looking for lift. Therefore powered aircraft should avoid these areas whenever possible.

The Typhoon lead pilot reported that the No3 pilot spotted the glider at an estimated range of half a mile. Aware of the difficulty of seeing white gliders, the Board considered that this was a reasonable distance for a first spot. Therefore the Board assessed the incident as a conflict resolved by the Typhoon formation in which any risk of a collision had been rapidly removed by the Typhoon pilots' manoeuvres.

The CAA Flt Ops advisor briefed the Board on work in hand in the CAA on glider visual and electronic conspicuity and RT licences and phraseology appropriate to glider operations. Success in these areas should reduce the risks of similar incidents close to military main operating bases.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict resolved by the Typhoon formation.

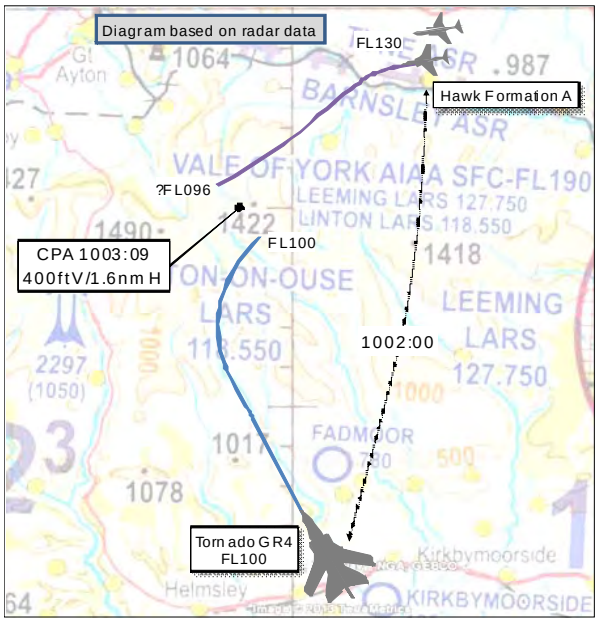
Degree of Risk: C.

AIRPROX REPORT No 2012138

AIRPROX REPORT NO 2012138

Date/Time: 29 Aug 2012 1003Z
Position: 5425N 00102W (19nm ENE Leeming)
Airspace: Vale of York AIAA (Class: G)
Reporter: ScATCC(Mil) Controller

	1st Ac	*2nd Ac*
Type:	Tornado GR4	BAE Hawk T1
Operator:	HQ Air (Ops)	HQ Air (Ops)
Alt/FL:	FL100	↓FL100↓
Weather:	IMC In Cloud	IMC In Cloud
Visibility:	0km	0km
Reported Separation:	NK	NK
Recorded Separation:	0ft V/3.4nm H 400ft V/1.6nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCATCC(MIL) CONTROLLER reports operating as Controller 2, working low level and high level transits through the Vale of York (VOY) area. He had been on console for approximately 1hr when he was controlling a pair of Leeming Hawks, operating on a discreet frequency in the confines of the inactive D323A. He was then handed 2 ac in fairly quick succession from LJAO(NE), the first of which was routeing N requesting FL 310 and the second, [Tornado GR4 C/S], routeing N under a DS at FL100 to go low level at Lossiemouth. Shortly after the handover of [Tornado GR4 C/S], he asked the pilot if he wished to climb or remain at FL100 and be handed over to Leeming as a LARS track. The pilot requested to remain at FL100 with ScATCC (Mil) and the Controller replied that he would be subject to the traffic situation in the VOY. He decided to 'keep' the ac through the VOY to prevent multiple frequency changes and then hand it over to Newcastle. Just after pre-noting the Newcastle Assistant, he noticed 2 ac inbound to Leeming from the E, the closest of which was approximately 20nm NE of [Tornado GR4 C/S] on a converging heading at FL130. Although at this point he had 3000ft separation, he knew these ac were shortly to descend inbound Leeming. He perceived there to be enough time to effect co-ordination without the need to avoid first, so he quickly called Leeming. The Leeming SUP answered the phone and he requested coordination, pointing out his traffic first because this was the easiest method. Her reply was, 'we're not working that traffic' to which he quickly responded, 'yes that's my traffic, maintaining FL 100' before pointing out the closest of the Leeming ac. By this point the Leeming ac had begun to descend and turn towards his aircraft. The SUP said that her aircraft had been, 'cleared all the way down to FL50' to which he asked, 'are you able to stop descent FL 110?' She replied, 'no it's been cleared down'. Without responding, he issued avoiding action when the ac were approximately 8nm apart. He gave the GR4 an avoiding action R turn to heading 090° to which the Tornado pilot replied, 'coming right north'. He corrected him and repeated the avoiding action. He monitored the situation and, because of the relative speeds and very slow rate of turn of [Tornado GR4 C/S], he decided to keep turning the ac onto heading 100°, being conscious of turning him into the Fylingdales HIRTA. He then hung up the phone in order to concentrate on preventing a collision. In his opinion, the safety of both ac were unnecessarily compromised because he was unable to effect co-ordination with Leeming.

He perceived the severity of the incident as 'High'.

THE SCATCC(MIL) SUPERVISOR reports that she was positioned on the N consoles as that AOR was particularly busy at the time with control of AARA5, transits to the W Coast of Scotland and a calibrator ac in OTA E. She believed 3 consoles were open. Two standards checks were being carried out for Controllers returning from ATLAS (Olympic Games) duties and she had just had to break up training in the AC (Co-Ord) S position in order

to open another console. She was also training a new Supervisor at the time. She did not witness the Airprox; however she heard the Controller on console 2 say 'avoiding action' and immediately went to see what was happening. She saw [Tornado GR4 C/S] at FL100 take a slow avoiding action R turn to a heading of 090°, which was then updated to 100°. It was apparent that the GR4 had got within 5nm of the [Hawk Formation A].

THE LEEMING CONTROLLER reports that he was the Screen Controller, instructing a UT Controller in the Director (DIR) position at RAF Leeming. At the time 2 formations of Stn-based Hawk ac were 'pre-noted from Scottish Mil', both requiring Instrument Recovery. They were handed over 30nm NE of RAF Leeming at FL130 under a DS. During the handover, the second formation, callsign [Formation B] free-called, approximately 30nm NNE of RAF Leeming at FL160, requesting a DS and a Radar to Visual recovery. The UT Controller was instructed to inform ScATCC(Mil) to 'standby' and to positively control [Formation B], which was subsequently identified and given instructions to descend to FL100 under a DS. The handover of [Formation A] was then completed and, once on frequency, they were identified, placed under a DS and shortly afterwards given instructions to descend to FL50 and turn L heading 230°, positioning for recovery. At this point the 2 formations were approx 20nm ENE of RAF Leeming 8nm apart on slowly converging tracks. The UT Controller then called Durham Tees Valley Airport (DTVA) Radar to co-ordinate a transit through DTVA Class D airspace in order to provide a more expeditious recovery to RW16; however, following a prompt, the UT Controller realised this would not be possible due to a conflicting DTVA RW23 departure. TI was passed to the DTVA Assistant on both formations and DTVA was informed that both formations would remain clear of DTVA Class D airspace. The liaison process with DTVA took longer than normally expected, following which the UT Controller was questioned as to his intentions and recovery plan for the 2 formations; however, he was unsure as to a recovery plan. At this point the 2 formations were steadily converging and, with the option of a descending profile through DTVA Class D airspace not available, he presented a number of possible courses of action to the UT Controller. The UT Controller chose to employ a stepped descent for [Formation B] in order to provide separation against [Formation A] until both formations were VMC below cloud and instructed [Formation B] to 'Stop descent FL120 for co-ordination'.

The UT Controller was further prompted to articulate the reason for the pause in descent and the plan for recovery to [Formation B]. This information was passed to [Formation B] along with an order of recovery. Shortly afterwards, the ATC Supervisor informed the Leeming Controller and the UT Controller of fast moving traffic under ScATCC(Mil) control at FL100, approximately 5nm S, heading N and conflicting with [Formation A]. The UT Controller was instructed to give immediate avoiding action and after a slight pause he instructed [Formation A] to turn R to heading 270°. At this point the conflicting ScATCC(Mil) traffic was 4nm to the S of [Formation A] and conducting avoiding action, turning R onto an E'ly track. The separation was estimated to have been 2nm and 500ft.

THE TORNADO GR4 PILOT reports transiting from RAF Marham to RAF Lossiemouth at FL100 under IFR in IMC and with a DS from London Mil [actually ScATCC(Mil)]. The grey camouflaged ac had navigation lights and HISLs selected on. The SSR transponder was selected on with Modes A and C; the ac is not fitted with an ACAS. Heading 350° at 0.75M in the Vale of York AIAA, avoiding action was given by ATC against a formation of Hawk ac and he turned R. A further R turn to E was then given by ATC. Due to the IMC flight conditions the Hawk ac were not seen. After the Hawk formation was clear, he was given a L turn to resume track.

He assessed the risk of collision as 'Low'.

THE BAE HAWK T1 PILOT reports leading [Formation A], a pair of Hawks on recovery to RAF Leeming under IFR in IMC with a DS from RAF Leeming. The black ac had navigation and landing lights selected on and strobe lights set to red. The formation leader had the SSR transponder selected on with Modes A and C; the ac were not fitted with ACAS. On handover to Leeming Director, heading 270° at 300kt, he became aware of another pair of ac also recovering from the NE. He was not aware of any further traffic in the region. In the descent from FL130 to FL50, he was given, 'Avoiding action, turn right 270°' with traffic L 11 o'clock 4nm tracking E at FL100. (He later understood this traffic to be the subject Tornado GR4). This was actioned and, having already passed FL100, he was unconcerned about the proximity of the GR4. The remainder of the recovery to RAF Leeming was flown without incident.

He assessed the risk of collision as 'Low'.

AIRPROX REPORT No 2012138

BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred on 29 Aug 12 between a formation of Hawks [Formation A] recovering in IMC to RW16 at RAF Leeming, in receipt of a DS from Leeming DIR, and a Tornado GR4 in IMC, in receipt of a DS from ScATCC(Mil) Controller 2.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Information

Leeming DIR was manned by an ab-initio trainee and a screen controller. The screen described their workload and task complexity as moderate; however, whilst SATCO has stated that the scenario posed by the recovery should have been within the trainee's capacity, analysis of the incident and the trainee's reported responses suggests that they may have held a markedly different perception of the task complexity.

In addition to the incident Hawk formation, [Formation A], DIR was providing a DS to an additional formation of Hawks, [Formation B], being vectored for an IFR approach. Controller training was also being undertaken on the Leeming Zone position, with a controller examination underway on the Leeming APP position. Controller 2 described their workload as high-to-medium with moderate task complexity and, in addition to the GR4, was providing a RCS to an E3 transiting through the Vale of York towards UK Orbit Area 5.

The incident sequence commenced at 1000:44 as the Hawk formation [A] called DIR on handover (from CRC Boulmer, not ScATCC(Mil) as related by DIR) at FL130, tracking SW'ly. At this point, the formation was 31.7nm ENE of Leeming and 24.6nm NNE of the GR4; the GR4 was at FL100 which it maintained throughout the incident sequence, tracking NW'ly. Given that the GR4 was at FL100, Controller 2 had asked the GR4 pilot whether they were, '*looking for further climb*' and had planned to hand them to Leeming for the N'ly transit; however, the GR4 pilot stated that they were, "*happy Flight Level 100*" and asked to remain with Controller 2. During the exchange of R/T between the Hawk formation [A] and DIR and between 1000:42 and 1001:16, DIR was also involved in a landline exchange with the Durham Tees Valley ATSA to provide TI to them on the recovering Hawk formations.

Between 1000:41 and 1001:18, Controller 2 had been involved in a landline exchange with the Newcastle ATSA to prenote the GR4 to them; at the end of this exchange, the GR4 was 19.6nm SSW of the Hawk formation [A]. Controller 2 reported that it was following this exchange that they identified the conflict between the GR4 and the Hawk formation.

At 1001:24, DIR instructed the Hawk formation to, "*descend Flight Level 5-0*" which was acknowledged; at this point the GR4 was 19nm SSW of the Hawk formation (Figure 1 refers).

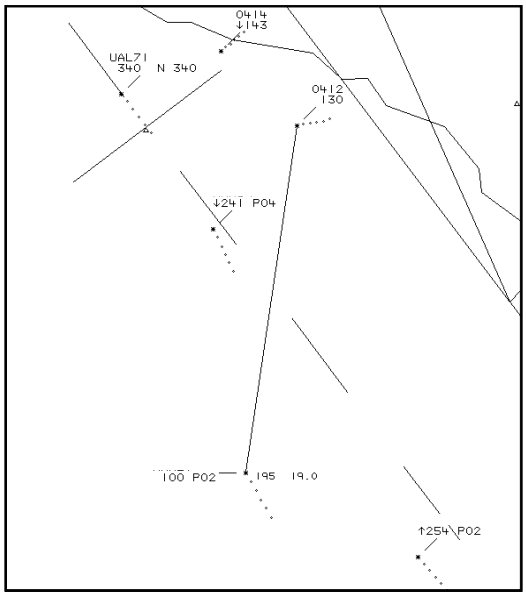


Figure 1: Radar Replay Screenshot at 1001:24

At 1001:51, DIR instructed the Hawk formation to, "*turn left heading 2-3-0 degrees*" which was acknowledged; at this point the GR4 was 15nm SSW of the Hawk formation (Figure 2 refers).

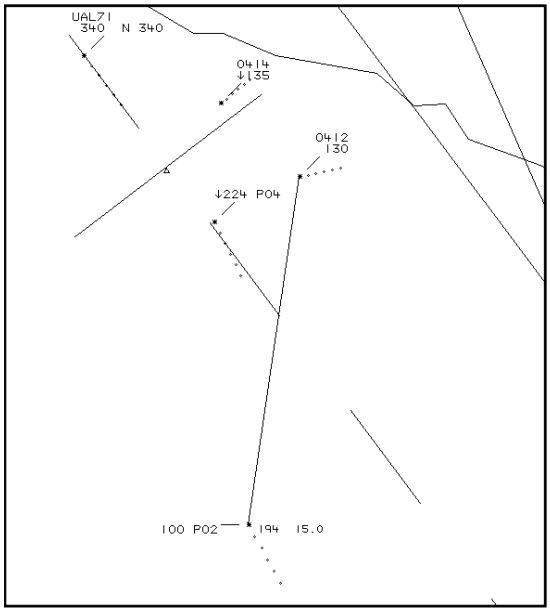


Figure 2: Radar Replay Screenshot at 1001:51

Between 1002:09 and 1002:51, DIR was involved in an RT exchange with the unrelated formation of Hawks to the N (SSR 3A 0414 in Figures 1, 2 and 3) [Formation B]. Based upon the DIR screen controller's report, this exchange was prompted by them, in order to encourage the trainee to formulate a recovery plan for the 2 formations.

At 1001:55, Controller 2 initiated coordination with Leeming SUP to agree a course of action between the GR4 and the 2 formations of Hawks being 'worked' by DIR; at this point the GR4 was 14.4nm SSW of the Hawk formation [A], which had just commenced descent and was indicating FL129. Whilst neither causal nor contributory to the incident, the delay of 29 secs between the passing of the descent instruction (1001:24) and the initiation of the Hawk formation's descent, was an aggravating factor in the magnitude of the subsequent loss of separation. Controller 2 first identified their traffic to the Leeming SUP, who replied, "*Err, that's not our traffic*." Controller 2 continued, "*yeah, it's my traffic*" and Leeming SUP asked, "*what do you want coordination on*?" As STCA white activated on the Controller 2's surveillance display at 1002:10, they replied, "*he* [the GR4] *is maintaining Flight Level 100. Okay, your traffic, arr, 0-4-1-2, north-east of Leeming by 23 miles*?" Leeming SUP replied, "*roger, that traffic not above Flight Level 1-2-0*." Although a discrepancy can be expected between the NATS Radar replay and the information presented to the Leeming SUP, at this point, the SSR Mode C of the Hawk formation leader could be observed on the NATS radar replay to be indicating descent through FL119. The statement made by the Leeming SUP suggests that they were monitoring the Hawk formation's descent. At 1002:18, the Hawk formation can be observed on radar to have commenced the L turn instructed by DIR at 1001:51 (Figure 3 refers).

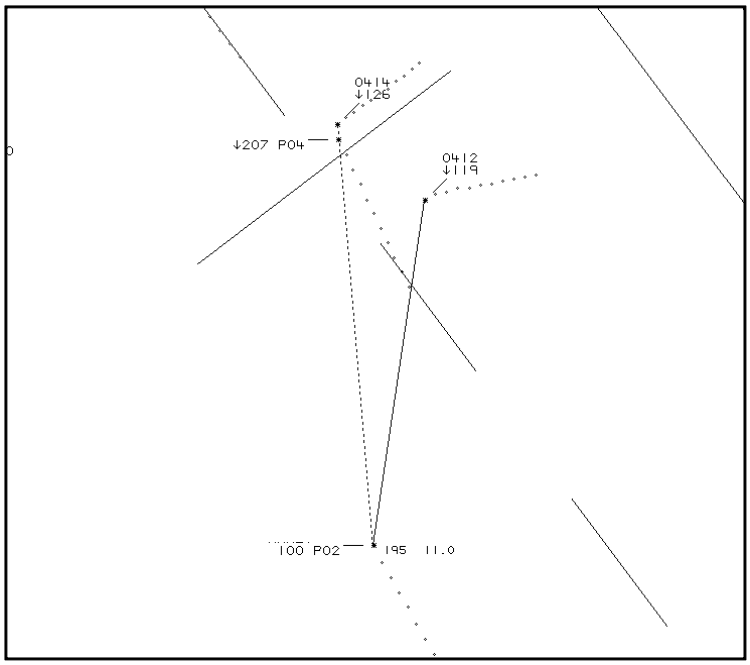


Figure 3: Radar Replay Screenshot at 1002:18

At 1002:22, Controller 2 asked whether Leeming was, "*able to stop his* [the Hawk formation's] *descent not below Flight Level 1-1-0*?" and the Leeming SUP replied, "*no, it's already in the descent to Flight Level 5-0 now*." At this point the SSR Mode C of the Hawk formation leader could be observed on the NATS radar replay to be indicating descent through FL115. This mirrors the report by the Leeming SUP who stated that their decision that 'there was not enough time available to instruct DIR to advise [Hawk Formation A] to stop descent at FL110' was based on observing the SSR Mode C of the formation indicating descent through FL115. This suggests that there was a good correlation between the SSR Mode C presented to the 2 units, potentially as a result of the Hawk formation's benign ROD (radar replay shows approximately 3000fpm, which is in-line with Hawk SOPs for a formation descent in IMC).

MAA RA 3010(1), supported by MMATM Chapter 10 Para 10, states that the initiating controller requiring coordination should 'Refer to his aircraft and the aircraft upon which coordination is requested in the order most appropriate to the situation'.

Controller 2 immediately (1002:28) issued the GR4 with, "*avoiding action, turn right immediately heading 0-9-0 degrees, traffic was right, 1 o'clock, 5 miles, crossing right-left, Flight Level 1-1-0 descending*." At this point the GR4 was 8.8nm SSW of the Hawk formation, which was indicating descent through FL112. The GR4 pilot acknowledged the instruction saying, "*right North* [GR4 c/s]" as STCA red activated on Controller 2's surveillance display. Whilst terminating the landline call to Leeming, Controller 2 immediately corrected the GR4 pilot, re-iterating the avoiding action, which was correctly read-back by the GR4 pilot at 1002:44; the GR4 was now 5.9nm SSW of the Hawk formation, which was indicating descent through FL104.

At 1002:50 the turn by the GR4 becomes evident on radar and, at 1002:53, DIR issued avoiding action to the Hawk formation instructing them to, "*turn right heading 2-7-0 degrees, traffic was left 11 o'clock, 4 miles, tracking east, Flight Level 100*" which was acknowledged. The GR4 was 4.3nm SSW of the Hawk formation, turning through N; the SSR Mode C of the Hawk formation leader could be observed on the NATS radar replay to be indicating descent through FL101. At 1002:55, Controller 2 amended the avoiding action to the GR4 pilot, instructing them to, "*turn right immediately heading 1-0-0 degrees now, traffic was north, 3 miles, tracking south-east, Flight Level 100, descending*" which was correctly read-back. Whilst Controller 2 incorrectly described the Hawk formation's direction of travel as "*south-east*", this was neither a causal nor a contributory factor in this Airprox.

The CPA occurred at 1003:10 as the GR4 was turning through NE and passed 1.6nm SSE of the Hawk formation, which was indicating descent through FL96. At 1003:22, the avoiding action turn by the Hawk formation becomes evident on radar.

Analysis

Turning first to the Area ATM aspects of this incident, Controller 2 realised that the Hawk formation [A] were likely to commence descent and sought coordination from Leeming. However, given that 14.4nm existed when Controller 2 attempted to initiate coordination with Leeming, this represented the latest point by which a coordination agreement could reasonably be expected to have been successfully reached. ScATCC(Mil)'s investigation has stated that a more defensive controlling technique could have been employed, involving the application of an 'opening' heading prior to initiating the coordination. That said, at the point that the coordination was initiated, it was still possible for an agreement to have been reached. However, the response by Leeming's Supervisor was initially unhelpful and, given that the Hawk formation were descending, with the GR4 maintaining FL100, BM SPA agrees with the view expressed by ScATCC(Mil) that Controller 2's identification of their traffic first was the most appropriate to the situation. Moreover, given that the Supervisor's comment at 1002:19 suggests that they were monitoring the Hawk formation, a more pro-active response may have been to have first instructed DIR to stop the Hawk formation's descent and then to have continued the landline conversation with Controller 2. By reporting the Hawk formation's 'level not above', forcing Controller 2 to request a stopped descent, they ensured that the formation had descended to a point at which coordination could not be agreed. Whilst Controller 2 reacted immediately by issuing the GR4 pilot with avoiding action to break the confliction, as identified by the ScATCC(Mil) investigation, a turn to the L, perhaps allied with a climb, would have provided greater deconfliction.

A further aggravating factor to the magnitude of the loss of separation was the delay between the Leeming Supervisor hearing Controller 2 issue avoiding action to the GR4 and DIR issuing avoiding action at 1002:53. The Leeming Supervisor reported instructing DIR to issue avoiding action to the Hawk formation; however, the DIR screen controller related that the Supervisor informed both controllers in the position. The wording of his report suggests that they then prompted the trainee to issue avoiding action, hence the delay. This also indicates that the DIR team's scan had not previously detected the conflict between the GR4 and the Hawk formation. As the Leeming investigation determined, this reduced scan was as a result of the distraction caused to the DIR team by having to prompt the trainee through the decision making process of formulating a plan to recover the 2 Hawk formations. Indeed the language used by the DIR screen controller throughout their DASOR suggests that they were actively coaching the trainee throughout the incident sequence. Whilst conscious of the balance that must be sought in allowing trainees to undertake experiential learning, BM SPA contends that the trainee was not an active participant from an early stage of the incident sequence and thus would have expected the screen controller to intervene at an earlier stage. Critically, albeit that they had not detected the GR4 on their surveillance display and thus the act was not 'wilful', DIR introduced the confliction by descending and turning the Hawk formation into conflict with the GR4.

Conclusion

This Airprox resulted from control instructions issued by Leeming DIR which introduced a conflict between a GR4 and a formation of Hawks [Formation A]. Given that the avoiding action issued by DIR did not take effect until after the CPA, the conflict was resolved by ScATCC(Mil) Controller 2. Contributory factors were the capacity, awareness and ability to successfully divide attention of the DIR controlling team and the supervision provided by the Leeming Supervisor. Aggravating factors in the subsequent magnitude of the loss of separation was Controller 2's decision to turn the GR4 to the R and the delay in the Hawk formation's commencement of the descent.

Outcomes

Following this incident, and RAF Leeming's subsequent thorough unit investigation, RAF ATM STANEVAL visited the unit to combine the training and examination of an additional unit ATM examiner, with a 'health check' of the unit's Safety Management, Training and Standards Systems.

Both units conducted in-depth incident investigations and made a number of recommendations which have been implemented. BM SPA will disseminate the lessons identified by this investigation throughout the RAF ATM and ASACS communities.

HQ AIR (OPS) comments that the aircrew involved in this incident could do little to affect the outcome. The lack of ACAS on both platforms is noteworthy; it would have provided additional warning to the crews of the emerging threat. Nevertheless, the Hawk crew reacted promptly to the avoiding action and had good SA on the other traffic in the area. Distractions, prioritisation and task saturation are factors which seem to have played a large part in

this incident; they are all factors which the aircrew community is well aware of and which form the core of HF error management training; this is a bi-annual requirement for aircrew and ATM personnel. However, it is generic in nature and perhaps needs to be made more role-specific to maximise its relevance to key trades in the Air Safety chain.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

ATC Members first considered the actions of the ScATCC(Mil) controller, Controller 2, and agreed that in the normal course of events he had allowed just enough time to achieve coordination. Notwithstanding this viewpoint, it was also agreed that it would have been prudent to apply a degree of defensive controlling, prior to calling Leeming, in order to mitigate any potential failure to coordinate. Members also discussed area radar controllers' common practices and perceptions of their airspace. It was opined that most area radar controllers would be uncomfortable providing a service to traffic at FL100 in the VOY, due to the amount of traffic and hence attention required, which would adversely impact on their ability to provide a service to other traffic. Perhaps unsurprisingly, pilot Members did not have as acute an appreciation of this facet of airspace management and it was felt that greater awareness could have helped; for example, if the Tornado pilot had been aware and consequently accepted the offer of a handover to Leeming to transit the VOY the risk of confliction with other Leeming traffic would have been greatly diminished. Having not achieved coordination, Controller 2 then issued avoiding action. However, whilst mitigating the collision risk, deconfliction minima were not achieved, with the Tornado pilot's apparent slow reaction to the instruction exacerbating the situation. The majority of ATC Members were not critical of the direction of Controller 2's avoiding action turn.

Members then considered the actions of those in the control room at Leeming. It was agreed that the Leeming SUP's response to the ScATCC(Mil) controller's first statement was not helpful, but it was also recognised that she was supervising a control room with a U/T DIR controller with screen, training being undertaken on Zone position and a controller examination underway on APP. Some Members were surprised at the amount of training and standardisation being undertaken concurrently with normal ATC duties and questioned whether any SUP would be able to contend with that level of activity whilst maintaining effective supervision. Military ATC Members opined that the reported level of activity in the Leeming control room was by no means extraordinary; rather it emphasised the need to select highly experienced and capable individuals to take on the role. Whilst there was no evidence to support the contention that Leeming SUP was over-tasked, several Members expressed their concern. Turning to the actions of the DIR team, ATC Members were of the opinion that the U/T DIR controller had, to all intents and purposes, ceased controlling prior to CPA and was effectively acting as a mouthpiece for the screen controller. To that extent, it would have been prudent for the screen controller to take over the position; however, none of the Leeming controllers saw the approaching Tornado in time to effect deconfliction and the Board contended that this was primarily due to concentration on the U/T controller's performance at the expense of monitoring the wider area of responsibility.

As regards the Cause, some Members opined that Leeming DIR had descended Hawk Formation A into confliction with the Tornado. However, it was agreed that the confliction was not sighted sufficiently early and that a degree of responsibility rested with all the controllers. Therefore it was decided, on balance, that ATC had not taken timely action, with a subsequent loss of deconfliction minima. In terms of Risk, Members agreed that although safety margins were reduced somewhat, effective action had been taken to prevent ac collision.

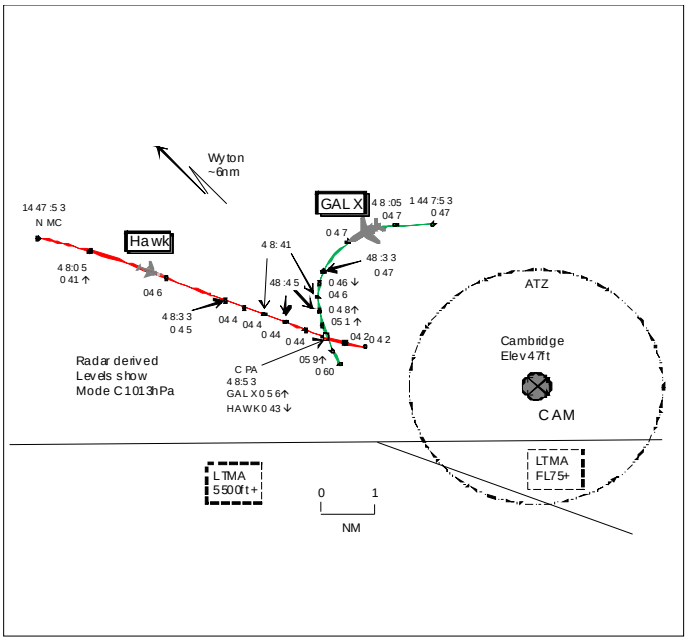
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: ATC did not take timely action and did not achieve deconfliction minima.

Degree of Risk: C.

AIRPROX REPORT NO 2012139

Date/Time:	7 Sep 2012 1449Z	
Position:	5213N 00004E (4·5nm W Cambridge - elev 47ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Gulfstream Galaxy	Hawk T Mk1
Operator:	Civ Comm	HQ Air (Trg)
Alt/FL:	5000ft	4000ft↑
	QNH	RPS (1018hPa)
Weather:	VMC NR	VMC NR
Visibility:	NR	30km
Reported Separation:	200-300ft V/Nil H	300ft V
Recorded Separation:	200ft V/1·1nm H Or 1300ft V/0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GULFSTREAM GALAXY PILOT reports inbound to Cambridge, IFR and in receipt of an AFIS, he thought, from Cambridge on 123·6MHz, squawking an assigned code with Modes S and C. They were on the final stage of their flight already established on the LOREL 4C STAR. As they approached BPK they were instructed to maintain 220kt and to descend to FL80 before they were transferred to Essex Radar and were given radar vectors for Cambridge and descent clearance to altitude 5000ft. After some radar vectors they were instructed to route to CAM NDB which was about 10nm N of their position. As they were getting close to CAM they asked for instructions after CAM. The instruction received was to hold over CAM at 5000ft but when it was issued they were already passing O/H the Locator; he believed it was too late for ATC to issue that order. They were then transferred over to Cambridge Approach. The Capt, PF, initiated a turn to the W for a parallel entry whilst the FO, PNF, was trying to input the hold into the FMS. Whilst turning their TCAS generated a TA and the conflicting traffic was identified on the NAV display to the W of them at a lower altitude, climbing. Almost immediately an RA 'descend' was commanded, ROD >3000fpm, probably about 4000fpm or more; separation was about 1nm. The PF disengaged the A/P and A/T and initiated a steep dive whilst the PNF called out loud the TCAS instruction 'descend, descend'. After a very short time, maybe 3-7sec, TCAS called 'clear of conflict'. Both pilots looked for the conflicting traffic on the NAV display and after a couple of seconds TCAS commanded an RA 'climb' at 4000fpm or more. The PNF called out this instruction loudly again whilst the PF initiated an aggressive full-power climb, which set the ac climbing at over 4000fpm. By now the ac was in a shallow banked turn to the L passing through a S'ly heading which placed the conflicting ac out to the W on their starboard side. The PNF seated on the RHS looked out, trying to find the traffic, and saw it and on realising the close proximity he emphasised the climb instruction, which the PF promptly followed. He estimated the ac passed 200-300ft below with almost nil horizontal separation. Some seconds later TCAS called again 'clear of conflict' and both the PF and PNF saw the traffic off to their port side in a steeply banked attitude to its L turning towards the N. The PF resettled the ac into a straight and level flight whilst the PNF reported the 'near miss' to Cambridge Approach. The controller informed them that the conflicting ac, a Hawk, was supposed to be low level traffic (later updated to 1000ft below) and asked the crew if they wanted vectors for the approach or if they wanted to perform a visual approach. They asked for the visual approach and the rest of the flight was uneventful. He assessed the risk as high.

The Capt opined that the instruction to hold over CAM was given too late since they were almost over the Locator at 220kt and the transfer from Essex Radar to Cambridge Approach was given at the same time, which was too late. The Locator is the initial approach fix for both the ILS and NDB DME approach to RW23 so before initiating the approach the flight should have been in contact with Cambridge. The conflicting traffic should have been

1000ft or more below but had climbed well over that, up to at least their altitude of 5000ft. The Cambridge controller later told them that he was not informed that the conflicting traffic was going to climb but instead that it was going to maintain low-level, 1000ft or more below. The first the Approach controller knew that this traffic was climbing and thus creating a hazard was when the controller saw it climbing on his radar screen with little or no time to react. This, added to the late transfer of communication, made it almost impossible for Approach to issue instructions to try and avoid the situation that seconds later developed between the 2 ac.

THE HAWK T MK1 PILOT reports transiting from Valley to Duxford, VFR and in receipt of a BS from Cambridge Approach on 123·6MHz, squawking 7001 with Modes S and C. The visibility was 30km in VMC and the ac was coloured black with nav, strobes and landing lights all switched on. After low-flying in Wales and pulling-up for the Lichfield Corridor it was realised that there was still plenty of fuel so additional low-flying practice was carried out to the NW of Cambridge and to the S of Wyton; a BS was acquired from Cambridge. When S of Wyton, heading 120° flying out of sun, the Capt (rear-seater) manoeuvred the ac into a climb from low-level in Class G airspace. Any information from ATC about traffic in the vicinity was not heard in-cockpit if the controller did pass any. As the ac was in a climb passing 4000ft QNH 1018hPa he, the front-seater, noticed an ac [the G200 Galaxy] flying from L to R but didn't take control as he thought the Capt in the back seat was visual and didn't assess the closure to be safety critical although he knew it was quite close. He assessed the closest point to be 300ft clear. The rear-seater was not visual with this ac at any point. The rear-seater handed control over to him, the front-seater, when level and was initially confused as to why he was asking the rear-seater to apologise to ATC. After explaining the situation the rear-seater spoke to ATC but this was not acknowledged as the RT was busy. On landing the rear-seater rang Cambridge to explain the situation as the other ac was under Cambridge control at the time. He assessed the risk as low.

THE CAMBRIDGE APPROACH CONTROLLER reports that at about 1435Z he was pre-noted about a Hawk inbound to Duxford from the NW. The Hawk pilot called about 35nm NW of Cambridge at high-speed (>400kt) descending through 5000ft requesting a BS. This was given and the pilot stated he would be holding low-level to the W of Cambridge before transiting to Duxford. He was informed about a lot of gliding activity at Gransden Lodge [10nm WSW Cambridge] and the ac's squawk changed from 7000 to 7001 and he noticed the ac passing through 1000ft. At about 1445 the GALX entered the CAM hold at 5000ft owing to a late release and transfer from Essex Radar. Unfortunately, this turned the GALX towards an area of intense aerial activity to the SW of Cambridge. Without warning a 7001 squawk climbed at 2-500ft per second in a zoom climb towards the GALX. He started a transmission to the GALX flight stating that traffic was approaching from the W climbing quickly (at this time it was through about altitude 2000ft) and without a pause called the unknown traffic "R 2 o'clock passing 4000ft, passing 4700ft, may go just behind you". The contacts merged with Mode C readouts for both ac changing rapidly. The Hawk's squawk then changed back to 7000. He believed both ac were in extreme close proximity to each other.

ATSI reports that the Airprox was reported when a Gulfstream Galaxy (GALX) and a Hawk T1 came into proximity in Class G uncontrolled airspace, 4·5nm W of Cambridge at FL048.

The GALX was operating IFR on a flight from Madrid-Torrejón to Cambridge airport and was in receipt of a service from Cambridge Radar on frequency 123·6MHz. The Hawk was operating VFR on a training flight from RAF Valley to Duxford and was in receipt of a BS from Cambridge Radar on frequency 123·6MHz.

CAA ATSI had access to written reports from the pilot of the Hawk, the Stansted INT controller and the Cambridge Radar controller, together with area radar recordings and RT recordings of the Cambridge Radar frequency 123·6MHz and the Stansted INT frequency 120·625MHz.

The Cambridge METARs were:

EGSC 071420Z 25010KT 220V290 CAVOK 25/08 Q1023= and EGSC 071450Z 24011KT CAVOK 25/05 Q1023=

[UKAB Note (1): The UK AIP promulgates the CAM hold for RW23 as a RH racetrack, inbound track 092°.]

At 1442:00 the pilot of the GALX contacted Stansted INT descending to FL080 and was instructed to continue on his present heading.

The written report from the Cambridge controller stated that he had been pre-noted about a Hawk inbound to Duxford from the NW. At 1442:20 the pilot of the Hawk contacted Cambridge Radar requesting a BS and advised

Cambridge that they would be operating, "…*low level to the west of your field initially before routeing to Duxford"*; a BS was agreed. Radar replay shows a 7000 squawk 38nm to the NW of Cambridge with a speed and track that correlated with that expected from the Hawk; however, the Hawk was not formally identified by Cambridge.

At 1444:20 the traffic squawking 7000 changed its transponder code to 7001. At 1445:10 the pilot of the Hawk was informed of glider activity in the vicinity of Gransden. A 7001 squawk may be selected at pilot's discretion to indicate Military Fixed-Wing Low Level Conspicuity and Climb-out.

At 1445:20 the service given to the GALX by Stansted INT was changed to a TS outside CAS. The GALX flight was instructed to descend to altitude 5000ft and instructed to take up the NDB [CAM] hold at Cambridge. The Stansted INT controller contacted Cambridge by telephone to agree a course of action for the GALX. The Cambridge controller requested that the GALX be transferred to the Cambridge Radar frequency. The service to the GALX flight was terminated and the GALX crew was instructed to contact Cambridge on frequency 123·6MHz.

At 1447:04 the 7001 squawk is manoeuvring 11·5nm WNW of Cambridge indicating FL015. At 1448:05, as the pilot of the GALX contacted Cambridge, *"…on course to Charlie Alpha Mike er holding ready for approach"*, the 7001 squawk is still manoeuvring with NMC level information being detected.

At 1448:05 the Mode C of the 7001 reappeared, indicating FL041, 6·1nm W of the GALX and now tracking ESE. The controller asked the pilot of the GALX what type of approach he required and the pilot replied, "*visual approach*". The GALX is in a L turn to join the hold. The controller replied (1448:30), "*roger continue the left turn there is traffic er south er correction west of you right one o'clock er range of two miles manoeuvring now climbing er through your level four thousand five hundred feet possibly a Hawk aircraft high speed".*

At 1448:33 the 7001 squawk showing FL045 is 2nm WSW of the GALX indicating FL047. The tracks of the 2 ac are converging and at 1448:41 the distance between the 2 ac is 1·1nm with the 7001 squawk indicating FL044 and the GALX indicating FL046. Another 7000 squawk is manoeuvring low level where the 7001 squawk had previously been operating. The controller transmitted to the GALX, *"(GALX c/s) that traffic's just passing underneath three hundred feet unknown to me*". This was followed by a transmission from the Hawk, "*that's us passing below visual*". The GALX climbs as the 2 tracks cross, the Hawk is indicating FL043 and the GALX FL056, lateral separation 0·1nm, the CPA.

At 1449:00 the pilot of the GALX advised the Cambridge controller that they had responded to a TCAS RA to traffic that was, "*at our nine o'clock same level well actually behind us and er looks like a fighter something like that".* The Cambridge controller confirmed that it was a Hawk that climbed up from low level.

At 1451:10 the pilot of the GALX requested the registration or callsign of the Hawk as, "*he was very very very near to a collision*".

When the pilot of the Hawk contacted Cambridge he advised them that they would be operating at low-level. Although the Cambridge controller did not formally identify the Hawk, the 7001 squawk followed the expected track and level of the Hawk and could be seen on radar replay manoeuvring low level until 1448:06, which may have reinforced in the controller's mind an expectation that the Hawk would remain low level.

The pilot of the Hawk requested a BS. Under the terms of a BS there is no requirement to monitor the flight or to identify it. The Cambridge controller stated that the conflicting traffic was possibly a Hawk as he could not be certain that the 7001 squawk was the Hawk traffic until it was confirmed by the pilot. Another 7000 squawk was operating low level where the 7001 squawk had been operating. As the Cambridge controller probably had an expectation that the Hawk was going to remain low-level this may have caused him to doubt whether the 7001 squawk was in fact the Hawk.

The service being provided to the GALX was not agreed although the controller's report indicated that a TS was being provided. It is likely that the controller intended to provide a TS; however, as the situation deteriorated rapidly after the first call from the GALX, it is likely that the need to provide a traffic warning to prevent a collision precluded the agreement of service provision.

As the Airprox occurred in Class G airspace collision avoidance was ultimately the responsibility of both pilots. In the very short time available (approximately 20sec between the initial action taken by the controller and the GALX

responding to the TCAS RA), the controller provided a traffic warning to the GALX flight in order to assist the pilot in discharging that responsibility.

NATS SAFETY INVESTIGATIONS provided a TCAS Performance Assessment using InCAS simulation and Eurocontrol's automatic safety monitoring tool (ASMT).

CODE	***DESCRIPTION***	***CODE***	***DESCRIPTION***
TA	Traffic Alert	DCL	Don't Climb
RA	Resolution Advisory	DE	Descend
COC	Clear of Conflict	RCL	Reversal Climb
DDE	Don't Descend	CL	Climb

GALX

Alert Time	***Alert Description***	***Altitude (FL)***	***Intruder Range (Nm)***	***Vertical Sep. (ft)***
14:48:20	TRAFFIC ALERT	47	3.56	264
14:48:25	MONITOR V/S	47	2.85	87
14:48:27	DESCEND	47	2.60	63
14:48:30	CLIMB NOW	47	2.25	159
14:48:31	CLIMB (sim artefact)	47	2.13	143
14:48:35	CLEAR OF CONFLICT	46	1.65	79
14:48:37	CLIMB	46	1.40	162
14:48:47	ADJUST V/S	51	0.28	694
14:48:54	CLEAR OF CONFLICT	58	0.36	1491

CPA Time	***Horizontal Sep. (NM)***	***Vertical Sep. (ft)***
14:48:49	0.15	943

Assessment of TCAS Performance

Eurocontrol's automatic safety monitoring tool (ASMT) recorded five RAs relating to this encounter as shown in the Mode S Downlink table. All recorded RAs were downlinked from GALX and hence it was assumed that Hawk was not TCAS-II equipped.

By combining timing information from all radars that receive a downlinked RA it is possible to estimate the time that each RA was issued to the pilot; this information is used to assess the accuracy of the InCAS simulation. Of the five RAs, 3 were simulated within the actual timeframe they would have been issued to the pilot; the other 2 were 1sec outside the window. This indicates the simulated tracks are well matched to the tracks flown by each ac.

It should be noted that immediately after a reversal, InCAS always generates a superfluous RA; hence the Reversal Climb (RCL) is immediately followed by a Climb (CL). The Climb RA is simply an artefact of the simulation.

The simulation shows that the first RA was a Monitor Vertical Speed (MVS) which InCAS classified as a don't climb message. A corrective Descend RA was subsequently issued, which was countermanded 3-5sec later by the Reversal Climb (RCL). There was a gap of approximately 10sec between the RCL and the subsequent CL. The InCAS simulation suggests a Clear of Conflict (CoC) message could have been issued in this gap, but no recorded information is available to confirm this. The CL RA at around 14:48:40 appears to cause the pilot of the GALX to climb strongly, however it is possible this was a reaction to the earlier RCL. At the time of the Adjust Vertical Speed

(AVS) RA (which InCAS classified as DDE - don't descend) the estimated vertical rate of the GALX was approximately 6000fpm.

HQ AIR TRG comments that whilst the crew comprised 2 Tac Weapons students, the rear-seater captain had just completed a 'creamie' tour as a QFI on the Hawk, and the front-seater had graduated and was holding awaiting an OCU course. The crew had informed Cambridge of their intentions when they had descended to low-level some 10min before the event, but they did not inform them that they had pulled up, making it difficult if not impossible for the controller to inform them of the traffic that was now in the O/H. Whilst the crew were operating well clear of the ATZ and in good VMC at all times, such a call and a request for a TS might have improved their SA. Whilst they were aware from the RT of traffic talking to Cambridge, they remained unaware of its position until it was sighted by the non-handling front-seater passing O/H.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Controller Members agreed that the Cambridge controller had done all that was expected in the timescales that pertained. The TC Stansted INT had informed the Galaxy crew that a TS would be provided after the ac left CAS, descended the Galaxy flight to 5000ft and instructed the crew to take-up the hold at the CAM NDB. Although the crew may have expected a more expeditious arrival through radar vectoring or by carrying out a visual approach, without onward clearance beyond the CAM, the hold was the only initial option until an alternative course of action had been agreed. The transfer of communication/control was effected late, close to the Cambridge O/H. This was probably owing to the LTS Stansted INT retaining control until the Galaxy was clear of LTC traffic and clearing CAS by descent; the base of CAS just S of Cambridge is 5500ft. Pilot Members were surprised that the Galaxy crew was apparently unprepared, such that the hold had not been programmed into the ac's FMS prior to arrival. That said, Members opined that the ac would probably have been in roughly the same place had the FMS hold been activated.

The Cambridge controller's mental-model was based on the Hawk flight operating low-level (i.e. <2000ft) and out to the W, which it had over 11nm away, immediately prior to the Airprox. He had not placed any 'restriction' on the Hawk flight (report before climbing above 2000ft) or given the crew information that the Galaxy was inbound from the S at 5000ft to hold O/H. Under a BS there was no requirement for the Hawk crew to inform ATC of their manoeuvre; however, the controller's SA would have been improved had the Hawk crew informed him of their intention to turn towards Cambridge and climb. The Hawk crew would have been unaware of the Galaxy's position, the Galaxy's RT exchange with ATC had only mentioned "on course to the CAM, holding, ready for approach" before ATC passed TI on the Hawk to the Galaxy crew. Nevertheless, with the incident occurring in Class G airspace, both crews were responsible for maintaining their own separation from other traffic through see and avoid. The Hawk Capt, seated in the rear, executed the climb towards Cambridge but had not seen the Galaxy at all although it should have been visible, being within the crew's field of view in the airspace into which he was intending to fly. The front-seat pilot saw the Galaxy as the Hawk climbed through 4000ft but did not inform the Capt. The 2 military pilot Members were disappointed that the Capt had not seen the Galaxy and commented that there had been a CRM issue within the Hawk cockpit as the front-seat pilot should have pointed out the Galaxy to the rear-seat Capt before they had closed into close proximity. The Hawk front-seat pilot might also have anticipated that an ac like the Gulfstream would be fitted with TCAS and a close pass would generate warnings and manoeuvres that were easily preventable.

Although the Cambridge controller had not agreed a service with the Galaxy crew, Members agreed that this had not materially altered the outcome as the Hawk's turn and climb into confliction only became apparent during the RT exchange between the Galaxy crew's first call and establishing which type of approach was required, too late to take any effective action. The controller quickly passed TI on the converging Hawk to the Galaxy crew during their turn inbound to the CAM NDB as they joined the hold. The Galaxy crew was cognisant of the Hawk's presence from TCAS and, following the receipt of a TA and then RA commands, they visually acquired the Hawk just before it passed below. The Hawk's flightpath triggered the TCAS to generate reversal RAs, a not uncommon occurrence when only 1 ac is TCAS II equipped such that the generated commands are uncoordinated. The Hawk had levelled-off 200-300ft below the Galaxy however it's climb profile caused TCAS to activate on the Galaxy flightdeck and this had led to the Galaxy initially descending momentarily before climbing steeply as the 2 ac

approached the CPA, resulting in 1300ft vertical separation as they crossed 0·1nm apart. Members agreed that it was the Hawk crew's climb towards the Galaxy that had caused the Airprox. However, with the Hawk front-seat pilot and the Galaxy PNF both gaining visual contact and the Galaxy crew responding correctly to the TCAS RAs, the Board were persuaded that any risk of collision had been quickly and effectively removed.

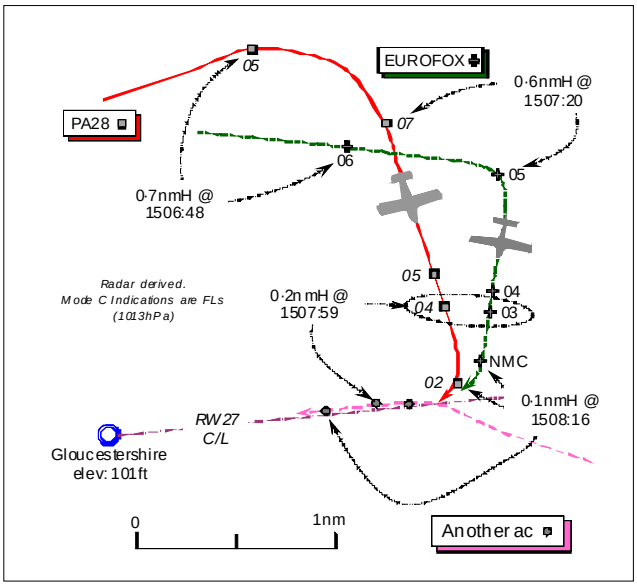
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hawk crew climbed into conflict with the Gulfstream Galaxy.

Degree of Risk: C.

AIRPROX REPORT NO 2012140

Date/Time:	31 Aug 2012 1508Z	
Position:	5154N 002 07W (1·7nm final RW27 Gloucestershire A/D - elev 101ft)	
Airspace:	Gloucestershire ATZ (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	EuroFox ML	PA28
Operator:	Civ Club	Civ Pte
Alt/FL:	600ft↓	600ft
	QFE (1026hPa)	not specified
Weather:	VMC CAVOK	VMC NR
Visibility:	>10km	>10km
Reported Separation:		
	Nil V/50m H	NK
Recorded Separation:		
	100ft V/<0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EUROFOX 912 MICROLIGHT (EUROFOX ML) PILOT reports he was instructing a student who was a National PPL holder but had just purchased a share in the ML and was unfamiliar with the type. They were carrying out ccts to RW27 at Gloucestershire as the student needed familiarisation with tail-wheel landings and a high-wing configuration ML (he had gained his NPPL on Eurostar low-wing ac). Although the student was handling the ac, he as the instructor was seated in the LH seat, as the ac has brakes only on the L side of the cockpit and the student was not yet totally familiar with brake operation on tail-wheel types. The objective of this flight was to familiarise the student with tail-wheel take-offs/landings, after which he would be allowed to occupy the LH seat. A squawk of A7000 was selected with Mode C on; elementary surveillance Mode S is fitted.

Downwind on their 4th cct, under an Aerodrome Control Service, they heard GLOSTER TOWER ask the pilot of the other ac – the PA28 - if he had 'the ultralight' in sight, to which the PA28 pilot replied in the affirmative. The instructor assumed, therefore, that the PA28 pilot was visual with his ML as they were the only ML in the cct. They reported '[EuroFox C/S] downwind', whereupon TOWER advised they were No3 and to report final for RW27. Whilst carrying out the turn onto base leg onto a heading of 180°, he thought about 1nm out from RW27 threshold, visual with the ac No2 ahead of them and a landing ac on late final, they slowed their ML and dropped the flap so they were now flying at about 55kt. As the student PF started to turn R onto final descending through 600ft QFE (1026hPa), he – the instructor - realised that the student PF had not raised the R wingtip to look out before turning, but through the transparent roof of their ML the instructor spotted the PA28 flying alongside them about 50m away (possibly even less) and turning final. The instructor stopped the turn by taking control and rolled to the L. They could clearly read the PA28's registration and the instructor considers that had they turned without looking a collision would have been highly likely.

Their ML was now diverging from the PA28 who continued to turn R onto final ahead of them. He immediately reported to GLOSTER TOWER that 'we've been cut up on final turn by a PA28' and that 'I'll be reporting this'. TOWER replied 'roger' and then cleared the PA28 pilot to continue his approach as No2 - becoming No1. They then widened their final turn, slowed to 50kt and continued their approach as No3 - becoming No2. The PA28 pilot carried out a touch and go, after which they also carried out a touch and go.

He added that after the Airprox with the PA28 had occurred, the pilot of another ac following in the cct was told to go-around and that after their touch and go, the instructor noticed through the roof of their ML that the other ac went around directly down the RW27 centre-line about 300ft above them. Therefore, he told his student PF to reduce the ROC and informed GLOSTER TOWER that they were visual with the traffic going around directly above them.

Having experienced two close encounters in the space of a minute or so, he was feeling quite shaken, so he cut the sortie short and they landed after the next cct. He reported by landline to the Control Tower that he would be filing an Airprox. The ML is coloured white/red; no lights/HISLs are fitted.

THE PIPER PA28-180 PILOT reports that after returning to Gloucestershire A/D from a short local flight he requested a few ccts. The cct to RW27 was very busy and on his first cct GLOSTER TOWER instructed him to 'follow the microlight', which he did. On the second cct, on base leg at 80kt, he did not see any conflicting traffic and saw what he believed to be the ac he was required to follow well ahead of him on final, so he duly turned final himself. A short time later - perhaps 30sec - he heard an RT call from a pilot reporting being 'cut up by a PA-28'. He did not know at the time whether this referred to his PA28 or to another ac. As he was close to landing, with the cct and TOWER frequency busy, he did not pursue the matter there and then but concentrated on executing a safe touch & go. After landing and parking the ac he phoned ATC but was told that the ADC had gone off-watch; the controller on-watch did not know whether it was his PA28 that was the reported ac, so he left his name in case ATC needed to contact him.

With hindsight it seems likely that the ac that he saw well ahead of him before he turned final on this cct was not the EuroFox ML that he was supposed to be following, but rather the ac ahead of it in the pattern. He did not see the EuroFox so did not quote a minimum separation or assess the Risk.

The PA28 is coloured blue/white with red markings. The red anti-collision beacon was on.

THE GLOUCESTERSHIRE AERODROME CONTROLLER (ADC) reports the PA28 downwind was instructed to follow the EuroFox ML, which was acknowledged. The PA28 pilot was asked again on base-leg to confirm that he as following the EuroFox. However, the PA28 pilot turned in ahead of the EuroFox ML onto final. The EuroFox pilot reported that the PA28 was very close and subsequently telephoned to advise that he would be filing an Airprox.

ATSI reports that the Airprox occurred at 1508:12, 1·6nm East of Gloucestershire Airport, on the final approach for RW27, within the Class G Gloucestershire ATZ.

The ATZ comprises a circle radius 2nm, centred on the midpoint of RW09/27 and extending to a height of 2000ft above aerodrome level (elevation 161ft).

The EuroFox crew was operating VFR in the RH visual circuit for RW27 and had previously completed 3 training ccts prior to the Airprox. The PA28 was operating VFR and had joined the RH visual circuit for RW27. The PA28 pilot had completed one visual cct following the EuroFox and was commencing the second cct.

The ATSU was providing a split Aerodrome and Approach Control Service. The Aerodrome controller's workload was assessed as medium to heavy.

ATSI had access to RT recordings for GLOSTER TOWER and area radar recordings, together with the written reports from the two pilots concerned and the ADC. A problem when accessing the RTF recording equipment resulted in the recording only commencing at 1506UTC, as the two ac commenced their respective downwind legs prior to the AIRPROX. The area radar recording showed intermittent coverage of ac operating in the cct.

The Gloucestershire METAR: 1450Z 29007KT 9999 FEW040 18/07 Q1029=

The EuroFox was established as No 4 in the visual RH circuit for RW27 with the PA28 as No 5 in the pattern following the EuroFox. The cct was busy with a number of ac in the circuit and also on the ground.

At 1505:36, the EuroFox crew reported downwind and TOWER instructed them to report ready for base-leg and then asked the PA28 pilot, *"…are you still following an ultralite".* The PA28 pilot replied, *"..affirm* [PA28 C/S]."

(ATSI Note: At this point one ac had just landed and there were 3 ac ahead of the EuroFox, 2 on final and 1 on base-leg. No traffic information was given to the PA28 or EuroFox pilots regarding their position in the sequence or the number of ac ahead of them.)

At 1506:04, the pilot of one aircraft reported final and at 1506:13, the aircraft on base leg was advised No 3 following a Tecnam ac.

At 1506:48, radar recordings show the EuroFox tracking 097 degrees downwind at 500ft Mode C (1013hPa). The PA28 was shown tracking slightly wider on 072 degrees at 600ft Mode C (1013hPa).

At 1506:56, the PA28 commences a R turn towards base leg. The EuroFox is shown to be continuing downwind tracking 097 degrees.

At 1507:03, TOWER asks if the EuroFox is turning base leg whose crew responds, *"Affirm just turning base-leg…".* TOWER instructed the EuroFox crew to continue on base. The PA28 pilot then transmitted, *"and* [PA28 C/S] *also just turned base."* The controller acknowledged, *"Roger just..continue with the Ultralite."*

At 1507:20, the radar recording shows the EuroFox [at 82kt GS] commencing a R turn towards base leg at 500ft Mode C. The PA28 is 0.6nm NW of the EuroFox on a tighter base leg [at 88kt GS] indicating 700ft Mode C.

At 1507:59, the two ac are 0.2nm apart converging with a vertical separation of 100ft; the PA28 is indicating 400ft Mode C [at 87kt GS] and the EuroFox 300ft Mode C [at 61kt GS].

At 1508:16, the EuroFox at 1.7nm from touchdown, starts the turn onto final approach, with the PA28 0.1nm ahead at 200ft Mode C; the Mode C of the EuroFox is then lost. The PA28 pilot's written report quoted a height of 600ft QFE, and the EuroFox pilot as 600ft (pressure setting not specified).

At 1508:19, the EuroFox pilot reported, "..[EuroFox C/S]..*I've been cut up by a P A 28 on the right hand side of turning final."* TOWER replied, *"Roger see you there."* The EuroFox pilot responded, *"I think I ought to report that one..we'll talk about it when I get down."*

At 1508:32, the PA28 pilot reported on final and TOWER advised, *"Roger continue..probably for a go around there is a Tecnam to land the wind 2-9-0 degrees 8 knots."*

(ATSI Note: the aircraft following the Tecnam had reported going around.)

At 1509:19, the PA28 pilot was cleared to land and the EuroFox crew instructed to continue.

At 1510:18, the EuroFox crew was cleared for a touch and go. The following ac on final elected to go around.

At 1510:54, the EuroFox crew reported visual with a hightail ac directly above (this was the following aircraft going around.)

In a busy cct the EuroFox crew was instructed to report when ready for base turn and the PA28 pilot was asked to confirm that he was following the EuroFox. It is likely that the TOWER controller was assessing the order and position of the traffic ahead on final and base-leg. Radar recordings show that the cct pattern followed by the PA28 is wider than the EuroFox and the downwind leg diverged (073 degrees) from the normal downwind leg (090 degrees).

The PA28 pilot commenced the base turn just before the controller asked if the EuroFox had turned base-leg. The EuroFox crew replied, *"Affirm just turning base leg"* and the PA28 pilot responded *"and* [PA28 C/S] *also just turned base."* The PA28 pilot was advised, *"Roger just..continue with the Ultralite."*

Radar recordings show that the PA28 pilot had commenced the base turn 24 seconds before the EuroFox and this resulted in the PA28 routeing inside the EuroFox on a tighter base-leg. When established on base-leg, the PA28 pilot was probably looking out ahead and right, towards the A/D, very likely mistaking an ac on final approach as the EuroFox, when in fact the EuroFox was to the PA28 pilot's L on a wider base-leg. The PA28 turned onto final approach slightly ahead of and in conflict with the EuroFox. The PA28 pilot had confirmed that he was following a microlight and the controller had an expectation that the PA28 pilot would continue to follow the EuroFox in the cct. Additional TI regarding the number of ac ahead and position in the landing sequence may have aided the situational awareness of the two pilots.

The Manual of Air Traffic Services MATS Part 1, Section 2, Chapter 1, Page 1, Paragraph, 2, states:

'Aerodrome Control is responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between:

a) aircraft flying in, and in the vicinity of, the ATZ;

b) aircraft taking-off and landing…'

The Airprox occurred when the PA28 pilot following the EuroFox, turned into a shorter cct pattern that brought the PA28 into conflict with the EuroFox as the two ac turned onto final approach. The absence of TI regarding the position and number of ac ahead in the traffic sequence is considered to have been a contributory factor and may have caused the PA28 pilot to mistakenly believe that another ac on final approach was the EuroFox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a transcript of the relevant RT frequency, radar video recordings and a reports from the air traffic controller involved.

Noting that both ac had flown at least one cct before the Airprox occurred, the Board first considered the instructions and information passed by the ADC as the ac flew downwind prior to the Airprox. A civilian controller Member advised that it was common practice at civilian airfields to instruct pilots to follow the ac ahead. It is also non-standard but common practice to instruct pilots to call before turning on to base leg. Military controllers opined that when the pilots called 'downwind', the ADC should have advised them how many ac were ahead of them in the pattern; the absence of this information constituted incomplete TI.

Although some Members considered that this was a busy cct, a GA pilot Member reminded the Board that it was not unusual to have 5 or more ac in a visual cct and when this occurred at aerodromes without ATC, pilots were required to maintain separation entirely by their lookout. A controller Member agreed, emphasising that this was a visual cct and that pilots were required to look out and position themselves sensibly. That said, the maintenance of separation and sequence order was made more difficult by the differences in ac speed and performance. In this regard the ADC's reference to the ultralight ahead could have been useful in alerting or reminding the PA28 pilot about its lower speed. That said, the specific reference later to a Tecnam, rather than a generic description, would only have been useful if the PA28 pilot was familiar with a Tecnam.

Members considered that the ADC had a reasonable expectation that the PA28 pilot would follow the EuroFox downwind after confirming that he was 'still following an ultralight'. It was not clear to the Board whether the PA28 pilot was visual with the EuroFox downwind before losing sight of it, or whether he did not see the EuroFox at any stage downwind. Certainly the small size and tail-on aspect of the EuroFox would have made it difficult to see and the difference in ground tracks would have exacerbated the problem. As it was the PA28 pilot was clearly unsighted on EuroFox when he turned base earlier than the EuroFox. Moreover he did not appear to appreciate the significance of his turning base before the EuroFox pilot confirmed on the RT that he was also turning base. Rather he assumed that the ac he should be following was the one he could see on final. The Board concluded therefore that the Airprox was caused by the PA28 pilot misidentifying preceding traffic and flying into conflict with the EuroFox, which he had not seen.

In assessing the Risk, the Board noted that from the point at which the PA28 pilot turned base, the geometry and physical configuration of the ac made it difficult for the pilots involved to see the other ac. There was an element of good fortune that the PA28 had not descended directly on top of the EuroFox, but in the circumstances the Board considered that the sighting of the PA28 by the EuroFox instructor was the result of good airmanship and his avoidance manoeuvre was both timely and effective. Nevertheless, safety margins were considerably reduced and therefore safety was not assured.

PART C: ASSESSMENT OF CAUSE AND RISK

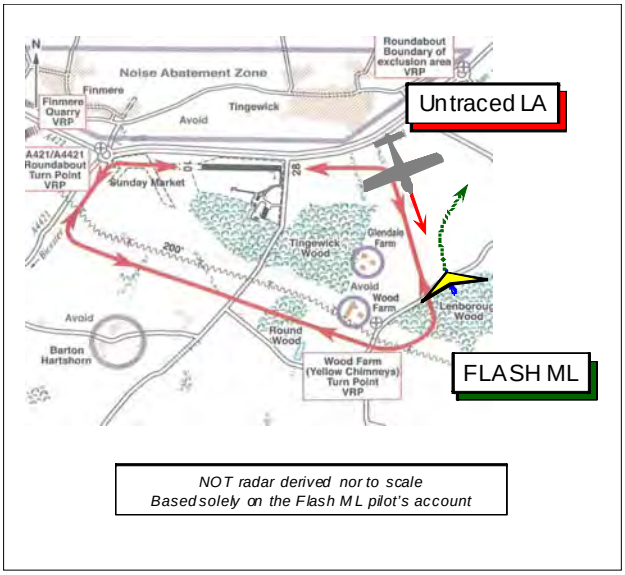
Cause: The PA28 pilot misidentified the preceding traffic and flew into conflict with the EuroFox, which he did not see.

Degree of Risk: B.

AIRPROX REPORT No 2012141

AIRPROX REPORT NO 2012141

Date/Time:	1 Sep 2012 1417Z (Saturday)	
Position:	5159N 00103W (Finmere Microlight Site cct RW28LHC - elev 395ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Flash 2A ML	Untraced LA
Operator:	Civ Trg	NK
Alt/FL:	700ft	NK
	aal (QFE)	(NK)
Weather:	VMC CLBC	NK
Visibility:	10km	
Reported Separation:		
	Nil V/150m H	NK
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MAINAIR FLASH 2A FLEXWING MICROLIGHT PILOT (FLASH ML) reports that he was conducting a training flight with a student in the LHC to RW28 at Finmere. As they turned onto the promulgated L base leg heading 350-360° at 42kt, flying the cct pattern at 700ft aal [as he had depicted on the attached extract from a popular flight guide], both he and his student became aware of a high-wing light ac (LA) approaching head-on at exactly the same height, some 500m away when first seen. As the LA was relatively slow moving, it gave them 2-3 seconds to determine whether its pilot would take avoiding action, but the LA pilot did not do so, even though he had encroached into a live cct at a low height. The pilot of the other ac – a high-wing grey and blue coloured ac, which he thought was a distinctive type of vintage ac [registration provided] - did not deviate from his course even slightly, which suggested that the LA pilot was not maintaining a forward lookout. They took 'immediate avoiding action' by banking sharply to the R and the oncoming LA passed within 150m at exactly the same height of 700ft aal; he assessed the Risk of collision as 'high – certain'.

They were both able to identify the registration letters on the port side of the LA's fuselage as it flew on a steady SSE'ly course at 700ft until it had cleared the cct area. The LA had also flown directly over the centre of Tingewick Village at 700ft agl and through the nose abatement zone established for this ML site that is published in several commercial flight guides.

He made a visual identification of the ac that he thought was the same as an Auster ac shown on a photograph within 'g-info' [the web based ac register].

Finmere Microlight Site is marked as an active A/D on CAA and military charts. It has operated as a microlight training school since 2002 and its noise abatement procedures and cct pattern are published in all the current flight guides:

'Pilots are to avoid the Noise Abatement Zone north of A421 at all times.

Ccts: 700ft QFE, RW 10 RH, RW28 LH.

All approaches from E/SE or W/SW. No deadside. Join overhead Tingewick Wood at 1500ft QFE. Once cct direction established, maintain 1500ft QFE until clear of cct pattern to E or W. Descend to 700ft QFE and join cct on downwind leg to south of power cables.

Avoiding overflying Sunday Market to west of RW (Sundays only) and Barton Hartshorn village to SW.'

UKAB Note (1): The UK AIP at ENR 5-5-4-2, lists Finmere as a Microlight Site located at 51°59'07"N 001°03'23"W, with a site elevation of 395ft amsl.

UKAB Note (2): Upon receipt of the reporting pilot's report, the owner of the ac identified by the Flash ML pilot was contacted. However, he reports he has never flown around Finmere and is adamant that his ac was not the ac reported to be involved in this Airprox. Consequently, the RAC was tasked to review the available radar data and to trace the reported LA.

LATCC (MIL) RADAR ANALYSIS CELL reports that all the recorded radar sources available to the Unit have been reviewed closely, but neither the Flash ML nor the reported LA are evident in the vicinity of the Finmere cct. An intermittent primary radar contact does track ½nm W of the site heading SW-SSW. Because of the intermittent nature of this contact, however, the RAC have been unable to track the ac either to its destination or by back-tracking the contact to the A/D of departure. Consequently, the identity of the reported ac remains unknown.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the Board was limited to the report from the Flash 2A M/L pilot.

The Board acknowledged the difficulty of making a balanced assessment in the absence of a report from the untraced light aircraft pilot. Moreover the Board noted that Finmere is located where the airspace surrounding airspace constraints (Turweston ATZ, Bicester glider site, Croughton HIRTA) create a funnelling effect. Nevertheless, Members agreed that flying so close to a promulgated microlight site that is clearly marked on VFR charts was indicative of poor sortie planning and/or poor airmanship. The Board discussed whether, given the performance of some modern microlight aircraft, the symbology for microlight sites on VFR charts was appropriate to cover the range of microlight activities. A Member questioned whether microlight pilots perceived that an entry in the AIP and a symbol on VFR charts offered more 'protection' than is actually the case in practice. The CAA Flt Ops advisor confirmed to Members that microlight sites are considered to fall within the definition of an aerodrome. Therefore Rule 12 of the Rules of the Air applies and therefore pilots transiting the local area are required to conform to the traffic pattern formed by other ac or keep clear of the airspace in which the pattern is formed. This being the case, Members decided that contravention of Rule 12 was the Cause of the Airprox.

In discussing the Risk associated with the Airprox, the Board noted that having spotted the light aircraft some 500m away, the Flash pilot had waited 2-3 seconds before initiating avoiding action. There was some difference of opinion, but by a majority the Members assessed that the Flash pilot's sighting had been early enough to enable him to perform a manoeuvre that effectively removed the risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

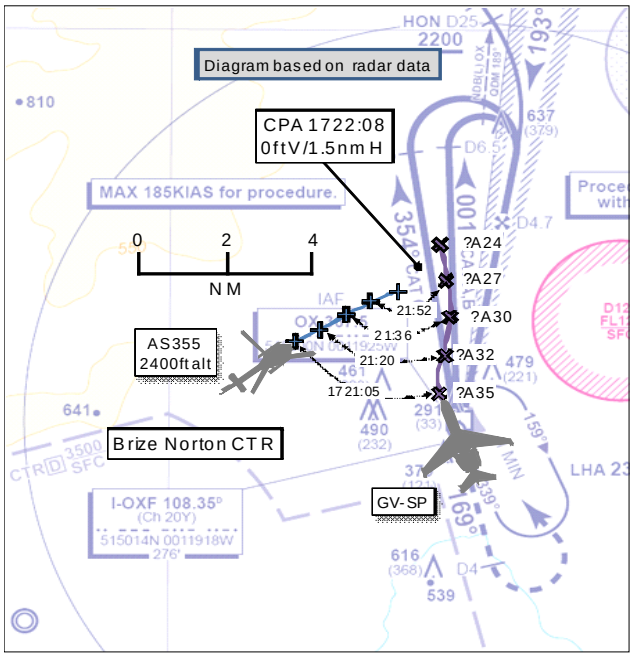
Cause: The pilot of the untraced Light Aircraft did not comply with Rule 12 and flew into conflict with the Flash 2A on the base leg for RW28 at Finmere ML site.

Degree of Risk: C.

AIRPROX REPORT No 2012142

AIRPROX REPORT NO 2012142

Date/Time:	9 Sep 2012 1722Z	(Sunday)
Position:	5153N 00122W (3.5nm NNW OX NDB)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	AS355	Gulfstream GV-SP
Operator:	Civ Exec	Civ Pte
Alt/FL:	2500ft (QNH NR)	NR (NR)
Weather:	VMC CLBC	NR
Visibility:	>10km	NR
Reported Separation:	100ft V/0.5nm H	NR
Recorded Separation:	0ft V/1.5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS355 PILOT reports operating under VFR in VMC with a TS from 'Brize Zone'. The black, red and silver helicopter had anti-collision and 'position' lights selected on. The SSR transponder was selected on, with Modes A, C and S, as was the Traffic Advisory System (TAS). On leaving the Brize Norton CTR to the NE, 200ft below cloud heading 065° at 120kt and altitude 2500ft [QNH NR], he was informed of an ac 'over the Oxford ATZ' which was 1000ft above him. The ac was identified on TAS and seen to commence a descent and to turn 'towards his position'. The ac continued to descend, Brize ATC informed him of this, and he descended 400ft, turning R through 50°. The TAS display showed the ac, which he did not see, pass down his LH side by ½nm.

He assessed the risk of collision as 'High'.

[UKAB Note(1): The AS355 pilot's descent and turn are apparent on radar, but occurred very shortly after CPA and hence are not depicted on the diagram.]

THE GULFSTREAM GV-SP (GV) PILOT reports conducting an ILS approach to Oxford/Kidlington A/D, operating under IFR with a PS from Oxford TWR. The TCAS was selected on, as was the SSR transponder with Modes A, C and S. The only other ac he was aware of was another 'light jet' that was in the hold above him when he 'arrived at Oxford'. There were no TCAS TA or RA alerts during the approach, nothing was reported by ATC and his recollection was that nothing conflicted with the flight. He reported that he was notified of the Airprox by his company safety department some time after the event.

THE BRIZE NORTON APPROACH CONTROLLER reports [AS355 C/S] was on a TS, routeing from Dunkeswell to Silverstone. The pilot was maintaining altitude 2500ft [Brize QNH 1008hPa] for the transit. When the AS355 was 4nm NW of Oxford he called traffic to the pilot, which was indicating 1000ft above, within the lateral limits of the Oxford ATZ. The traffic was squawking [GV C/S]. He saw the traffic turn N and start to descend so he called Oxford via landline to give TI on his [AS355] track. He told Oxford that the helicopter was maintaining [altitude] 2500ft; Oxford acknowledged and told him their track was a Gulfstream. He gave TI to [AS355 C/S] again, giving a position report and telling the AS355 pilot the Gulfstream was 800ft above him, descending. [AS355 C/S] turned on to an E'ly heading and descended 400ft to avoid the traffic, which was now descending through his 12 o'clock, 'on top of him'. After he was clear, the AS355 pilot asked if Oxford were controlling the other ac involved and queried why it had been given a descent through his level. The controller informed him that he had 'given Oxford TI', to which the AS355 pilot replied that the 2 ac had come very close and that he was thinking of filing an Airprox.

THE BRIZE NORTON SUPERVISOR reports being in the Approach Control Room at the time of the incident. The controller had two Zone transits on frequency, one of which was [AS355 C/S] under a TS, who was passed TI on traffic inside the lateral limits of the Oxford ATZ, indicating 1000ft above. The controller then telephoned Oxford to pass TI on [AS355 C/S], to which the Oxford controller stated that her traffic was a Gulfstream. [AS355 C/S] continued to receive TI on the Oxford track and decided to turn E'bound and descend 400ft to remain clear of it. The AS355 pilot telephoned Brize Norton ATC on landing to discuss the incident.

ATSI reports that the Airprox occurred at 1721:56 UTC, 3.6nm to the NW of Oxford Airport, within Class G airspace, between a Eurocopter Ecureuil II AS355NP (AS355) and a Gulfstream GV-SP G550 (GV).

The AS355 pilot was operating VFR on a flight from Dunkeswell to Silverstone and was in receipt of a TS from Brize Norton Radar. The GV pilot was operating IFR on a flight from Dublin to Oxford and was in receipt of a PS from Oxford Approach.

Oxford was operating a combined Aerodrome and Approach Control Service without the aid of surveillance equipment. Oxford is promulgated as providing radar services between the hours of 0830 to 1600 UTC. Brize Norton Radar was aware that Oxford was providing a PS without radar surveillance.

CAA ATSI had access to RTF recording from Oxford Approach and area radar recordings, together with written reports from both pilots. Oxford ATSU was not immediately aware that an Airprox had been reported. When subsequently questioned the Oxford controller concerned had no recollection of an incident.

The Brize Norton and Oxford Airport weather was reported as follows:

METAR EGVN 091650Z 22009KT 9999 FEW025 BKN200 20/15 Q1008 BLU NOSIG=
METAR EGVN 091750Z 21009KT 9999 FEW022 SCT150 BKN200 19/15 Q1008 BLU NOSIG

METAR EGTK 091650Z 23016KT CAVOK FEW040 21/14 Q1007=

Factual History

The GV pilot was cleared to the Oxford OX(NDB) at altitude 4500ft, QNH 1007hPa, with an arrival estimate of 1718 provided by London Control. He contacted Oxford APP at 1713:32; the Oxford controller responded and gave further descent to altitude 3500ft and cleared the GV pilot to go outbound on reaching the OX(NDB).

At 1714:02, radar recording shows the GV 10nm NW of the OX(NDB), passing an altitude of 5700ft. The AS355 is shown 9.1nm SW of Brize Norton, approaching the Brize Norton CTR boundary at 2600ft.

At 1714:28, the GV pilot requested, *"er to lose some altitude could we make a er a one turn outbound and then come back inbound er OX and then go to er into the procedure."* The Oxford controller replied, *"Affirm"*. At 1716:10, the GV pilot reported level at 3500ft and the controller confirmed that he was cleared for the RW19 Procedural ILS approach, which the pilot acknowledged. At 1717:25, the GV was 1.8nm SE of the OX(NDB), positioning for the entry procedure prior to going outbound. The AS355 was 2.1nm NW of Brize Norton Airport at altitude 2400ft.

At 1720:42, the GV pilot reported beacon outbound and the controller replied, *"*[GV C/S] *report base tur - correction localiser established.*"

At 1721:05, the GV pilot was outbound in the procedure, 1nm NW of the OX(NDB) at altitude 3500ft. The AS355 is shown in the GV pilot's 10o'clock position at a range of 3.6nm indicating altitude 2400ft. The outbound QDR for the ILS/DME/NDB(L) RW19 procedure is 001^{o} for CAT A & B ac and 354^{o} for CAT C ac. The GV is a CAT C ac.

At 1721:30, Brize Norton Radar contacted Oxford Approach and the following conversation occurred.

Oxford*"Air Traffic Oxford"*

Brize*"Er Brize there's traffic northwest of you three seven zero three"*

Oxford *"Oh Yeah"*

Brize *"Yeah he's maintaining two thousand five hundred feet one zero zero eight"*

Oxford "*Okay the traffic east in his twelve o'clock is a Gulfstream"*

Brize*"Thank You"*

Oxford *"Okay Bye"*

It was not clear if the Oxford controller was visual with both ac or if they were observed on the ATM.

At 1721:36, radar recording shows the GV passing altitude 3000ft, 2.4nm due E of the AS355 which was at altitude 2400ft. The CPA occurs at 1722:08, when the GV has crossed R to L through the 12o'clock of the AS355 and descends through its level at a range of 1.5nm. The distance between the two ac then increased as the GV continued on a N'ly track.

At 1723:55 the GV pilot reported established on the ILS at 7nm. The AS355 is shown 2.5nm SE of the GV on an E'ly track. The GV continued without further incident and landed at 1727.

At 1727:01, Brize Norton contacted Oxford and advised of a possible Airprox report from the AS355 pilot, who he indicated had descended 400ft to avoid the GV traffic. There was some initial confusion about which ac were involved; the Oxford controller confirmed that the GV pilot had commenced the ILS letdown procedure and the Brize controller indicated that he would 'update Oxford' once he had spoken with the AS355 pilot.

Analysis

The AS355 pilot was in receipt of a TS from Brize Norton Radar. CAA ATSI did not have access to the Brize RTF recording and were therefore unaware of any TI passed to the AS355 pilot. CAP774 (UK Flight Information Services), Chapter 3, Page 1, Paragraph 1, states:

'A Traffic Service is a surveillance based ATS, where in addition to the provisions of a Basic Service, the controller provides specific surveillance-derived traffic information to assist the pilot in avoiding other traffic. Controllers may provide headings and/or levels for the purposes of positioning and/or sequencing; however, the controller is not required to achieve deconfliction minima, and the avoidance of other traffic is ultimately the pilot's responsibility.'

The GV pilot was in receipt of a PS from Oxford Approach. CAP774, Chapter 5, Page 1, Paragraph 1, states:

'A Procedural Service is an ATS where, in addition to the provisions of a Basic Service, the controller provides restrictions, instructions, and approach clearances, which if complied with, shall achieve deconfliction minima against other aircraft participating in the Procedural Service. Neither traffic information nor deconfliction advice can be passed with respect to unknown traffic.'

The Oxford controller had no prior notification of the AS355 pilot's intention to cross the Oxford instrument letdown track and the controller was not able to provide a warning or timely TI to the GV pilot. Brize Radar were aware that Oxford were operating procedurally, without the aid of surveillance equipment, and it was considered likely that, had more timely TI been passed to Oxford, it would have aided the SA of those involved and would have afforded the opportunity to agree a course of action. The Manual of Air Traffic Services Part 1, Section 1, Chapter 10, Page 1, Paragraph 1, states:

'Traffic information passed between ATS personnel is information about aircraft that is relevant to the provision of an air traffic service. The purpose of traffic information is to enable the recipient to determine whether or not any action is necessary to achieve or maintain the required separation between the subject aircraft. For example, after receiving traffic information, a controller may consider it necessary to issue avoiding action or may request co-ordination with respect to the traffic.

The passing of traffic information does not imply a commitment to an agreed course of action and there is no undertaking to update the information that has been passed. The dynamic nature of an air traffic environment may render traffic information obsolete once passed but if, after receiving traffic information, a controller believes that co-ordination is necessary, he shall use the term "request co-ordination"…'

CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

Conclusions

The Airprox occurred when the AS355 pilot, in receipt of a TS from Brize Norton Radar, transited through the promulgated Instrument letdown area for Oxford Airport and came into conflict with a GV which had commenced an ILS approach procedure for RW19.

BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred on 9 Sep 12, between an AS355 operating VFR in receipt of a TS from Brize Norton (BZN) APP and a Gulfstream V (GV) operating IFR in receipt of a PS from Oxford APP, inbound to Oxford.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Information

The AS355 pilot reported operating at altitude 2500ft in unlimited visibility, 200ft beneath cloud. BZN APP reported medium to low workload and low task complexity and were providing an ATS to one ac conducting a BZN CTR crossing, in addition to the AS355 pilot.

The incident sequence commenced at 1719:08, as the AS355 pilot left the BZN CTR and was placed under a TS. At this point, the GV pilot was 11.7nm ESE of the AS355 and 6nm SE of Oxford, in a RH turn passing through W, indicating altitude 3400ft [QNH 1007hPa]. The AS355 pilot was tracking NE'ly, indicating altitude 2400ft, and maintained this track until 1722:12, shortly after the CPA. The GV squawk code was code-callsign converted to display the ac's callsign and entry designator. This information was displayed to BZN controllers on their surveillance displays.

Between 1719:37 to 1719:46 and 1720:32 to 1720:37, BZN APP was involved in RT exchanges with the unrelated ac conducting a BZN CTR crossing. At 1720:54, BZN APP passed TI to the AS355 pilot stating, "*traffic south-east, 3 miles, tracking north-west, one thousand feet above*" which was acknowledged. At this point, the GV pilot was 4.3nm SE of the AS355, tracking NNW'ly and indicating altitude 3400ft. The AS355 pilot stated that he first sighted the GV on his TAS when it was 1000ft above him, at the '3500ft position passed by Brize ATC', which correlates with this initial TI transmission.

The guidance material for CAP774 Chapter 3 Para 5 states that, '*Controllers shall aim to pass information on relevant traffic before the conflicting aircraft is within 5 nm*.' However, given the time of the CPA (1722:08), the relative speeds of the ac involved and the incident geometry, BM SPA contends that the late provision of TI was neither a causal nor contributory factor in the Airprox.

At 1721:12, the GV pilot, 3.1nm ESE of the AS355, turned onto a NNE'ly track and commenced descent. At 1721:28, BZN APP updated the TI on the GV to the AS355 pilot stating, "*previously called traffic er 12 o'clock, 2 miles, crossing left-right er 800ft above descending*." The AS355 pilot acknowledged the TI, replying that he had, "*got him on TCAS*." The GV was 2.6nm E of the AS355, tracking NNE'ly and descending through altitude 3100ft. Notwithstanding that BZN APP incorrectly described the track of the GV as "*left-right*", it is clear from the AS355 pilot's reply to the TI and his Airprox report, that this error had no bearing on his SA and thus was neither a causal nor contributory factor in the Airprox.

At 1721:42, the GV pilot turned onto a NNW'ly track and, at 1721:45, BZN contacted Oxford APP to advise them of the AS355, stating that, "*there's traffic north-west of you, 3-7-0-3*." At this point, the GV was 2.1nm ENE of the

AS355, descending through altitude 2800ft and the AS355 was 3.6nm NW of Oxford. BZN APP continued, advising Oxford APP that the AS355 was, "*maintaining 2500ft, 1-0-0-8*." Oxford APP replied, "*Okay, the traffic in his twelve o'clock's a Gulfstream*" which was acknowledged by BZN APP and the landline call terminated at 1721:54. Oxford APP's reply suggests that whilst he was not using the recently installed radar to provide an ATS to ac, he was able to see the AS355 on radar.

The CPA occurred at 1722:08, 3.5nm NNW of Oxford, as the GV passed 1.5nm NE of the AS355, through its 12o'clock position and descending through its level, on a NNW'ly track. At 1722:12, the AS355 can be seen on radar to have initiated a turn to the R and a descent. At 1722:34, BZN APP provided a further update of the TI on the GV to the AS355 pilot stating, "*previously called traffic north, 2 miles, indicating 100ft below, descending, it's a Gulfstream, will be descending into Oxford*." The GV was 2.3nm N of the AS355, continuing to track NNW'ly, descending through altitude 2000ft. The AS355 pilot acknowledged the TI, replying "*Err, roger, that's copied, I'm regaining 2500*." Immediately after this, the AS355 pilot and BZN APP were engaged in an exchange of RT concerning the Airprox event and, at 1723:29, the AS355 pilot advised that he had, "*dropped about 400ft cos I couldn't see him*."

Analysis and Conclusion

In terms of the military ATM aspects of this Airprox, it may have been useful for BZN APP to enhance the TI that was passed to the AS355 pilot at 1720:54, by adding that the GV was inbound Oxford. This point was echoed by the AS355 pilot in his report, saying that if he had been aware of the GV pilot's intentions as an Oxford inbound ac he would have altered his 'position in space…so as not to create any possible conflict'. That said, the AS355 pilot acknowledged that he was aware of the potential for Oxford IFR traffic to be operating within that area. Given the low workload experienced by BZN APP, it is also reasonable to suggest that an earlier call to Oxford APP to pass them TI on the AS355 may have been appropriate, once it became apparent that the AS355's track could be a factor for the GV. That said, given that it was only certain that the AS355 would affect the GV once the GV had commenced its descent 'beacon outbound' at 1721:12, the call could have been made, at best, only 33sec earlier. Moreover, when the call was made, at 1721:45, it did not elicit any request from Oxford APP to agree a course of action with regard to the AS355 and GV.

Notwithstanding the "*left-right*" error which, as already stated, was neither a causal nor contributory factor, BZN APP provided relatively accurate and timely TI to the AS355 pilot. The AS355 pilot was able to utilise this information, alongside that gained from his TAS, to undertake a course of action to increase the separation that already existed between his ac and the GV. Given the lateral separation that existed at the CPA, it is reasonable to suggest that the pilot of the AS355 would have been less concerned if he had been able to visually acquire the GV.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings and reports from the appropriate ATC and operating authorities.

The Board first considered the actions of the pilots. The AS355 pilot was aware of the conflicting GV traffic from information supplied by his TAS and TI from Brize Norton APP although it was apparent he perceived that the traffic was closer than it actually was. His avoiding action turn and descent occurred very shortly after the CPA and so did not increase mis-distance. The Board agreed that the erroneous TI passed at 1721:28 did not have a significant effect on the AS 355 pilot's SA. The GV pilot was under a PS from Oxford and was starting the procedural ILS approach to RW19. He stated that he did not receive a TCAS TA or RA or indeed any indication of proximate traffic during the approach. In the absence of relevant recorded information, the Board were unable to determine why proximate traffic was not indicated, especially given the AS355 pilot's TAS indications. One Pilot Member opined that the area has such a high level of flight activity that the GV pilot could have become desensitised to proximate traffic indications such that he was not able to recall a specific instance on this approach. The Board also opined that the cloud conditions were a factor, with the AS355 pilot reporting flying '200ft below cloud' and the reported weathers at Brize Norton and Oxford indicating FEW between 2200ft and 4000ft. The GV pilot did not report his weather conditions so the Board could only surmise that the AS355 pilot would not initially have been able to see the GV. A controller Advisor to the Board noted that controllers cannot be aware of local weather conditions unless pilots brief them; the exchange of weather reports and TI being controller/pilot teamwork. It was noted that both pilots were flying in Class G airspace, that they both had an equal responsibility

to ‘see and avoid’ and that the GV had right of way over the AS355. The Board also emphasised that the responsibility to ‘see and avoid’ remained, no matter what the flight conditions or whether the flight was operating under VFR or IFR, and consequently that pilots were expected to request an ATS appropriate to their conditions.

Turning to the provision of ATS, ATC Members were of the unanimous opinion that both controllers had provided the agreed service iaw the relevant regulations and that this Airprox served as a prime example of why the provision of a service to the bare minimum required may not enhance safety of flight. Both controllers were in possession of the information required to effect safe deconfliction and, whilst the Board recognised they did not have any responsibility to do so themselves, it was entirely within their power to provide sufficient information to the pilots to enable them to do so. ATC Members also opined that, given the medium to low workload of both controllers, it could reasonably have been expected that they effect some form of meaningful coordination or that Brize APP offer to transfer control to Oxford, thereby enabling deconfliction under the PS. In the event, Brize APP’s phone call to the Oxford controller occurred some 38sec before CPA and probably represented the last opportunity to effect meaningful coordination. The opportunity was not taken and the ac flew into conflict.

Despite the absence of a proactive approach by the controllers, and notwithstanding the AS355 pilot’s perception of the proximity of the GV, the Board recognised that the CPA was such that the risk of collision was negligible and consequently that the Risk was minimal.

PART C: ASSESSMENT OF CAUSE AND RISK

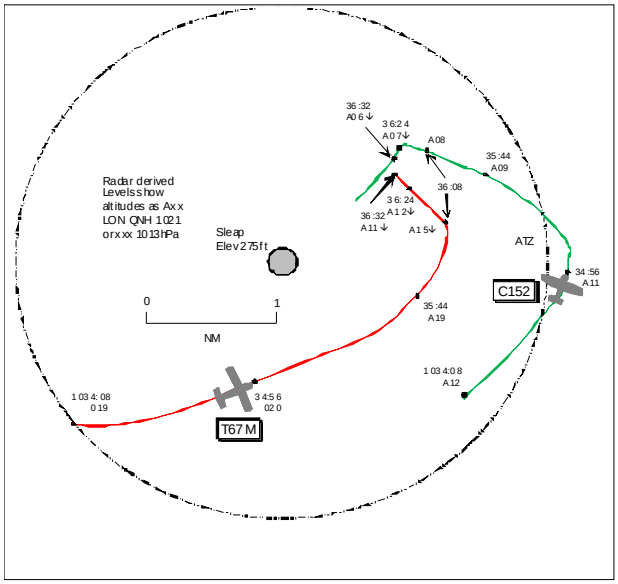
Cause: A conflict between Procedural IFR traffic and VFR traffic in the vicinity of the Oxford instrument approach pattern.

Degree of Risk: C.

AIRPROX REPORT No 2012143

AIRPROX REPORT NO 2012143

Date/Time:	13 Sep 2012 1035Z	
Position:	5251N 00245W (1nm FIN APP RW23 Sleap - elev 275ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Slingsby T67M	C152
Operator:	Civ Club	Civ Club
Alt/FL:	500ft	300ft
	QFE (1011hPa)	QFE (1011hPa)
Weather:	VMC CLOC	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:		
	100ft V	Not seen
Recorded Separation:		
	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SLINGSBY T67M PILOT reports flying a solo local sortie from Sleap, VFR and in receipt of an A/G service from Sleap Radio on 122·45MHz, squawking 7000 with Mode C. The visibility was >10km clear of cloud in VMC and the ac was coloured yellow with strobes and landing light switched on. He rejoined the cct from the W after carrying out aerobatics and was visual with an ac about to descend deadside whilst his ac was on the liveside at 2000ft in a downwind position for RW23 LH cct. He was also visual with an ac on short final about to touchdown. He decided to practise a glide approach from his current position as no ac would conflict with this so he radioed his intentions and checked no other ac were downwind by asking on the radio. No replies were received so he closed the throttle and set up a downwind glide at 70kt and then turned L base, looking out for other traffic, before then turning onto final. He called "final" and then another ac's pilot called "final for a go-around". He looked out and saw nothing so thought the other ac must be behind his ac and its pilot had seen him so he carried on with his approach. On very short final around 600ft Sleap Radio called, "(T67M c/s) another ac is on final". He replied, "I'm on short final" and looked for the traffic but still saw nothing. A moment later at around 500ft the other ac, a C152, appeared below (about 100ft) and slightly in front. He immediately opened full throttle and climbed away in a go-around to the R of the RW. He assessed the risk as high.

THE C152 PILOT reports flying a local sortie with a passenger from Sleap, VFR and in receipt of an A/G service from Sleap Radio on 122·45MHz, squawking 7000 with Modes S and C. The visibility was >10km flying 5000ft below cloud in VMC and the ac was coloured blue/white with strobe and landing lights switched on. He had departed at about 1015 for cct practice RW23 LH cct with a cct height 1000ft and conducting touch and go landings. He made 'blind' position calls to identify when he was "downwind for touch and go" and "final for touch and go". He maintained a lookout, seeing and hearing other traffic talking to Sleap A/G Radio Operator. On his third downwind leg the RT was busy with radio communications preventing a normal 'downwind' call so he consequently declared "late downwind" when the frequency became clear to indicate that he was nearing the end of the downwind leg. He turned onto base leg prior to Wem to comply with the noise abatement procedures and configured the ac for landing (landing light on, 2 stages of flaps and 70kt) whilst descending from 1000ft to 700ft. At 700ft he turned L onto final approach heading 230° for RW23 and made a blind call, "(C152 c/s) final touch and go". Whilst his attention was focussed on the RW numbers he saw no other ac in front, above, below or to either side. On previous approaches, the A/G Operator has passed surface wind direction and speed but he could not recall these being given on this approach. However, having just declared his position he heard another ac's pilot declare, "[T67M] c/s short final". He instantly checked for other traffic but saw nothing in front, above, below or either side and was unable to check above/behind owing to his ac's high-wing configuration. Before he could respond further, the A/G Operator informed the other ac's pilot that his C152 was already on final approach. The

other pilot responded in a way that indicated that he had just seen his C152 and declared, “going around”. He couldn’t see the T67M but was now satisfied that its pilot was taking avoiding action so he decided to continue his approach to land as he didn’t want to conflict with any avoiding action taken by the T67M pilot; by now he was descending through 300ft QFE. He made a touch and go before completing a fourth and final cct for landing. He assessed the risk as high. Later he discussed the incident with the A/G Operator, the Duty FI, and also had a face-to-face debrief with the T67M pilot to try and understand how the Airprox occurred and what lessons could be learned.

THE SLEAP A/G OPERATOR reports the T67M flight conducted a non-standard join, a downwind descent from 2000ft and called short final on a glide approach. The C152 pilot had already called “final” during a standard cct. The T67M descended above the C152, coming within 50ft of it, its pilot had been told there was already 1 ac [the C152] on final.

Unofficial Met Ob was provided: - 24012KT CAVOK=

ATSI reports the Airprox occurred at 1036:37 UTC, on the final approach for RW23 at Sleap Aerodrome and within the Sleap ATZ, Class G airspace, which consists of a circle radius of 2nm centred on RW05/23, extending from the surface to a height of 2000ft above the aerodrome elevation (275ft above mean sea level).

The C152 was conducting a VFR cct detail on RW23 LH, following the Sleap cct procedures using QFE 1011hPa. The C152 pilot was in communication with Sleap Radio (A/G) on frequency 122·45MHz. The Slingsby T67M was operating VFR from Sleap aerodrome and was returning to Sleap from the W after the completion of an aerobatic flight. The T67 pilot was in communication with Sleap Radio (A/G) on frequency 122·450MHz.

Sleap Aerodrome is promulgated as providing A/G within the notified hours of operation. Sleap ATZ is located within the RAF Shawbury MATZ. The UK AIP entry for Sleap EGCV AD 2.22 states:

1(c) Join overhead at 2000ft QFE
3(a) Circuit height 1000ft QFE

CAA ATSI had access to: area radar recordings; written reports from both pilots; written report from the Sleap A/G operator. RT recordings are not available at Sleap Aerodrome. The area radar system QNH was 1021hPa. The multi-radar tracking mode of the area radar suffered from some slight track deviation as the 2 ac turned onto final approach, but provided a good indication of the relative positions of the 2 ac.

The Shawbury weather is provided:

METAR EGOS 130950Z 26013KT 9999 FEW022 13/07 Q1020 BLU NOSIG=
METAR EGOS 131020Z NIL=
METAR EGOS 131050Z 24012KT 9999 FEW030 15/08 Q1019 BLU NOSIG=

The C152 pilot reported conducting standard ccts RW23 LH at 1000ft QFE, with ‘touch and go’ landings and blind position reports when downwind. On the third downwind leg the C152 pilot reported that the RT was busy, preventing the normal downwind call, but he subsequently reported late downwind.

The T67M pilot reported rejoining from the W and that when in the live downwind position at 2000ft QFE, the T67M pilot was visual with 1 ac descending deadside and 1 ac on short final. The T67M pilot decided to practise a glide approach determining that no other ac was likely to affect the approach.

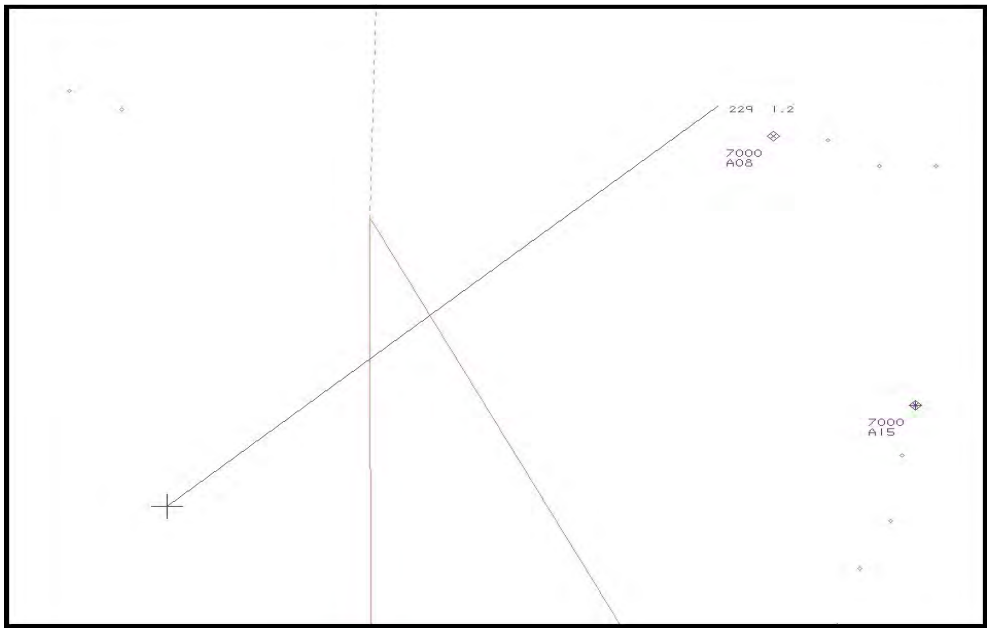
[UKAB Note (1): The radar recording at 1034:08 shows the T67M 2nm SW of Sleap tracking E’ly level at FL019 (altitude 2100ft or height 1825ft QFE) with the C152 1·7nm SE of Sleap downwind LH for RW23 indicating altitude 1200ft (925ft QFE).]

At 1034:56, radar shows the C152 at an altitude of 1100ft (Height 825ft), turning base leg in the standard cct pattern. The T67M is shown at FL020 (Height 1900ft) commencing the downwind leg in a short cct pattern.

AIRPROX REPORT No 2012143

The C152 pilot reported that he descended on base leg and turned onto final at 700ft, reporting "final touch and go". At 1035:44, radar shows the C152 established on L base at a range of 1·6nm from the threshold of RW23 indicating altitude 900ft (675ft QFE). The T67M is shown at an altitude 1900ft (1625ft), late downwind 1nm SE of the threshold.

The T67M pilot's written report indicates that he may have heard another ac's pilot call on final but as he turned L base, he wasn't aware of another ac on final. At 1036:08, the C152 is shown at altitude 800ft (height 525ft) on a closing heading and 1·2nm from touchdown. The T67M is shown at altitude 1500ft (height 1225ft), on L base in a continuous L turn as shown in picture 1 below.



Picture 1 – 1036:10

At 1036:24, the T67M is shown to continue the L turn inside the C152 which was turning onto final approach. The 2 ac continued to converge, with the T67M making a steeper glide approach from above the C152.

[UKAB Note (2): At 1036:32 the C152 is established on final approach descending through altitude 600ft (325ft QFE) with the T67M in its 11 o'clock range 0·1nm indicating altitude 1100ft (825ft QFE). The T67M disappears from radar on the next radar sweep as the C152 continues its descent on final approach. The CPA is not captured as the T67m only reappears N abeam the Sleap O/H as the C152 disappears during its touch and go.]

The T67M pilot indicated that when on final he heard another ac's pilot calling final for a go around but saw nothing and continued with the approach. The T67M pilot indicated that Sleap Radio advised him that there was another ac on final. The T67M pilot indicated that he sighted the C152 below and applied full throttle and climbed away.

The Sleap A/G operator's written report indicates that the T67M conducted a non-standard join downwind descending from 2000ft and called short final using a glide approach. The C152 had already called final when the A/G operator observed the T67M descending from above the C152. The A/G operator reported that the T67M had been told that there was already 1 ac on final.

The 2 ac were operating in the Sleap ATZ, within Class G airspace, in contact with Sleap Radio (A/G) and not in receipt of an ATS. The cct and RT reporting was considered to be at medium levels of traffic. The T67M pilot decided to conduct a non-standard join from the downind position at 2000ft QFE for a glide approach, without being fully aware of the other traffic in the cct. This resulted in the T67M making a short cct pattern from 2000ft and turning onto short final above the C152 on the normal approach.

The RoA Rule 12(a) states:

'that the commander shall... conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed…'

The Airprox occurred when the T67M commenced a non-standard join from 2000ft in the downwind position for a practice glide approach, without being fully aware of the other traffic in the cct. This resulted in a much shorter pattern and high approach which brought the T67 into conflict with the C152 on a normal approach path.

The Sleap Radio operator observed the T67M descending from above the C152 and advised the T67M pilot that there was another ac on final. The situation was resolved when the T67M pilot sighted the C152 and broke off the approach.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, reports from the A/G Operator involved and reports from the appropriate ATC authorities.

Without the benefit of an RT transcript, it was unclear to Members as to the timings and content of the T67M and C152 pilots' transmissions on the Sleap frequency. Consequently the pilots' recollections of what they thought was broadcast or heard during the evolution could not be clarified. The C152 pilot was carrying out a cct detail and, as shown on the radar recording, had established a cct pattern ahead of the T67M's arrival in the Sleap O/H. The T67M pilot had flown to the O/H and then elected to carry out a glide approach from a high-downwind position by flying a tight cct close-in to the RW. The GA pilot Member commented that when intending to carry out a non-standard cct, the onus was on the pilot to ensure that there were no other ac which would conflict with his flight profile. However, the T67M pilot's mental picture of the cct state was erroneous as he had not assimilated that the C152 was ahead on a wider cct. Although he had tried to improve his SA from the RT exchanges, his primary method of cct integration was through see and avoid. Members commented that SA is significantly improved by conducting an O/H join during which cct traffic can be visually acquired whilst manoeuvring in the O/H and following the procedure. Members agreed that the cause of the Airprox was that, in electing to fly a glide cct, the T67M pilot did not conform with the cct pattern formed by the C152 and descended into conflict with it on final approach.

Looking at the risk, the low-wing T67M was descending towards the high-wing C152 from above, a combination where the pilots' ability to see the other ac was degraded by the ac's wing configurations. That said, the radar reveals that there was ample opportunity for the T67M pilot to see the C152 ahead and below all the way around the cct until he was established on final approach. It was only when both pilots broadcast their 'final' calls that it became apparent that something was amiss. The T67M pilot believed that the C152 was behind and continued his approach whilst the C152 pilot was concerned as he could not see the T67M ahead and was unable to scan for it above and behind. Fortunately the A/G Operator had seen the deteriorating situation and stepped-in on the frequency by alerting the T67M pilot to the C152 on final; Members commended the action taken by the A/G Operator who believed that only 50ft of separation pertained at the CPA. It was at this very late stage that the C152 appeared just ahead and about 100ft below to the T67M pilot who immediately executed a go-around and broadcast this on the RT. On hearing this transmission, the C152 pilot was satisfied that the situation had been resolved and elected to continue his approach. Members believed that luck had played a large part in the outcome as it was only at a very late stage that visual acquisition was made and action taken as the T67M descended on top of the C152. This fact alone was enough for the Board to conclude that an actual risk of collision existed during this Airprox.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The T67M pilot did not conform with the established cct pattern and descended into conflict with the C152 on final.

Degree of Risk: A.

AIRPROX REPORT No 2012145

AIRPROX REPORT NO 2012145

Date/Time:	9 Sep 2012 1427Z (Sunday)		
Position:	5213N 00137W (1nm FIN APP RW18 Wellesbourne Mountford - elev 159ft)		
Airspace:	ATZ	(Class: G)	
	Reporting Ac	*Reporting Ac*	*Reported Ac*
Type:	PA28(A)	RC114	PA28(B)
Operator:	Civ Trg	Civ Pte	Civ Pte
Alt/FL:	500ft↓	1000ft	1000ft↓
	QFE (1002mb)	QFE	QFE
Weather:	VMC CAVOK	VMC NR	VMC NR
Visibility:	NR	>10km	>10km

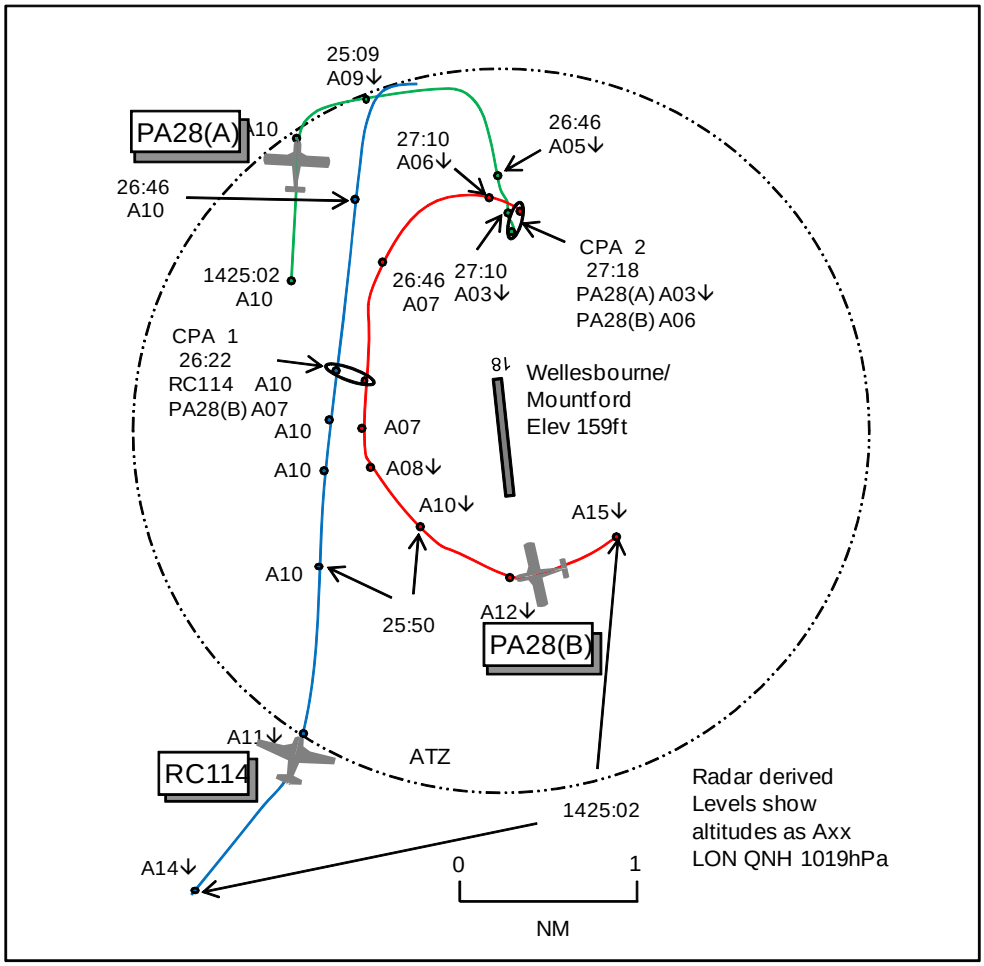
Reported Separation:

PA28(A) v PA28(B) 50ft V/<100m H
RC114 v PA28(B) Nil V/0·3nm H
PA28(B) v PA28(A) 500ft V

Recorded Separation:

300ft V/0·1nm H

PA28(A) AND RC114 PILOTS AND FISO FILED



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28(A) PILOT reports flying dual training sortie from Wellesbourne, VFR and in communication with Wellesbourne Information on 124·025MHz, squawking 7000 with Mode C. The Wx was VMC in CAVOK conditions. Whilst descending on final approach RW18 he saw 2 ac [PA28(B) and RC114] very close together downwind but at that stage there was no risk of collision as far as his ac was concerned. They continued to concentrate on flying the final approach and when descending through 500ft QFE heading 180° at 70kt he suddenly noticed that there was an ac 100m away on a very tight R base heading straight towards his ac. Assessing the situation quickly he realised that the ac was on a direct collision course from the R and above so he called on the radio to ask "ac on base to go-around immediately" whilst he diving his ac away with a L turn. In doing so he lost sight of the ac but was later told by the FISO that it had ended up directly above his ac. He assessed the risk as high.

THE RC114 PILOT reports inbound from Compton Abbas, VFR and in communication with Wellesbourne Information on 124·025MHz, squawking 7000 with Modes S and C. The visibility was >10km flying 1500ft below cloud in VMC and the ac was coloured blue/white with nav, landing, strobe and anti-collision lights all switched on. Positioning to join downwind at 1000ft QFE and 100kt PA28(B) was first seen on PCAS and immediately visually 1·4nm on a conflicting 90° track off to his R about midpoint downwind to land RW18 RH cct. At 0·4nm PA28(B) turned R to parallel his N'ly downwind track, at cct height but well inside the Wellesbourne cct. A pilot seated in the RH seat observed PA28(B) descending and moving under their starboard wing, PCAS indicated 0·3nm. He took no avoiding action as his ac's speed exceeded that of the PA28. He intended to allow PA28(B) to take the No 2 to land position but when it was abeam the RW18 threshold the ac began a sharp descending RH turn towards the RW and into conflict with another ac, PA28(A), which was on final, before climbing on the deadside. He assessed the risk as high owing to the confusion the Airprox caused and subsequent Airprox between PA28(A) and PA28(B).

THE PA28(B) PILOT reports inbound from Gloucestershire, VFR and in communication with Wellesbourne Information on 124·025MHz squawking with Mode C. On arrival he was instructed to join O/H and descend on the deadside. On tracking crosswind there was an ac [the RC114] in his 11 o'clock on which he was visual. He reported downwind and explained that he was visual with the ac in his 11 o'clock and was instructed to report final. [Diagram provided shows PA28(B) turning inside the RC114 downwind]. Turning onto base leg he realised there was an ac [PA28(A)] on final approach so he initiated a climbing go-around and acknowledged with the FISO that he was going around. He had not heard PA28(A) pilot's calls in the cct to establish the ac's position and only saw it when it was at 500ft on final. He estimated 500ft vertical separation at the CPA.

THE WELLESBOURNE FISO reports PA28(A) was carrying out a training flight conducting ccts on RW18 RH. The RC114 had joined the cct having returned from a cross-country flight and was positioned downwind. PA28(B) flight was inbound from Gloucestershire and had received joining instructions for RW18 RH cct and was told informed there were 2 ac in the cct. PA28(B) flight joined the cct on the deadside and reported downwind. PA28(A) flight turned onto final approach and reported final and was given information to touch and go. Suddenly, as PA28(A) continued its approach, at 1nm PA28(B) made a descending R turn towards final approach conflicting with PA28(A). The instructor in PA28(A) made a radio call stating that an ac was to his R and above him and that it should go-around. The pilot of PA28(B) was advised to take avoiding action and the ac proceeded to go-around onto the deadside of the cct. PA28(A) carried out a touch and go, the RC114 landed and PA28(A) carried out another cct and landed. The RC114 pilot later explained that PA28(B) had also conflicted with his ac causing him to take avoiding action but this was not seen by the FISO as he was focussed on PA28(A) on final approach. Later the PA28(B) pilot was told of the confliction with both the RC114 and PA28(A), the pilot stating he had not seen either ac, he thought. The pilot was reminded of the need to maintain a good lookout and to ensure adequate separation is maintained.

ATSI reports that the Airprox was reported in the Wellesbourne Mountford ATZ, Class G airspace, which comprises a circle radius 2nm centred on RW18/36 from the surface up to 2000ft above aerodrome level (aal). The Airprox was reported by the pilot of PA28(A) and the pilot of a RC114 when another ac, PA28(B) flew into conflict with both other ac.

The PA28(A) flight was operating VFR, conducting RH ccts to RW18 at Wellesbourne Mountford and was in receipt of a BS from Wellesbourne Information on frequency 124·025MHz.

AIRPROX REPORT No 2012145

The RC114 flight was operating VFR on a flight from Compton Abbas to Wellesbourne Mountford and was in receipt of a BS from Wellesbourne Information on frequency 124·025MHz.

The PA28(B) was operating VFR on a flight from Gloucester to Wellesbourne Mountford and was in receipt of a BS from Wellesbourne Information on frequency 124·025MHz.

CAA ATSI had access to area radar recordings and written reports from the pilots of the PA28(A), the RC114 and the PA28(B) together with a written report from the Wellesbourne Mountford FISO.

The Coventry METARs are provided for 1420 and 1450 UTC:

EGBE 091420Z 20012G23KT 160V230 CAVOK 26/12 Q1007= and EGBE 091450Z 20010KT 170V240 CAVOK 25/13 Q1007=

The written report from the Wellesbourne FISO stated that the PA28(A) was conducting RH ccts to RW18. The RC114 was returning from a cross country flight and was positioned downwind while the PA28(B), which was inbound from Gloucester, had received joining instructions for RW18 RH and had been informed that there were 2 in the cct.

The written report from the pilot of the RC114 stated that the PA28(B) was initially sighted on a conflicting 90° track to the R. The PA28(B) turned R to parallel the RC114's N'ly track at cct height but well inside the Wellesbourne circuit. The pilot of the RC114 intended to extend downwind and allow the PA28(B) to take the number 2 position but abeam the 18 numbers the PA28(B) began a sharp descending RH turn towards the RW in conflict with the PA28(A) which was on final.

The written report from the pilot of the PA28(A) stated that while on final approach for RW18 he saw 2 ac very close to each other downwind. The pilot of the PA28(A) continued the approach and then saw the PA28(B) turn onto a very tight R base directly towards the PA28(A). The pilot of the PA28(A) believed that the PA28(B) was on a direct collision course from the R/above and called on the radio for the PA28(B) to go-around immediately.

The written report from the PA28(B) stated that he was instructed to join O/H and descend on the deadside. When the PA28(B) was crosswind there was an ac in the 11 o'clock position from the PA28(B) which the pilot was visual with. When the PA28(B) turned base the pilot realised that there was an ac about 500ft on final approach. The PA28(B) carried out a go-around.

Radar recordings show that at 1422:41 the PA28(A) is airborne in the cct while the PA28(B) is 1·5nm SW of the airfield indicating altitude 2000ft prior to the O/H join. At 1425:02 the PA28(A) is approaching R base, the PA28(B) has descended to 1500ft and is turning crosswind while the RC114 is 3·1nm SW of the airfield at 1400ft.

[UKAB Note (1): At 1425:50 PA28(B) is turning towards the downwind leg, inside the RC114. PA28(B) rolls out onto a parallel the track with that of the RC11, with the CPA (CPA 1) occurring at 1426:22 as the RC114, at altitude 1000ft, passes 0·1nm on the PA28(B)'s LHS, PA28(B) indicating 700ft. Twenty-four seconds later, at 1426:46, PA28(B) commences a R turn onto R base towards the PA28(A) which was on final. By 1427:10 PA28(B) is indicating 600ft and converging with PA28(A), which just R of its 12 o'clock range 0·2nm and 300 ft below. The next sweep at 1427:18 shows PA28(B) passing 0·1nm behind PA28(A) with vertical separation 300ft, CPA 2. PA28(A) continues the approach while PA28(B) breaks onto the deadside and later rejoins the cct.]

CAP410 the Manual of Flight Information Services, part B Aerodrome, Chapter 1, Paragraph 7.4 states:

'Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly.'

The Airprox took place in Class G airspace where pilots are ultimately responsible for their own traffic avoidance.

The FISO passed information to the PA28(B) that there were 2 other ac in the cct with the expectation that the pilot of the PA28(B) would position himself accordingly.

An Airprox was reported in the Wellesbourne Mountford Aerodrome Traffic Zone, when the PA28(B) flew into conflict with the RC114 and the PA28(A).

[UKAB Note(2): The RoA Rule 12(a) states:

'that the commander shall... conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed…']

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, reports from the FISO involved and reports from the appropriate ATC authorities.

Because of the nature of this incident, Members agreed that it should be assessed as 2 independent Airprox with 2 separate causes and risks.

The first incident occurred as both PA28(B) and the RC114 were integrating into the visual cct, after PA28(B) pilot carried out an O/H join and the RC114 pilot joined downwind. The Chairman opened the discussion with the question of "who had established the traffic pattern?" The CAA Flt Ops Advisor opined that Rule 12 was open to interpretation; it was written on the understanding that 1 ac had already formed a traffic pattern whereas in this incident both flights were trying to integrate into the pattern formed by PA28(A). In slightly different circumstances, had the RC114 been already established downwind, PA28(B) pilot would be expected to position from crosswind behind, and to follow, the RC114; if both ac had joined O/H, the traffic order would have been previously sorted. However, pilot Members noted that when the PA28(B) flight was positioning crosswind in the ATZ (although not O/H the upwind numbers of the RW in accordance with the procedure), the RC114 was still outside the ATZ and turning to join on an extended upwind 'downwind leg' position. Owing to the high speed differential, the RC114 very quickly arrived into the downwind leg as PA28(B) was turning downwind. It is possible that the pilot of PA28(B) did not appreciate initially that the RC114 was travelling much faster than his own ac; furthermore, from his position on the crosswind leg he had few options to manoeuvre to give way to the RC114. The Board noted that the RC114 pilot intended to allow PA28(B) to turn on to base and final ahead of him, but Members agreed that it would have been better to have slowed down early for better integration into the cct against other cct traffic As it was PA28(B) pilot saw the RC114 in his 11 o'clock and elected to turn inside of it and descend as it overhauled his ac on his LHS. The RC114 pilot reported seeing PA28(B) converging from the R before it manoeuvred onto a parallel track on his RHS. Members agreed that as neither ac had formed a pattern ahead of the other the cause was a conflict on the downwind leg between PA28(B) and the RC114.

The second incident was more straightforward. After the RC114 had passed on his LHS, PA28(B) pilot turned onto base leg without assimilating the position of PA28(A) on final and this caused the second Airprox. The FISO had told PA28(B) pilot that there were 2 ac in the cct [PA28(A) and RC114] when he joined O/H ahead but one Member wondered whether the RC114's passage had led PA28(B) pilot, unaware that the RC114 pilot intended to extend his downwind leg to let PA28(B) land ahead of him, to execute an early turn towards final in order to stay ahead of the RC114, instead of following it as No3. Whatever the reason, PA28(B) pilot was in error to turn towards final when he did.

In assessing the risk, in the first incident, with the early visual sightings obtained by both pilots and the actions taken by PA28(B) pilot, the Board concluded that any risk of collision had been effectively removed.

During the second encounter, Members commended the actions taken by PA28(A) Instructor when he noticed PA28(B), converging and descending from his R, during his final approach. He had made a broadcast advising PA28(B) to go-around whilst he turned and descended his ac: a good call. However, during this manoeuvre he lost sight of PA28(B) so was unable to keep track of its relative position. PA28(B) pilot saw PA28(A) late and executed a climbing go-around estimating 500ft vertical separation at CPA. Although Members were confident that these actions had removed the actual collision risk, the pilot of PA28(B) had descended towards PA28(A) and the radar recording reveals that PA28(B) crossed just 0·1nm behind and 300ft above PA28(A), which was still

descending, with each ac unsighted to both pilots. This was enough to persuade the Board that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: 1. A conflict on the downwind leg between PA28(B) and the RC114.

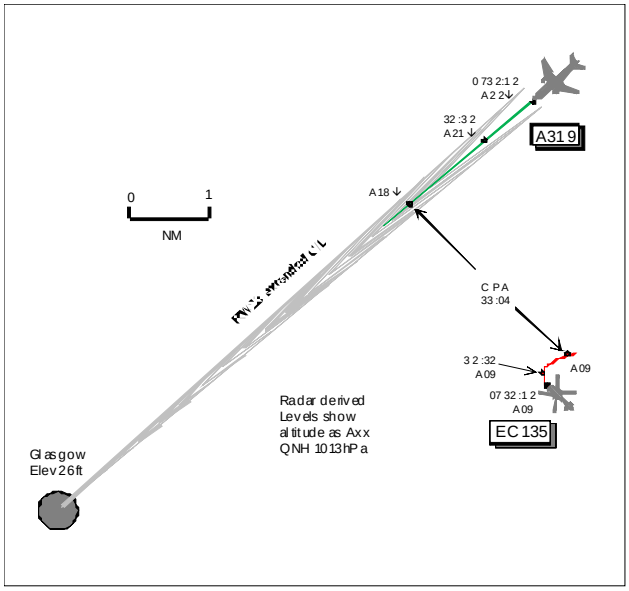
2. The pilot of PA28(B) turned into conflict with PA28(A) on final.

Degree of Risk: 1. C.

2. B.

AIRPROX REPORT NO 2012146

Date/Time:	13 Sep 2012 0733Z	
Position:	5555N 00416W (6nm FIN APP RW23 Glasgow - elev 26ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	A319	EC135
Operator:	CAT	Civ Comm
Alt/FL:	2000ft↓ (QNH)	800ft (agl)
Weather:	IMC KLWD	VMC CLBC
Visibility:		10km
Reported Separation:		
	400ft V/2·4nm H	500ft V/3nm H
Recorded Separation:		
	900ft V/2·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports inbound to Glasgow, IFR and in communication with Glasgow Tower on 118·8MHz squawking an assigned code with Modes S and C. Established on the ILS RW23 heading 231° at 180kt in cloud, traffic was seen on TCAS indicating 100ft below, he thought, approaching from 5nm and reducing. At 6nm from touchdown descending through 2000ft QNH, the traffic was seen on TCAS to pass 400ft below and 2·4nm clear on their LHS but was not seen visually. No avoiding action was taken as the traffic was passing behind.

THE EC135 PILOT reports being unaware of an Airprox until contacted by RAC Mil. At the time of the incident he was in receipt of an Approach Control Service, he thought [actually a RCS], from Glasgow on 119·1MHz, squawking a discrete code with Modes S and C; TCAS 1 was fitted. The Wx under the cloudbase was fine in VMC with 10km visibility and the helicopter was coloured dark blue with strobe lights and 2 landing lights switched on. The flight involved flying orbits around a lake approx 080° range 6nm Glasgow at 800ft agl and 15kt. All CAT traffic was being warned of his presence, location and altitude and he was being informed of ac on the approach. He did not see the other ac visually but noted it on TCAS some 8nm range and estimated it passed 500ft vertically clear and 3nm horizontally.

THE GLASGOW TOWER CONTROLLER reports operating as the Air controller when the A319 flight was transferred to his frequency at approximately 7nm on the ILS RW23. After initial contact the pilot requested information on a return he had on TCAS approximately 2·5nm away. He replied it was a helicopter, VFR just under 3nm away moving away. He advised the pilot that he would pass on to the Radar controller that the pilot felt that TI should have been passed.

ATSI reports that the Airprox occurred at 0733:05 UTC, 6nm to the NE of Glasgow Airport, on final approach for RW23, within the Glasgow Control Zone (CTR) Class D airspace, between an A319 and an EC135. The Glasgow CTR extends from the surface to an altitude of 6000ft.

The A319 flight was IFR and inbound to Glasgow from Belfast International Airport, in receipt of a RCS initially from Glasgow Radar on 119·1MHz before being transferred to Glasgow Tower on frequency 118·8MHz. The EC135 flight departed a heliport 4·75nm E of Glasgow Airport, VFR and was tasked to conduct a search in the vicinity of a small lake 6·5nm ENE of Glasgow Airport. The EC135 flight was in receipt of a RCS from Glasgow Radar on frequency 119·1MHz. The controller workload for Radar and Aerodrome Control was reported as low with no unserviceabilities.

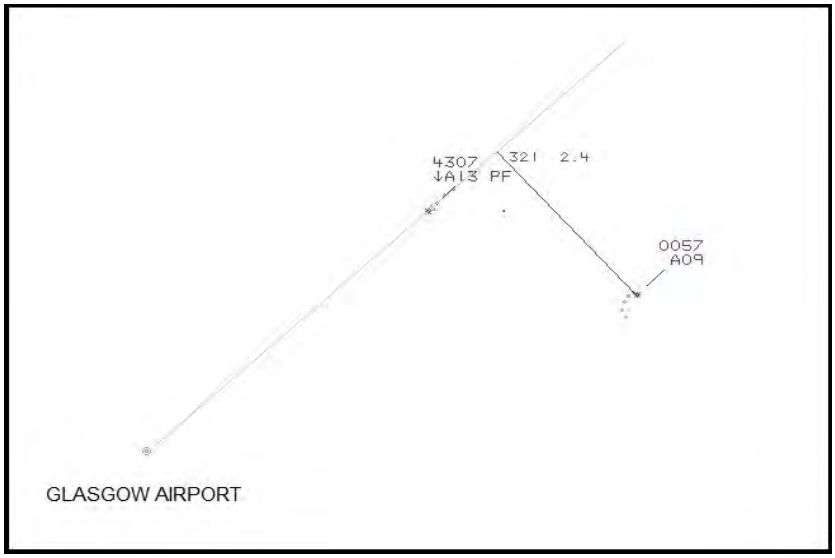
AIRPROX REPORT No 2012146

CAA ATSI had access to RT recordings for Glasgow Tower and Radar together with area radar recording and written reports from the controller, ATSU and from the 2 pilots concerned. The A319 pilot did not advise ATC of his intention to file an Airprox.

The Glasgow METAR was: EGPF 130720Z 23013KT 8000 VCSH SCT025 BKN037 11/09 Q1013=

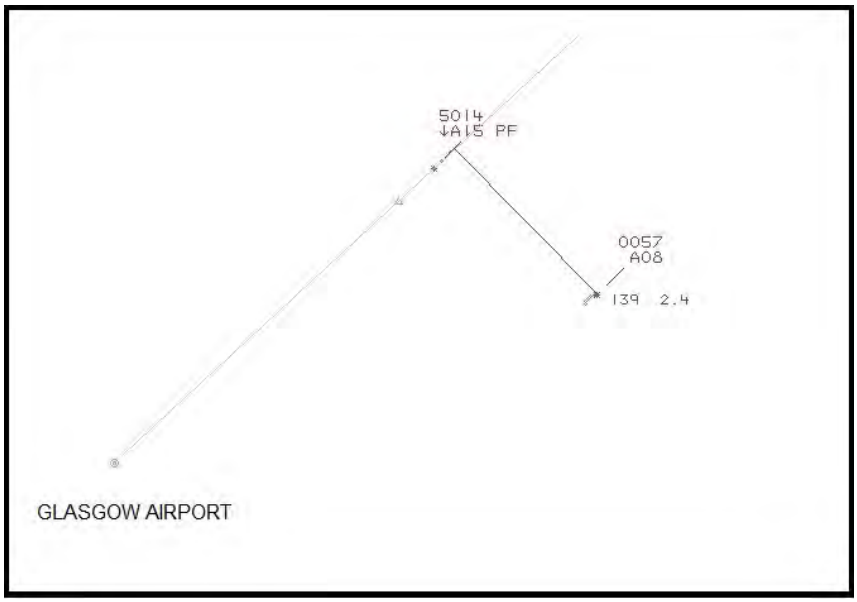
At 0708:32, the EC135 pilot contacted Radar and reported getting airborne on task from a Helipad 4·75nm E Glasgow Airport. This required the EC135 crew to search for a missing person in the vicinity of a small lake situated 3NM SE of the RW23 C/L at a point 4·6nm from touchdown. The EC135 starts to show on radar at 0710:26 as it passes an altitude of 100ft in the climb, 4·4nm E of the airfield.

At 0712:17, the EC135 (squawk 0057), is shown on task commencing a RH orbit over the lake at an altitude of 900ft and position, 2·4nm SE of the RW23 C/L. An earlier inbound (squawk 4307) is shown on the ILS (Picture 1).



Picture 1. (0712:17)

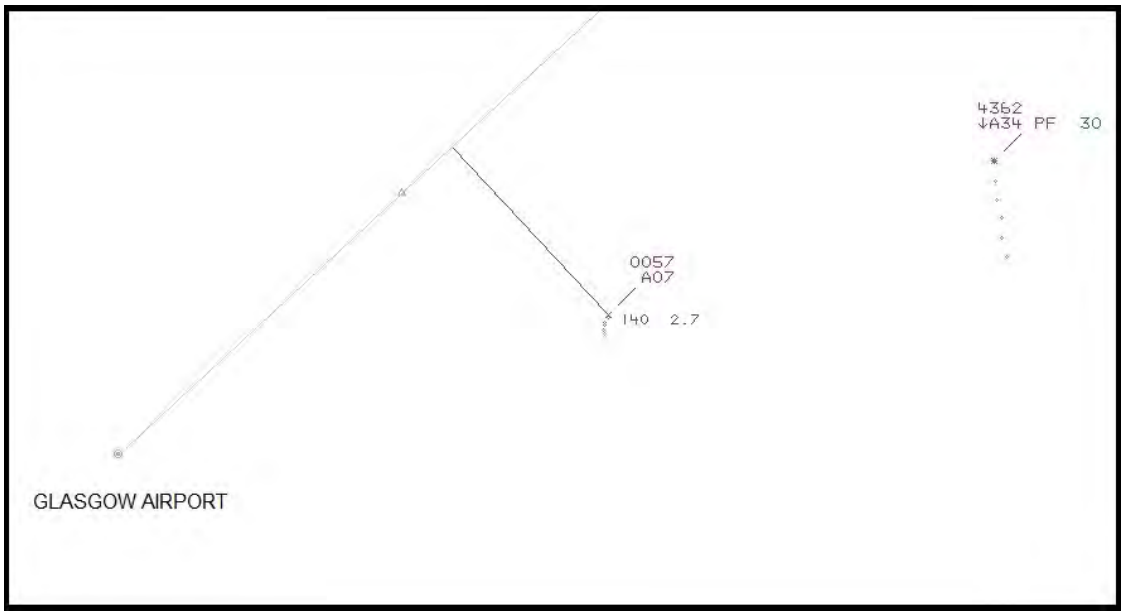
At 0715:57, another earlier inbound (squawk 5014) is shown on the ILS, with the EC135, 2·4nm SE of the RW C/L at 800ft.



Picture 2. (0715:57)

At 0722:02, the A319 flight contacted Glasgow Radar and the controller advised, *"(A319 c/s) vectors for the ILS approach Runway two three information mike you're number one in traffic there's no speed restriction and you're approximately 46 miles from touchdown.*"

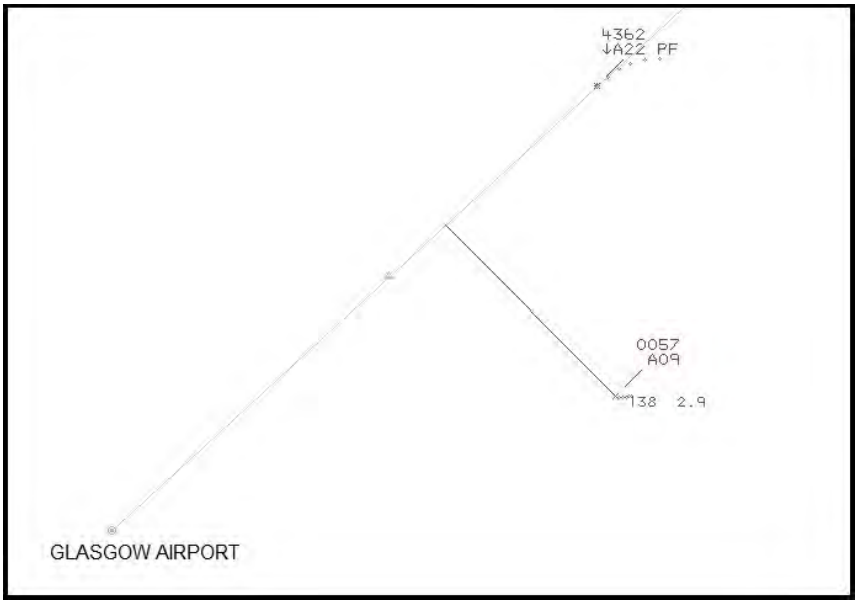
At 0730:01, radar shows the A319 (squawk 4362) passing an altitude of 3400ft, 10·9nm NE of the airfield. The EC135 is shown in a RH orbit around the lake at 700ft and positioned 2·7nm SE of the RW C/L (Picture 3).



Picture 3. (0730.01)

At 0730:03, the A319 flight is given a closing heading and instructed to report established on the LOC. Shortly afterwards the A319 flight is instructed to descend altitude 2000ft and cleared for the ILS approach RW23.

At 0732:12, the A319 is established on the localiser 7·5nm from touchdown at 2200ft, with the EC135 in the A319's half past 10 at a range of 3·7nm. The EC135 is in the RH orbit around the lake at 900ft and positioned 2·9nm from the C/L (Picture 4).

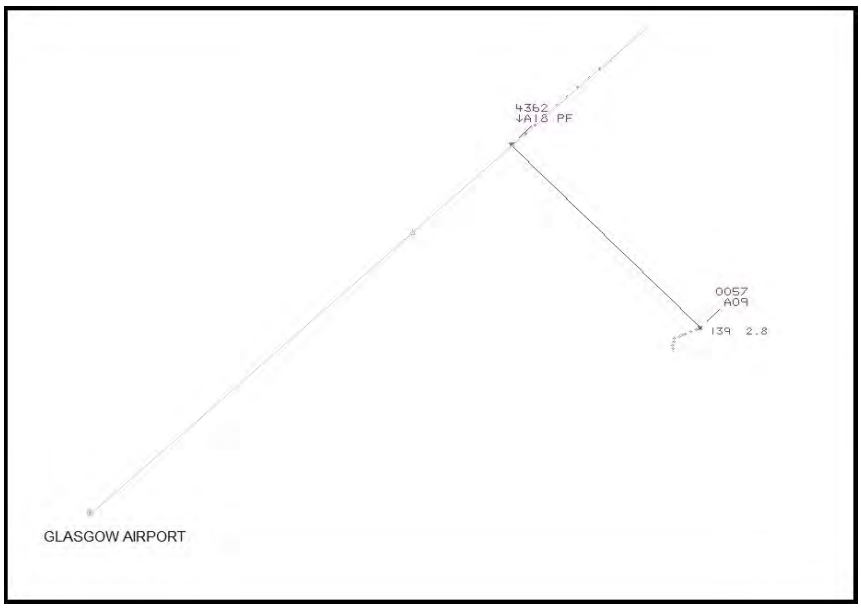


Picture 4. (0732:12)

AIRPROX REPORT No 2012146

The A319 was transferred to Glasgow Tower on frequency 118.8MHz. At 0732:31, the A319 flight is instructed to continue approach and 20sec later is cleared to land. At this point the distance between the 2 ac is 3·2nm.

At 0733:04, the A319 is 5·8nm from touchdown indicating 1800ft, with the EC135 in the A319's 9 o'clock at a range of 2·8nm (CPA), indicating 900ft. The EC135 is shown tracking NE (Picture 5).



Picture 5. (0733:04)

At 0733:11, the A319 crew advised, *"Glasgow Tower (A319 c/s) th – there's traffic on our TCAS two and a half miles away at seven hundred feet ????? six hundred feet are you working the traffic."* The Tower controller replied, *"(A319 c/s) there's traffic er working approach in your er nine o'clock at the moment just coming into your eight o'clock I think er er range about three miles moving away."* The A319 pilot responded, *"Yeah you might be able to see him but we can't see him."* The Tower controller informed the A319 pilot that he would pass on the message to the radar controllers.

At 0736:38, the Tower controller advised the A319 crew that the traffic mentioned was the EC135 operating VFR and just under 3nm away. The Tower controller added that TI would not normally be passed on such traffic, but that radar had agreed to pass TI to further inbounds if it was of concern.

At 0737:26, the EC135 pilot reported task complete and was shown to depart the area, landing at the City site at 0741:05.

During the ILS approach the crew of the A319 became concerned about the relative position of unknown traffic approaching them from the L and considered that the traffic was too close. The A319 pilot's written report indicated that TCAS showed the other ac 100ft below, approaching from 5nm, but that no avoiding action was required as the traffic was passing behind.

The Manual of Air Traffic Services (MATS) Part 1, states:

'Section 3, Chapter 4, Page 1, Paragraph 3:

The minimum services provided to VFR flights in Class D airspace are specified at Section 1, Chapter 2, paragraph 2. Separation standards are not prescribed for application by ATC between VFR flights or between VFR and IFR flights in Class D airspace. However, ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to 'see and avoid' each other as specified at Section 3, Chapter 1, paragraph 2.'

The UK AIP ENR 1-4-5 (23 Aug 12) states:

'Separation within Class D Airspace:

IFR Flights

Separation provided between all IFR flights by ATC. Traffic information provided on conflicting VFR Flights.

VFR Flights

Traffic information provided on IFR and other VFR flights to enable pilots to effect own traffic avoidance and integration.'

Had the EC135 flight been IFR, the required separation would have been 3nm or 1000ft. However, the EC135 flight was operating VFR and was being monitored by radar as it operated over the fixed geographical location. When the A319 flight was transferred to the Tower, separation was in excess of 3nm and 1000ft. The controller had judged that TI was not required. At the closest point the minimum separation was 2·8nm and 900ft.

The A319 crew was not aware of the EC135. The controller's workload was light and TI regarding the position and intentions of the EC135 would have aided the SA of the A319 crew. However, 3 previous arriving ac had not commented on the presence of the EC135 and this probably added weight to the controller's perception that the EC135 was not in conflict with traffic on the ILS. In response to the comment and concern of the A319 crew, the radar controller indicated that he would advise further inbounds.

The Airprox occurred when the A319 crew, unaware of the EC135, became concerned about the relative position and intentions of the EC135, which was operating O/H a geographical position, situated approximately 3nm SE of RW23 C/L. TI would have been helpful and would have aided the A319 crew's SA regarding the presence and intentions of the EC135. However the controller considered that the EC135, operating VFR at a safe distance, was not in conflict with ac on the ILS and judged that TI was not required.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

CAT pilot Members noted that the EC135 was operating at an 'awkward' range from the RW23 FAT. The helicopter was orbiting a fixed location located 3nm away but during the orbit it flew <3nm from the C/L. The A319 crew operating under IFR would have been expecting 3nm separation from other IFR flights in CAS. However, within Class D airspace separation is not afforded to IFR flights from VFR flights; only TI will be passed on conflicting VFR traffic and traffic avoidance issued if requested. The Radar controller judged that the EC135 was operating at a safe distance from the C/L and was not a conflicting ac to the inbound IFR flights so that passing TI was not needed. This perception was reinforced by the lack of any comment from the crews of the previous 3 ac, also under IFR, landing ahead of the A319. The A319 flight was IMC in cloud during the ILS descent phase whilst the EC135 pilot was in VMC, clear below cloud. This would have made visual acquisition by either crew impossible until their ac were close to the CPA. However, the EC135's flightpath had caused the A319 crew concern when TCAS indicated the helicopter was converging and in confliction (<5nm and 100ft) whilst the A319 flight was established on the ILS. Members were acutely aware of the inaccuracies of TCAS equipment in azimuth when pilots are trying to gauge the relative bearing of traffic, particularly when one or both ac are turning and when at close range; the A319 crew's recollection of 100ft vertical separation could not be resolved as the EC135 is shown maintaining 900ft throughout the evolution. The EC135 was perceived to close to <2·5nm away from the A319 and 400ft below which had 'encroached' into the A319 crew's comfort zone. The helicopter, the intentions of which were unknown to the A319 crew and unsighted to them, although orbiting well clear of the A319's flightpath, had distracted them during the final approach phase. Members agreed that if TI had been passed by the controller to the A319 crew, this would have almost certainly allayed their fears. As it was, Members agreed that all parties had discharged their responsibilities correctly, and that the controller's decision to not pass TI to inbound flights had been a reasonable 50/50 judgement call which, on this occasion, resulted in the A319 crew filing a report. The recorded radar reveals 900ft and 2·8nm separation at the CPA (a marginal loss of standard separation minima if both flights were IFR). Taking all of these elements into account, the Board elected to classify this incident as a sighting report (TCAS) where normal procedures and safety standards pertained and where no risk collision existed during the encounter.

AIRPROX REPORT No 2012146

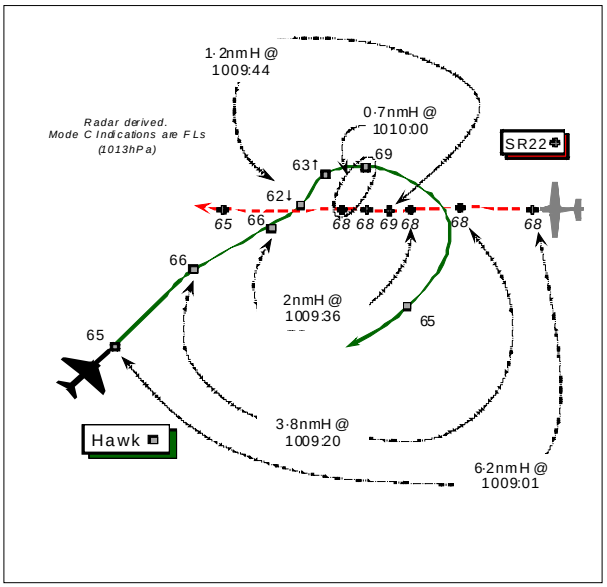
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: E.

AIRPROX REPORT NO 2012147

Date/Time:	14 Sep 2012 1010Z	
Position:	5306N 00442W (11nm SW of Valley)	
Airspace:	Valley ATA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk2	Cirrus SR22
Operator:	HQ Air (Trg)	Civ Pte
Alt/FL:	FL65	6600ft RPS
Weather:	VMC CLBC	VMC CLBL
Visibility:	10km	>10km
Reported Separation:	2nm V/200ft H	NK
Recorded Separation:	100ftV @ 0·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe HAWK T MK2 PILOT, a QFI, reports that his student was the PF whilst established in the published TACAN hold for Valley at FL65. Flying in VMC under IFR they were in receipt of a TS from Valley DIRECTOR (DIR) on 363·65MHz; the allocated code of A3741 was selected with Modes C and S on. TCAS is fitted.

At 19 DME on the inbound leg, tracking 040° at 230kt, DIR called traffic to them 4nm NE of their position tracking W some 300ft above his ac. This traffic – the SR22 - appeared on TCAS 4nm away (TA Mode selected) and since his student was flying 'heads-in' (simulated instrument flying), he concentrated on looking out for the traffic. DIR updated the TI as 300ft above and added 'appears descending'. At this point the TCAS contact suddenly switched and was displayed to the SW of their position – with some 180° of bearing error and a known issue with the Hawk T2 TCAS system - before returning to its correct position. TCAS (still in TA Mode) then enunciated 'Traffic Traffic'. As he could not see the other ac and his student was about to turn R into the holding pattern and thus towards the SR22, he took control from his student and initiated a descending LH turn away from the confliction. It was at this point that they saw the white civilian SR22 in his 2:30 position some 2-300ft above his ac flying towards them straight though their intended track in the TACAN hold. The SR22 did not manoeuvre and passed 200ft above and 2nm away at the closest point with a 'low' Risk of collision.

Thereafter, they returned to the TACAN hold and continued the sortie without further incident. The ac is coloured black; the white HISLs and nose conspicuity light were on.

THE CIRRUS SR22 PILOT reports he was on an IFR pleasure flight from Sleap to Dublin, routeing via Caernarfon and LIPGO on the FIR boundary, whilst in receipt of a TS from Valley LARS on 125.225MHz. The allocated squawk was selected with Modes C and S on; TAS is fitted.

Valley RADAR advised him of the presence of another ac that correlated with a contact on his ac's TAS. The other ac – the Hawk - appeared to him to be performing manoeuvres and not maintaining a constant heading. At this point he was flying at 7000ft but he decided to descend to 6000ft and whilst descending he observed the Hawk was closing in, when he received a second call from RADAR advising him again of the Hawk's position, which again concurred with his TAS. Heading 270° at 170kt, he elected to stop his descent at 6600ft, in VMC clear between layers, to allow the Hawk 'more room' and advised the controller of that. When the Hawk became visible to him it was in his 2 o'clock a range of about 1nm. The Hawk then circled about his ac in a clockwise direction; he last saw it in his 5 o'clock. The SR22 pilot estimated the minimum horizontal separation as 2km on the diagram included within his report. Assessing the Risk as 'none', he knew where the Hawk was at all times and saw no reason to take any evasive action.

The ac is coloured silver; the HISL and landing light were on.

THE VALLEY DIRECTOR (DIR) UNDER TRAINING reports that two ac were on frequency conducting TACAN Approaches to RW31RHC. The preceding ac had left the TACAN hold descending inbound at which point he instructed the subject Hawk crew to descend to FL65 and report established in the hold. Observing an ac squawking A3720 – the SR22 - indicating FL72 Mode C some 8nm NE of the Hawk, the SR22's track appeared to be heading towards Point A of the TACAN Hold. He passed TI on the conflicting SR22 to the Hawk crew, who were not visual with the other ac. TI on the conflicting SR22 was passed a further 2 times, advising the Hawk crew that the other ac appeared to have commenced a descent. He called the LARS controller - RADAR - via landline to request TI and was advised that the A3720 squawk had levelled at an altitude of 6600ft RPS and the ac type was a Cessna 22 (sic). Updating the TI to the Hawk crew a further 2 times, the Hawk pilot elected to break-off from the TACAN procedure. Subsequently, the Hawk crew called visual with the SR22, asked if the SR22 pilot was working Valley ATC and advising that an Airprox would be filed.

THE VALLEY DIRECTOR INSTRUCTOR CONTROLLER reports that he observed all of the actions undertaken by the controller under training and believed that the obligations of a TS had been met; the controller under training passed and continuously updated the TI in a timely fashion.

THE VALLEY LARS CONTROLLER (RADAR) [who was screening a trainee] reports he had been controlling a very slow moving civilian ac – the SR22 - for about 20 min under a TS en-route westbound to Weston Airport Dublin at 7000ft HOLYHEAD RPS (1004hPa). As the SR22 approached a position about 10nm S of Valley, an ac left the TACAN hold on a path that would conflict with the SR22 and was 'called appropriately'. This track then descended well below the SR22 well before it came within 3nm. As the SR22 continued westward, he could see that in approximately 20-25 miles it would fly into confliction with another ac established in the TACAN hold – the subject Hawk - level at FL65. Around this time the SR22 pilot informed him that he was going to begin a descent to 4000ft RPS. Although this would descend it through the level of the Hawk in the TACAN hold, he felt that the range from this track and from the speed that he had earlier seen the SR22 descend, this would position the SR22 comfortably below the Hawk before any potential confliction arose. DIR called on the landline requesting TI on the SR22 and he advised of the SR22 pilot's intended descent. Without a request for any form of co-ordination from DIR he took it that DIR, or the crew of the Hawk, were happy with the descent and probably on a TS themselves. He called the Hawk to the SR22 pilot at a range of 10nm, then again at 7 or 8nm, as it was not descending at all quick enough to take it below the Hawk. In response, the SR22 pilot advised that he would level off at 6600ft RPS (1004hPa) until it was safely clear of the Hawk. Whilst this would not provide 500ft of vertical separation it meant that it was no longer descending through the Hawk's level and would remain over 300ft above it within 5nm range. As the flight was under a TS, he did not give any avoiding action. He called DIR back on the landline and passed an update that the SR22 was no longer descending and had levelled off. Once the SR22 was around 3nm clear of the Hawk, the SR22 pilot began descending of his own accord without advising that he was clear of the traffic. Upon checking his intentions, the SR22 pilot replied that he was descending to 4000ft RPS, but at this point the Hawk was now clear of the SR22.

BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred between the Hawk operating IFR within the Valley TACAN hold in receipt of a TS from DIR, and an SR22 operating IFR in receipt of a TS from Valley RADAR.

DIR was manned by a trainee and screen controller; they reported their workload and task complexity as low and were providing ATSs to 2 Hawk ac, both conducting TACAN approaches to RW31RH. Disappointingly, the RADAR controller has not made an assessment of their workload and task complexity and was not available for comment at the time that this investigation was conducted. However, analysis of RADAR's RT transcript seems to show that the SR22 was the only ac in receipt of an ATS. No input was provided from the ATC SUPERVISOR. Moreover, this ATSU did not conduct an investigation of this Airprox in accordance with MAA RA 1410(1).

The incident sequence commenced at 1007:45, as DIR provided TI to the Hawk crew on the SR22 stating, "*traffic north-east 8 miles westbound indicating 1200 feet above*", which was acknowledged. The SR22 was 10.1nm NE of the Hawk, tracking W'ly, indicating 7200ft Mode C (1013hPa); the SR22 was flying at 7000ft on Holyhead RPS (1004hPa) – broadly 270ft difference between the RPS and the 1013.2hPa radar Mode C datum). The Hawk was flying level at FL65 within the TACAN hold (Figure 1 refers).

At 1007:51, the SR22 pilot advised RADAR that they were "*descending to 4000 feet*", which was acknowledged; 10.1nm lateral separation existed between the Hawk and the SR22 at this point. The RADAR screen controller stated in his report that, given the lateral separation that existed between the SR22 and the Hawk and the expected ROD of the SR22, based on a descent witnessed prior to the incident sequence, the SR22 would be 'comfortably below the TACAN traffic before the potential confliction arose'. Furthermore, RADAR stated that they conducted landline liaison with DIR over the SR22's transit at around this time and that as DIR had not requested co-ordination, they assumed that DIR was 'happy' with the SR22's descent and that the Hawk was also under a TS. However, this liaison call is not recorded on the tape transcript and is not referred to by DIR. It may be that the liaison was conducted 'off-line' and thus not recorded, or it may be that RADAR was mistaken and that they had confused this liaison with that conducted later in the incident sequence; a common human error in 'eye witness' reporting. Unfortunately, it has not proved possible to confirm either of these hypotheses.

At 1008:00, RADAR passed accurate TI to the SR22 on the Hawk, advising the pilot of, "*traffic left 10 o'clock 10 miles crossing left to right Flight Level 6-5*", which was acknowledged. At that point, the SR22 had not commenced a descent, which becomes apparent on the radar replay at 1008:21, when it is shown 9.1nm NE of the Hawk.

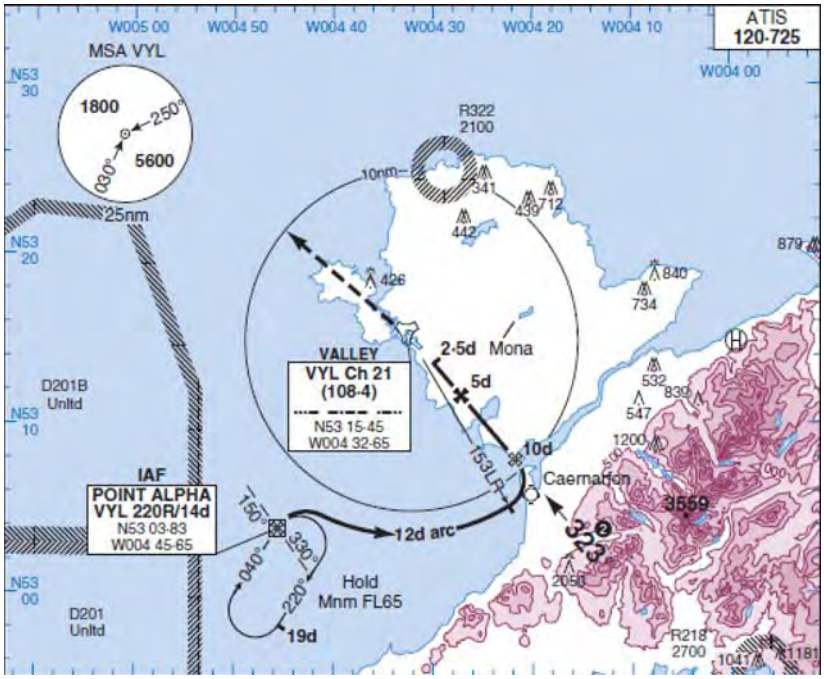


Figure 1: TACAN Procedure RW31RH at Valley.

At 1008:41, RADAR accurately updated the TI on the Hawk to the SR22 advising them that the, "*previously reported traffic now left 11 o'clock 7 miles crossing left to right Flight Level 6-5*." The SR22 pilot initially acknowledged the TI then, at 1008:59, advised RADAR that they were, "*maintaining 6600 feet till clear of that traffic*", which was acknowledged by the controller. At that point, the SR22 was 6.3nm ENE of the Hawk indicating 6900ft (1013hPa) - 6630ft RPS - tracking W'ly; the Hawk was turning through NNE, onto a QDM of 040° in accordance with the TACAN procedure. RADAR suggests in their report that the updated TI was prompted by the slow ROD of the SR22 which 'was not descending at all quick enough to take it below' the Hawk. Moreover, the RADAR controller states that whilst they were conscious that 6600ft RPS would not provide 500ft separation against the Hawk, they were content that the risk of collision had been averted as the SR22 would no longer be descending through the Hawk's level. RADAR's report also suggests that they were aware that, as the SR22 was in receipt of a TS, they were not required to achieve planned deconfliction minima.

At 1008:53, DIR updated the TI on the SR22 to the Hawk crew stating that, "*previously reported traffic now north-east 4 miles* [radar replay shows 6.6nm] *appears to be descending 300 feet above now this time*", which was acknowledged. At 1009:19, DIR provided a further update on the TI to the Hawk, advising the pilot that the, "*traffic now east abeam 3 miles, now...100 feet above this time*." The SR22 was 4.3nm ENE of the Hawk, indicating FL68 (about 6530ft RPS); the Hawk was indicating FL66 [and just about to turn R onto the outbound QDM of 220°]. Immediately after updating the TI, DIR contacted RADAR on the landline and requested, "*traffic information, Point*

ALPHA, north-east, 3 miles squawking 3-7-2-0 [the SR22]." RADAR replied that the SR22 was, "*maintaining 6600 feet, Valley Q*[garbled]." DIR immediately (1009:26) provided a further update on the TI to the Hawk crew, advising them, "*that Cessna aircraft* [it has not been possible to determine why DIR believed the SR22 to be a Cessna] *now east abeam 2 miles indicating 3 now 400 feet above*." Towards the end of this transmission at 1009:36, the Hawk indicates FL66; the SR22 is 2nm ENE indicating FL68. At 1009:40, the Hawk QFI advised DIR that they were, "*abandoning the hold, visual with that traffic*." It is evident on the radar replay that, just after this transmission is made, the Hawk has turned L and is next shown descending through FL62; the SR22 is 1.2nm ENE indicating FL69.

The CPA occurred at 1009:53, as the Hawk, indicating FL60, passed 0.6nm NW of the SR22 that was indicating 6900ft. [UKAB Note: The radar recording available to the UKAB only shows the Hawk descending to FL62, with min H occurring at 1010:00, as the Hawk, indicating FL69, flew into the SR22's 4 o'clock at a range of 0·7nm, the latter indicating FL68.] The SR22 pilot reported that he first sighted the Hawk in their 2 o'clock, which mirrors the geometry at the time of the CPA. The Hawk pilot reported sighting the SR22 shortly after initiating the descending L turn at about 1009:40.

CAP 774 Chapter 3 Para 6 states that:

'Whether traffic information has been passed or not, a pilot is expected to discharge his collision avoidance responsibility without assistance from the controller. If after receiving traffic information, a pilot requires deconfliction advice, an upgrade to Deconfliction Service shall be requested. The controller shall make all reasonable endeavours to accommodate this request as soon as practicable and provide deconfliction advice at the earliest opportunity.

When providing headings/levels for the purpose of positioning and/or sequencing or as navigational assistance, the controller should take into account traffic in the immediate vicinity, so that a risk of collision is not knowingly introduced by the instructions passed. However, the controller is not required to achieve defined deconfliction minima.

Notwithstanding the extract from CAP774 and cognisant that both DIR and RADAR maintained a flow of timely and accurate TI, BM SPA contends that as the Hawk crew was conducting an IFR procedure, both controllers had an opportunity to exhibit more positive control, at an earlier phase of the incident, in line with both 'good practice' and their 'Duty of Care'. Whilst RADAR did not knowingly introduce a risk of collision by permitting the SR22's descent, given that they were becoming concerned over the SR22's slow ROD, 'good practice' would have been an intermediate level-off instruction or to have requested the SR22 pilot to expedite the descent. Moreover, analysis of the DIR RT transcript proved that an earlier opportunity existed for them to contact RADAR to determine the SR22 pilot's intentions and, potentially, to agree a course of action to de-conflict the flight paths of the respective ac. That said, the pilots of both the SR22 and the Hawk were operating in Class G airspace and were in receipt of timely and accurate TI to enable them to discharge their responsibilities to 'see and avoid' each other's ac. It is noteworthy that the Hawk crew maintained the hold until visually acquiring the SR22 relatively late in the incident sequence. The risk of collision was broken by the SR22 pilot's decision to level-off at 6600ft RPS, with the lateral confliction broken by the Hawk QFI's descending L turn.

During this investigation it was noted that the advisory notes contained within the Terminal Approach Plates (TAPs) for RAF Valley still make reference to the fact that a 'Radar Advisory Service' is not available at certain phases of an IFR approach. SATCO Valley has stated that AIDU have been requested to make the necessary amendments; however, AIDU have stated that due to manpower shortages, they will not amend the Valley TAPs until the PANSOPS charts have been finalised.

HQ AIR (TRG) comments that everyone involved in this incident complied with their obligations; to pass TI on the part of the controllers and to take avoiding action on the part of the crews. Echoing BM SPA's comments, it is disappointing that more informative TI, or a degree of positive controlling, was not provided. The SR22 pilot was understandably not aware of the location of the TACAN hold and the intentions of the Hawk crew, perceiving them to be manoeuvring. Had ATC advise him that the Hawk was in the hold and would be descending at some point, possibly suggesting a clear altitude, the SR22 pilot may have been able to plan to remain clear, as was clearly his intent. That said, a DS might have been more appropriate in this instance, and his TAS should have provided a reliable altitude indication. The Hawk T2 operation in TA mode was in compliance with 22 Gp Orders, which do

not specify either TA or RA mode in this situation, although there is a good argument for RA mode. HQ Air note that there are currently no Regulations published regarding military operation of ACAS, other than ATM aspects.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Airprox occurred in Class G airspace where the pilots in both ac shared an equal responsibility to see and avoid other traffic. Both pilots had agreed a TS with their respective controllers and both received timely TI. Both ac were equipped with either a TCAS or TAS. The Hawk crew were aware of the approaching SR22 from TI and their TCAS and were required to give way to it on their R. However they stood on their course in the TACAN hold until their TCAS generated a TA. The Board understood that the Hawk instructor was trying to achieve a training objective for his student, but noted that standing on while attempting to gain visual contact is frequently a factor in Airprox incidents. A controller Member suggested that if the Hawk crew had been operating under a DS, DIR might have been prompted to coordinate the descent of the SR22 with RADAR thereby allowing the the Hawk to maintain the TACAN hold. As it was the Hawk instructor took control and turned L out of the hold. As he did so he spotted the SR22 at about the same time as they crossed ahead of it by 1·2nm and 600ft below. The Board considered this to be a late sighting and part of the Cause. The Board noted that the SR22 pilot was operating on the Holyhead QNH and not at an IFR quadrantal cruising level before he commenced his descent; it was surmised that this was to assist in maintaining a safe altitude above terrain. A GA pilot Member considered that the SR22 pilot would be unlikely to know that he was routeing through the TACAN hold and it would have assisted his SA if he had been advised that the Hawk was conducting an instrument procedure. Nevertheless, the SR22 pilot was aware from TI and his TAS that the Hawk was approaching at FL65 and he elected to level-off above it in a VMC layer to try to acquire it visually. However, he first spotted it only after it had crossed his nose and was passing down his RHS, which the Board also considered to be a late sighting and the other part of the Cause. Notwithstanding these late sightings, Members were satisfied that both pilots had taken sufficient positive and effective action to forestall any risk of collision.

[UKAB Note: Military FLIPs are available through the Aeronautical Information Documents Unit (AIDU) at www.aidu.mod.uk]

Controller Members agreed that the Valley DIR and RADAR controllers had done all that was required of them under the provisions of a TS. However, it was also agreed that a more proactive approach and a greater awareness of the Unit's training task would have seen the controllers working together to coordinate the 2 flights to ensure safe passage for the SR22 and the achievement of the training objective by the Hawk.

PART C: ASSESSMENT OF CAUSE AND RISK

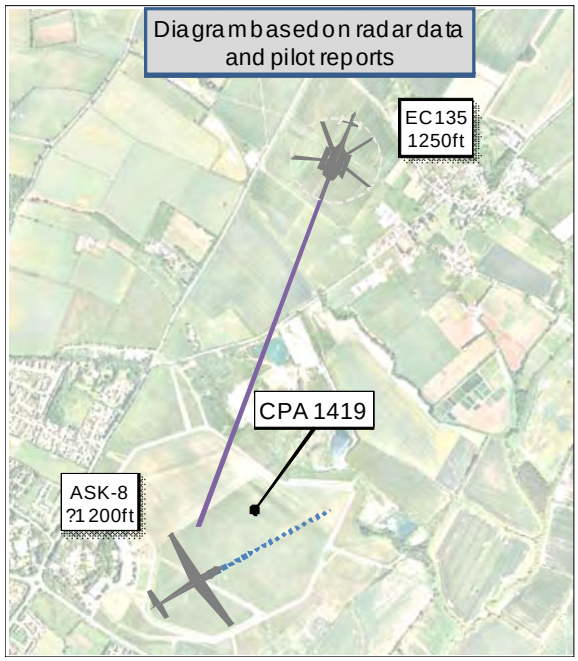
Cause: Late sightings by the pilots of both ac.

Degree of Risk: C.

AIRPROX REPORT No 2012149

AIRPROX REPORT NO 2012149

Date/Time:	22 Sep 2012 1419Z (Saturday)	
Position:	5155N 00108W (O/H Bicester A/D - elev 259ft)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ASK-8 Glider	EC135
Operator:	Civ Pte	Civ Com
Alt/FL:	↑900ft	1500ft
	QFE NR	QNH (1014hPa)
Weather:	VMC CLBC	VMC CAVOK
Visibility:	30km	40km
Reported Separation:		
	0ft V/100m H	500ft V/>300m H
Recorded Separation:		
	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK-8 GLIDER PILOT reports climbing during a winch launch, heading 060° at 60kt in a steep nose-up attitude. She was operating in VMC under VFR and was in RT contact with the launch control point. The white and blue glider was not fitted with external lights, SSR transponder or an ACAS. Between 800-900ft she saw a helicopter in her 11 o'clock position at a range of 150m, flying towards her at a similar height. She banked to the R to increase separation and the helicopter passed behind her on the L, at the same level and with a minimum separation of 100m. She continued to climb on the winch launch and released from the cable at 1200ft.

She assessed the risk of collision as 'High'.

THE EC135 PILOT reports transiting to Oxford Hospital on a Cat A HEMS Mission with 2 HEMS crew and 1 patient on board. He was operating autonomously in VMC under VFR in a red and yellow helicopter with external lights and landing lights on. The SSR transponder was selected on with Modes 3/A and C. The ac was not fitted with a Mode S capable transponder or an ACAS.

He had noted gliders in the general vicinity to the N of his departure point and knew that his planned track would take him near Turweston A/D and then O/H Bicester. He proceeded with caution and extra vigilance as he knew the Wx would make gliding a popular choice and he knew the area [of his route] was popular for gliding. He called Turweston, routed to the E of the A/D, and then proceeded by direct track towards the hospital, which [he was aware] would take him through the Bicester airfield O/H. He repeatedly attempted to establish RT contact with Bicester on the Common Glider Field Frequency [129.975MHz] but was unable to obtain a response. He noted there were 2 non-conflicting gliders in the distance to the W to the S. He could only verify that there was any activity when approaching the [Bicester] airfield N'ly boundary, at approximately 1-2nm. Heading 220° at 130kt at about altitude 1500ft [QNH 1014hPa]/height 1200ft, he saw the glider launching by cable and routed to the W side of the O/H which took him above and behind the climbing glider. Although the glider climbed to near his altitude, he had already passed above and behind and there was no perceived risk. The H distance was greater than 300m. He tried to establish RT contact a further 2 times but there was no answer. He stated that he proceeded with caution and extra vigilance and noted there had been no two-way RT at any time and that he thought there should have been.

He assessed that there was no risk of collision.

[UKAB Note(1): Bicester Gliding Launching Site is promulgated in the UK AIP ENR 5-5-1-1 as operating during daylight hours with winch and aerotow launches up to height 3000ft. The site uses the BGA Common Glider Field Frequency of 129.975MHz, as promulgated in Edition 18 of the BGA Laws and Rules for Glider Pilots, dated October 2012.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

Discussing the EC135 pilot's unanswered RT calls, the Board was advised that there is no requirement to maintain a RT listening watch, even during operating hours. Civilian glider pilot Members observed that when they are manned, glider club radios can be operated by inexperienced club volunteers who might have no awareness of how to respond to a non-club call. This could even be to the extent that they may assume the call was not intended for them and would therefore not respond. The Board noted that the EC135 pilot did not take the absence of a response to mean that there was no gliding taking place.

Members next discussed deconfliction strategies and noted that glider launch sites generally have no form of controlled or regulated airspace around them; the circles around glider launch sites, as printed on aeronautical charts, are intended purely to highlight their presence. As such, all parties are operating in Class G airspace where 'see and avoid' is the primary means of collision avoidance. Notwithstanding this, it was also noted that the locations of glider winch cable operation are well promulgated, that the cables are used at fixed locations, that it would be very difficult to see the descending cable once a glider had released and that minimal effort is required to avoid the launch site. Although the EC135 pilot was aware of gliding activity and entitled to take the course of action he took, helicopter pilot Members with HEMS experience were of the opinion that greater avoidance could have been effected without compromising the flight's purpose. Members with gliding experience regarded avoiding action by flying away from conflicting traffic during winch launch as a high risk strategy which, due to the cable geometry, was unlikely to increase significantly any potential miss-distance whilst appreciably increasing the risk of cable break or loss of control. Members were of the opinion that the winch launch should be flown normally and that a release/no-release decision would be a better course of action, dependant, of course, upon the circumstances at the time.

It was also observed that, by the nature of their operations, gliders, tugs and glider/tug combinations would be operating at altitude unless recovering to the cct. Low level activity is concentrated directly above the runway/ launch strip and, as altitude increases, is more dispersed laterally, Consequently, glider site activity describes a form of inverted cone above the launch site location, within which it is more likely gliders will be flying. It was therefore recommended to remain 'below the cone' if it was deemed essential to fly close to a glider launch site.

In this instance Members were content that both pilots had seen each other and that action was taken to prevent ac collision.

PART C: ASSESSMENT OF CAUSE AND RISK

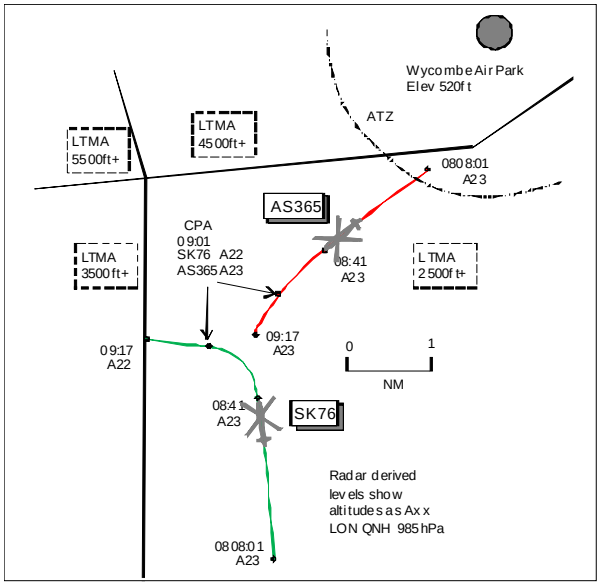
Cause: The EC135 pilot, on a Cat A Medevac flight, flew through a promulgated and active glider launching site below the maximum level of the winch cable and close enough to cause the launching glider pilot concern.

Degree of Risk: C.

AIRPROX REPORT No 2012150

AIRPROX REPORT NO 2012150

Date/Time:	24 Sep 2012 0809Z	
Position:	5133N 00053W (4·5nm SW Wycombe Air Park)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	SK76	AS365
Operator:	Civ Pte	Civ Pte
Alt/FL:	2400ft (QNH)	2400ft (QNH)
Weather:	IMC KLWD	IMC KLWD
Visibility:		
Reported Separation:	Nil V/1nm H	NR
Recorded Separation:	100ft V/1·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SK76 PILOT reports en-route from Blackbushe to Newcastle, IFR and in receipt of a RIS, he thought [actually a TS], from Farnborough LARS W on 125·25MHz, squawking an assigned code with Modes S and C; TCAS 1 was fitted. The Wx was IMC whilst flying in cloud at 2400ft QNH heading 360° at 145kt. He noticed traffic on TCAS in his 12 o'clock range 6nm but this was not called by Farnborough. He next received a TCAS TA when it was 12 o'clock range 2nm at the same level so he initiated a turn to the L (W'ly) and a descent whilst calling Farnborough for avoiding action. LARS W advised to turn further L onto 270° and the traffic passed <1nm to the E [on TCAS]. He assessed the risk as high.

THE AS365 PILOT reports en-route from Elstree to a private site near Boscombe Down, IFR and in receipt of a TS from Farnborough on 125·25MHz, squawking an assigned code with Modes S and C, TCAS 1 was fitted. In the cruise in cloud in IMC at 2400ft QNH heading 240° at 140kt a TCAS TA was received on traffic 2·5nm ahead so he turned to the S before ATC told him to turn L heading 180°. He assessed the risk as medium.

THE FARNBOROUGH APPROACH/LARS W CONTROLLER reports working bandboxed when the SK76 flight called and asked for a TS. After dealing with some other Approach traffic he identified the flight and issued a reduced TS owing to radar clutter giving intermittent contacts on radar. At some point during the next few minutes LARS N controller gave him an fps on the AS365 flight stating it was under a TS and it would be calling him after speaking to Wycombe Air Park. He then dealt with several other Approach items and phone calls and upon looking up saw the 2 subject ac about 2nm apart. He was about to call the traffic when the SK76 pilot advised that there was traffic and he requested an avoiding action turn. He gave a turn and upgraded to a DS before calling the SK76 to the AS365 flight. The SK76 pilot subsequently advised that he would be filing an MOR.

ATSI reports that the Airprox was reported by the pilot of a SK76 when it came into proximity with an AS365 in Class G uncontrolled airspace 4·5nm to the SW of Wycombe Air Park.

The SK76 flight was operating IFR on a flight from Blackbushe to Newcastle and was in receipt of a TS from Farnborough LARS W on frequency 125·250MHz. The AS365 flight was operating IFR on a flight from Elstree to a private site near Boscombe Down and was in receipt of a TS from Farnborough LARS W on frequency 125·250MHz.

At the time of the Airprox the Farnborough LARS W and Farnborough Approach frequencies were bandboxed and the controller was providing both services combined. The Farnborough Manual of Air Traffic Services Part 2 states that:

'Farnborough LARS West is available daily between 0800 - 2000 local; services are provided utilising the same selection of radar feeds as the Approach task. Subject to traffic loading the LARS West and Approach tasks may be band-boxed to a single operational position at certain times of the day.'

CAA ATSI had access to written reports from the pilots of the SK76 and the AS365, the Farnborough LARS W/ Approach controller, RT and desk-side recordings of Farnborough LARS W/Approach, RT recordings from Farnborough LARS N and area radar recordings.

The Farnborough METARs were:

EGLF 240750Z 10006KT 6200 SCT004 BKN005 15/14 Q0985= and EGLF 240820Z 12007KT 080V160 6000 DZ SCT004 BKN006 15/15 Q0985=

At 0803:50 the SK76 flight contacted Farnborough LARS W climbing to 2400ft IFR and requesting a TS. The flight was told to standby and after a short delay was issued the QNH and was assigned a squawk. Approximately 1min later the controller replied, *"(SK76 c/s) identified Traffic Service possible reduced warning of traffic er due radar er clutter…*"

At 0807:00 the AS365 flight contacted Farnborough LARS W on transfer from Farnborough LARS N at 2400ft. LARS W advised, *"(AS365 c/s) squawk zero four three one traffic service possible reduced warning of traffic due er weather breakthrough on the radar...*"

Between 0808:00 and 0808:40 the LARS W/Approach controller was involved with an ac that was too high on final approach and needed to be re-positioned. Following this RT conversation the controller answered one operational phone call and then called the Tower controller to advise that the traffic on final approach was breaking off and re-positioning.

At 0808:40, as the Farnborough LARS W controller ended the phone conversation with the Tower controller, the SK76 pilot transmitted that he had, "*a TCAS contact twelve o'clock four miles requesting any avoiding action"*. At 0808:41 the SK76 is tracking N (SSR code 0430) with the AS365 (SSR code 0431) positioned NNE of the SK76, tracking SW at a range of 2nm (Figure 1). Both ac are at 2300ft.

Figure 1

The controller replied, "*…roger turn left heading er two seven zero degrees er avoiding action it's now deconfliction service that traffic north northeast two miles same level is a Dauphin"*. This was read back before the controller transmitted, *"(clipped AS365 c/s) you've got traffic southwest at a mile suggest track to the south to turn you behind it's an S K seventy-six same level".* At 0809:01 the SK76 is tracking W at 2200ft with the track of the AS365 now pointing behind the SK76 at 2300ft. The distance between the 2 ac is 1·1nm (CPA).

The pilot of the AS365 did not respond to the controller's avoidance advice and the controller asked if the pilot had copied the previous transmission. The pilot of the AS365 replied, "*oh sorry sorry say again*". The controller replied, *"That traffic has now turned clear to the west of you at a mile same level suggest you track southerly it's an S K seventy six".* The AS365 pilot replied, *"Affirm that's what we are doing and he's er he's clear of us now"*. At 0809:17 the AS365 is behind the SK76, tracking SSW'ly and the distance between the 2 ac has increased to 1·3nm.

The Airprox took place in Class G uncontrolled airspace where regardless of the service being provided pilots are ultimately responsible for their own collision avoidance.

Both flights were being provided with a TS. CAP774, Chapter 3, Page 1, Paragraph 5 states that:

'The controller shall pass traffic information on relevant traffic, and shall update the traffic information if it continues to constitute a definite hazard, or if requested by the pilot. However, high controller workload and RTF loading may reduce the ability of the controller to pass traffic information, and the timeliness of such information.

Traffic is normally considered to be relevant when, in the judgement of the controller, the conflicting aircraft's observed flight profile indicates that it will pass within 3 NM and, where level information is available, 3,000 ft of

the aircraft in receipt of the Traffic Service. However, controllers may also use their judgement to decide on occasions when such traffic is not relevant, e.g. passing behind or within the parameters but diverging. Controllers shall aim to pass information on relevant traffic before the conflicting aircraft is within 5 NM, in order to give the pilot sufficient time to meet his collision avoidance responsibilities and to allow for an update in traffic information if considered necessary.'

Prior to the Airprox the controller was involved in breaking-off and re-positioning an ac that had been vectored for the ILS. It is likely that the controller's focus on this task prevented him from noticing the potential confliction between the SK76 and the AS365 earlier.

When the SK76 pilot requested avoidance advice the controller upgraded the service, gave instructions and TI to assist in resolving the confliction with the AS365. The pilot of the SK76 requested avoidance advice from the controller which was given. The controller also passed TI and suggested action to resolve the situation to the pilot of the AS365. In both cases the instructions and advice given was consistent with the actions already being taken by both pilots.

The Airprox occurred in Class G airspace when the SK76 and AS365 flights were both in receipt of a TS from Farnborough LARS W and in the absence of timely TI flew into proximity with each other.

When the Farnborough LARS W/Approach controller became aware of the situation he gave instructions, advice and information to assist the pilots of both ac in resolving the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members were surprised that the SK76 and AS365 pilots, whilst flying IFR in IMC within Class G airspace, only opted for a TS. Both crews were responsible for collision avoidance through see and avoid and their ability to meet this responsibility would have been significantly enhanced with assistance from ATC under a DS. A helicopter pilot Member opined that in his experience pilots normally only asked Farnborough LARS for a BS or TS as a DS was usually hard to obtain by transiting traffic. It was also noted that, although the Farnborough controller had limited the TS to both flights because of radar clutter, both the subject ac were displaying SSR labels so the confliction should have been apparent, irrespective of primary radar clutter. The ATSI Advisor confirmed that the workload was light, the 2 helicopters being the only traffic on the LARS frequency and the inbound ac the sole traffic on the Approach frequency, a level of traffic acceptable for bandboxing. However, after the AS365 pilot had called on handover from LARS N, the controller was apparently distracted, when the inbound traffic needed repositioning onto final approach, a telephone call was made and then coordination was effected with the Tower. From the RT transcript timings, there were short periods of time when he had an opportunity to see the potential for conflict: when LARS N passed the fps on the AS365 or after the AS365 pilot called on handover and before the controller concentrated on the inbound flight. However, the opportunities were missed and the confliction was only noticed when separation had reduced to about 2nm. A controller Member commented that if the controller was distracted, it was questionable whether having either or both flights under a DS would have made any difference. That said, another controller Member opined that had earlier TI been given, it may have spurred the crews into requesting a change of service. In the end Members agreed that in the absence of timely TI, this Airprox had been a conflict in Class G airspace between IFR traffic in IMC.

Turning to the risk element, the SK76 pilot had seen the deteriorating situation on TCAS and when a TA was generated he told Farnborough that there was conflicting traffic and that he wanted avoiding action whilst simultaneously commencing a L turn away. LARS W responded correctly by issuing an avoiding action L turn onto W with TI on the AS365 and upgrading the service to a DS. After this was read back, TI was given to the AS365 pilot on the SK76 with a suggestion that the pilot turn onto a S'ly heading. The AS365 pilot had already seen the conflicting SK76 on his TCAS equipment and was also commencing a L turn away ahead of the controller's suggested turn. Although the LARS W controller had given avoiding action to the SK76 flight and avoidance advice to the AS365 pilot, these were issued late, after the helicopter crews had initiated turns at their own volition. The Board noted that both crews had initiated avoiding action based on TCAS azimuth indications, which is undesirable. However, the manoeuvring options available to both crews were largely limited to the horizontal plane; the helicopters were flying at 2400ft with CAS immediately above at 2500ft and the area MSA of 2200ft.

These restricted manoeuvre options reinforce the imperative for requesting a DS when operating IMC. Nevertheless, the actions taken were judged by the Board to have resolved the conflict with any risk of collision effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

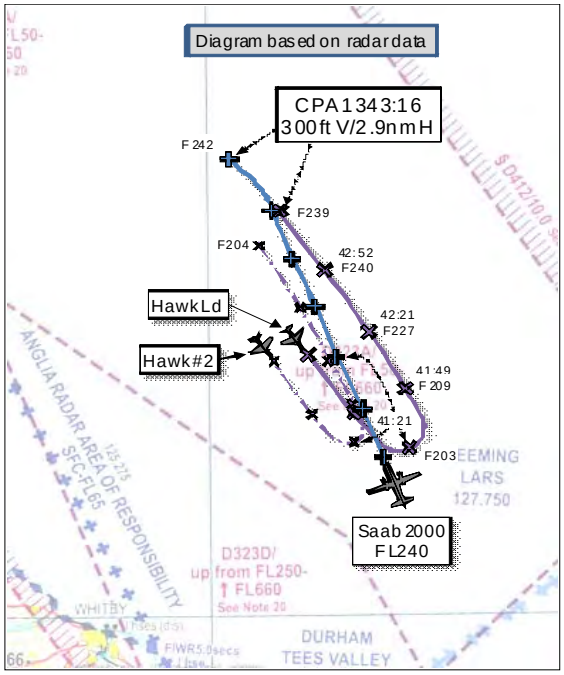
Cause: In the absence of timely TI, a conflict in Class G airspace between IFR traffic in IMC resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT No 2012152

AIRPROX REPORT NO 2012152

Date/Time:	7 Sep 2012 1343Z	
Position:	5449N 00028W	(ivo EGD323A)
Airspace:	TRA006	(Class: C)
Reporter:	Boulmer	
	1st Ac	*2nd Ac*
Type:	Hawk T Mk1	Saab 2000
Operator:	HQ Air (Ops)	CAT
Alt/FL:	24000ft↑ (RPS 1015hPa)	FL240
Weather:	NR	VMC NR
Visibility:	NR	NR
Reported Separation:	NR	<1000ft V/5-10nm H
Recorded Separation:	300ft V/2.9nm H 0ft V/3.2nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCATCC(MIL) CONTROLLER reports controlling on the Primary Tac S position, working 2 N-bound ac whilst also covering the Planner role. He noticed 3 fast-moving contacts get airborne from [an RAF base] with [Boulmer-allocated] squawks so he called Boulmer for TI and coordination. He was initially told the ac were en-route to the D513 area to manoeuvre; this then changed to D323A. He pointed out his DS traffic [the subject Saab 2000] and attempted to negotiate some coordination. The Boulmer controller agreed to stop off his traffic not above 23,000ft [1015hPa] against his ac at FL240. As the ac 'merged and got closer' he gave TI to the Saab 2000 pilot as "*… coordinated not above twenty three thousand on one zero one five*."; the pilot reported visual. Shortly afterwards he noticed the conflict alert go off. He passed TI again as he suspected the Saab 2000 TCAS might alert and informed the pilot so. The pilot concurred. On the next radar sweep the Hawk Mode C was indicating FL233 climbing. He gave an avoiding action turn [L on to heading 270°] and then a climb. He called the Boulmer controller who advised him that the Hawk pilot was informed to manoeuvre not above 23,000ft, QNH 1015hPa. He informed the Boulmer controller that he would be filing an Airprox. The ac were within 2.5nm at the same level with the Hawk in the 6 o'clock of the Saab 2000. Shortly thereafter the Hawk descended to below FL230 and the Saab 2000 resumed its track.

THE BOULMER CONTROLLER reports that as a planned formation of three Hawk ac 'came on channel' he received a phone call from ScATCC(Mil) to coordinate a CAT ac [transiting ivo the Hawk formation] at FL240. It was agreed that the Hawk formation would remain below altitude 23,000ft [RPS 1015hPa]. The Hawk formation was in class G airspace, [operating under VFR] with a TS, but he was content that they would comply with the restriction, being so close to the boundary with upper airspace. Hawk 3 proceeded out to the NE, in his role as target, while Hawk Ld and Hawk 2 established a CAP. The coordination was passed more than once, and the formation Ld pilot acknowledged. Hawk Ld and Hawk 2 then passed underneath the [coordinated] traffic 'in a leisurely climb', at which stage he considered re-iterating the deconfliction instructions; however, Hawk Ld and Hawk 2 SSR transponder Mode C then indicated they were 'level at 20,000ft'. They passed underneath the [coordinated] traffic and performed a L turn. He then became aware that 'the Mode C of Hawk Ld indicated 240' and issued descent instructions.

THE BOULMER SUPERVISOR reports that the Boulmer Controller was controlling a formation of three Hawks in the area of D323A, which was inactive. The Controller had coordinated against CAT, controlled by ScATCC(Mil),

that 'he would not be above 23k on 1015hPa' and that the CAT would not be below FL240. He heard the controller apply the coordination on more than one occasion. At the time of the incident his assistant had just finished handing over and he was starting to brief the replacement assistant on the ongoing activity, at which time the ScATCC(Mil) SUP called and asked 'what the Hawk formation leader was doing'. At this point he immediately spotted the confliction. As he started to communicate the information to the controller he heard him question Hawk Ld as to his height and then issue descent instructions.

THE HAWK T Mk1 FORMATION LEADER reports leading a 3 ac formation of black ac, setting up to conduct a 2v1 ACT sortie. [The ac are normally operated with external lights and HISLs on and the SSR transponder selected on with Modes A, C and S]. As the leader of the fighter pair he was positioning to set up a CAP [with the 3rd ac taking separation in order to generate a range split before turning towards the fighter pair]. The Boulmer Controller informed him that his formation was not to climb above 23000ft on the RPS, in order to coordinate against 'civil traffic in the airspace'. He acknowledged this instruction and continued to position for a CAP. He intended to climb to his briefed sanctuary altitude of 23000ft.

[UKAB Note(1): Unique 'sanctuary altitudes' are briefed to each formation member, such that the sortie can be continued, by maintaining deconfliction in height, should visual contact be lost.]

A few minutes after the coordination call from the Boulmer Controller his wingman, Hawk 2, informed him that he was no longer visual with him. He informed Hawk 2 of his position but he still could not regain visual contact. In order to get his wingman into the correct sanctuary, and to help him gain visual contact, he climbed to 24000ft and cleared his wingman to climb to 23000ft; he had become distracted and forgotten about the previous deconfliction agreement. As his wingman called that he was visual with him the Boulmer Controller asked him to confirm his height. He immediately started a descent to 23000ft and the Boulmer Controller also then instructed him to descend.

THE SAAB 2000 PILOT reports in the cruise at FL240 in a blue and white ac with navigation lights and strobe lights selected on. She was flying in VMC, under IFR, with a RCS from ScATCC(Mil), she thought. The SSR transponder was selected on with Modes A, C and S and the ac was fitted with TCAS. She was informed that there was Military traffic coordinated below her, climbing to 1000ft below her level. She stated that she could 'see the traffic on TCAS' and considered that its RoC might lead to a TCAS TA or RA. She informed the controller and was issued a radar heading in order 'to avoid'. Following this she was also issued a climb instruction, which she informed the controller she was unable to comply with due to technical restrictions. At this point 'the military ac' had been contacted and coordinated. She was then cleared to continue 'on her flight plan'.

He assessed the risk of collision as Low.

BM SAFETY POLICY & ASSURANCE reports this Airprox occurred on 7 Sep 12, between a Saab 2000 operating IFR in receipt of a DS from ScATCC(Mil) Tac S and a Hawk (Hawk Ld) operating as part of a 2v1 sortie, in receipt of a TS from CRC Boulmer WC1. All heights/altitudes quoted are based on SSR Mode C from the radar replay unless otherwise stated.

Information

WC1 reported low task-load with minimal complexity; Tac S reported moderate task-load with routine complexity.

The incident sequence commenced at 1335:28 as Tac S initiated coordination with WC1 between the Saab 2000 and the formation of 3 Hawks. Tac S stated that the Saab 2000 was, "*maintaining Flight Level 2-4-0*" and WC1 agreed that their, "*5-1-1 to 1-3* [the Hawks] *will not be above FL 2-3-0 when in confliction*." This was subsequently amended at 1336:16 with WC1 stating, "*Right, we're going to be going onto the Tyne 1-0-1-5 shortly…we won't be above 23 000 feet when in confliction with your traffic, 4-6-1-6* [the Saab 2000]." Tac S acknowledged this change saying, "*Roger, coordinated, thank you*" with the landline conversation ending at 1336:27. At this point, the Saab 2000 was 41nm SE of the Hawk formation, tracking NW'ly, at FL240; the formation of Hawks were tracking NE'ly between FL161 and 170.

At 1337:46, WC1 passed the coordination agreement to the Hawk formation stating, "*First run, you are not above 23 000 feet, deconflicted with Scottish traffic, Bullseye 2-3-0, 55, tracking 3-4-0, will be a factor.*" The Hawk formation leader initially asked WC1 to, "*standby*" and then, at 1338:48, asked them to, "*say again that traffic*

restriction please?" WC1 re-iterated, "*Deconflicted traffic is bullseye 2-3-0, 53. You are not above 23 000 feet against him, first run*", which was acknowledged by the Hawk Formation leader, "*not above 23 000 first run*." At this point, the Saab 2000 was 24.2nm SE of the Hawks, maintaining its NW'ly track at FL240; the Hawks were continuing NE'ly between FL129 and FL139.

At 1339:08, the Hawk formation split into 2 elements to set up for their 2v1 sortie, with Hawk Ld and 2 tracking SE'ly and Hawk 3 tracking NE'ly. At 1339:49, the Tac S deskside recording detected Tac S's side of the conversation with the ScATCC(Mil) SUP, referred to by the SUP in their DASOR, confirming the coordination that was agreed between Tac S and WC1. At 1340:26, Tac S passed TI to the Saab 2000 pilot on Hawk Ld and 2 stating, "*traffic 12 o'clock, 5 miles, manoeuvring, coordinated below.*" The radar replay shows the Hawks 6.3nm NW of the Saab 2000, tracking SE'ly, Hawk Ld indicating FL185 and Hawk 2 displaying no SSR Mode C. The Saab 2000 pilot acknowledged the TI and then, at 1340:44, reported "*visual*" with the Hawks. At 1341:09, having passed the Saab 2000, Hawk Ld and 2 initiate a LH turn onto a NW'ly track; the Saab 2000 is 2.2nm NNW of the Hawks.

At 1342:16, Tac S accurately updated the TI to the Saab 2000 pilot on the Hawk formation stating, "*that previously called traffic is now in your 6 o'clock, 5 miles, correction, 3 miles, similar heading, it's coordinated not above 23 000 on 1-0-1-5*" which was acknowledged. Tac S then advised the Saab 2000 pilot, "*just in case your TCAS goes, that's all*." The Saab 2000 pilot replied at 1342:32, "*yeah, it looks like it might go at any second*." During this transmission, the SSR Mode C of Hawk Ld indicated FL233. As reported by Tac S, after the next sweep of the radar, they noted that Hawk Ld's SSR Mode C indicated that the Hawk had 'level-bust' and at 1342:38, Tac S instructed the Saab 2000 pilot, "*avoiding action, turn left heading 2-7-0 degrees immediately, that previously reported traffic is now in your 6 o'clock, three miles, similar heading, similar level*"; the control instruction was read back by the Saab 2000 pilot. Hawk Ld was 3.2nm SE of the Saab 2000, tracking NW'ly, climbing through FL234.

At 1342:51, as reported by Tac S and the ScATCC(Mil) SUP, Tac S provided additional avoiding action to the Saab 2000 pilot involving a climb, agreeing with them at 1343:00 to climb to FL250.

[UKAB Note(2): The Saab 2000 pilot was initially requested to climb FL270. She stated that she was unable before accepting the climb to FL250.]

The Saab 2000's reaction to the avoiding action turn instruction was evident on the radar replay from 1343:05. The CPA occurred at 1343:08 with Hawk Ld 3.1nm in trail to the Saab 2000 and co-altitude with it. Co-incident with the CPA, WC1 requested Hawk Ld's height and then, without waiting for a response, immediately instructed Hawk Ld, "*you're coordinated not above 23 000, descend*." During this transmission, it was evident from the radar replay that Hawk Ld had commenced a descent. The pilot of Hawk Ld reported that whilst he was aware of the 'deconfliction arrangement' he had forgotten about it, having become distracted when trying to get Hawk 2 into the correct height sanctuary and visual with him.

Analysis & Conclusion

Turning first to Tac S' involvement in the Airprox, he appreciated early in the incident sequence the potential conflict between the Saab 2000 and the Hawk formation and agreed sensible and timely coordination. Moreover, conscious of the potential both for a TCAS RA to be generated onboard the Saab 2000 and for the Hawk to 'level-bust', Tac S provided appropriate TI and monitored the situation closely. Consequently, he was able to see the level-bust occur and provide timely and robust deconfliction advice to the Saab 2000 pilot.

CRC Boulmer's investigation identified that WC1 correctly applied the coordination and passed this to the Hawk formation. However, the CRC identified that, given the time period that elapsed between passing the altitude restriction at 1338:40 and the 'level-bust' at 1342:32, best practice would have been for WC1 to re-iterate the restriction; this has been briefed to all CRC WCs. That notwithstanding, Hawk Ld pilot was required to comply with the instruction and, as he has stated, he forgot the restriction having become distracted.

HQ AIR (OPS) comments that in this instance there was no immediate risk of collision as the Saab was already clear to the N when the Hawk Lead pilot started his climb to 24000 feet, although he appeared to be unaware of the proximity of the Saab. It is clear that the pilot of Hawk Lead did not comply with the altitude restriction placed on him by the instruction from the Boulmer WC because he forgot about the restriction when attempting to regain formation integrity (ie getting the Number 2 Hawk pilot visual with his ac). Equipping the Hawk T1 with TCAS is

under consideration by the MOD but would not remove the likelihood of a repeat of this occurrence, given TCAS' incompatibility with dynamic formation operations. The incident appears to have been the result of a mistake by the Hawk formation leader, made when he attempted to prevent a confliction with his wingman. However, the comment within the CRC investigation regarding the best practice of a timely reminder of the coordination is valid, and may have prevented the mistake being made. The incident will be publicised to all crews to remind them of the need to be pedantic with altitude restrictions and to consider their formation deconfliction procedures in such circumstances.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate operating authorities.

Members first considered the actions of the Hawk Formation Leader. It was opined that he was devoting the majority of his effort to managing the formation and its setup prior to commencing the sortie air exercise. Having agreed a maximum altitude of 23000ft with the controller, his workload was increased when his wingman lost visual contact and he then prioritised the visual rejoin before the need to remain below the coordinated altitude. Pilot Members opined that had the Hawk formation leader levelled off and, if necessary, re-briefed sanctuaries in clear, he could have effected a more expeditious rejoin with his wingman whilst also remaining below the cleared altitude. Equally, the wingman had a responsibility to remind his leader of the cleared altitude when the leader briefed him that he would climb to 24000ft, and the opportunity to do so was not taken. A military ATC Member stated that in similar situations it was his practice to coordinate traffic 2-3000ft below, in order to mitigate just this type of incident.

Board Members agreed that the controllers had done all that could reasonably be expected to coordinate the safe and timely transit of the Saab 2000 through the TRA. The lack of reiteration of the coordinated level by the Boulmer Controller was accepted as not being ‘best practice’ but the majority of Members were of the opinion that he had discharged his duties fully and correctly and that it was the Hawk formation leader’s responsibility to remain below 23000ft. Members also discussed the airspace regulations concerning TRAs and it was established that, whilst the airspace was categorised as Class C, ATS in activated TRAs was provided iaw the rules for ATSOCAS. It was noted that the Saab 2000 pilot believed she was in receipt of a RCS whereas she was actually in receipt of a DS and was therefore ultimately responsible for collision avoidance, as were the Hawk formation members, operating in receipt of a TS.

The Board agreed that sufficient ATS resource had been provided but that the Hawk formation leader did not remain below his coordinated and agreed maximum altitude. Members agreed that, while it was fortunate the Hawk formation leader and wingman did not turn earlier than they did, in the event the confliction was identified and resolved by the controllers and Hawk pilot taking effective and timely action, thereby preventing the risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

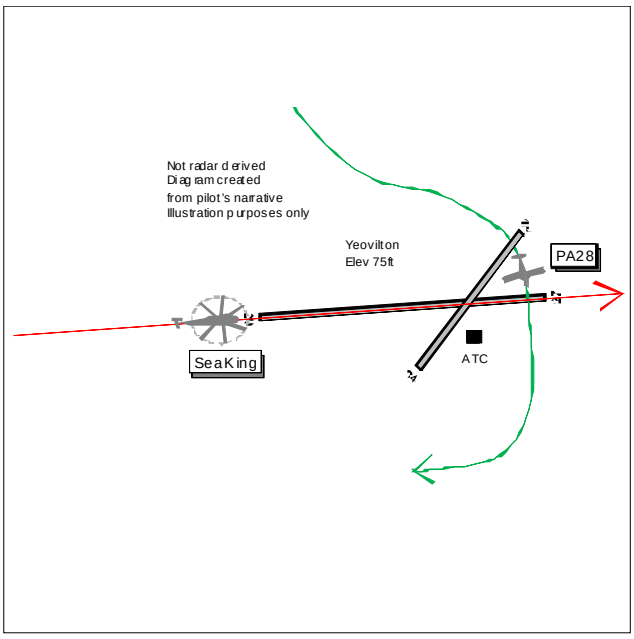
Cause: The Hawk Leader climbed above his coordinated altitude and into conflict with the Saab 2000.

Degree of Risk: C.

AIRPROX REPORT No 2012153

AIRPROX REPORT NO 2012153

Date/Time:	26 Sep 2012 1907Z (Night)	
Position:	5101N 00238W (O/H RW09 Yeovilton - elev 75ft)	
Airspace:	Yeovilton ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Sea King Mk4	PA28
Operator:	HQ JHC	Civ Club
Alt/FL:	1000ft↑ QFE (994hPa)	1500ft (QNH)
Weather:	VMC CLBC	VMC CLOC
Visibility:	10km	20km
Reported Separation:	100ft V/400m H	1200ft V/1350m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SEA KING PILOT reports flying a training flight using NVDs inbound from Poole HLS and in communication with Yeovilton Approach on UHF Channel 3, squawking 0222 with Modes S and C; TCAS was not fitted. The visibility was 10km flying 1000ft below cloud in VMC and the helicopter's red HISLs and flashing dim nav lights were switched on. Approaching decision height on a PAR approach and during the overshoot they saw traffic [the PA28] in their 9 o'clock to the N of their position. They initially thought the other ac may pass down their LHS and continue on its track. However, passing the RW09 midpoint approaching 1000ft QFE 994hPa heading 090° at 90kt they saw the other ac approach in a banking R turn from the N and cross the duty RW across their flightpath <500m ahead; they estimated the separation as 400m horizontally and 100ft vertically at the CPA. The ac continued its banked turn as it passed down their RHS. No avoiding action was taken as they were visual with the ac throughout. They had not heard the traffic on the Tower frequency or permission for the traffic to cross the duty RW. He assessed the risk as medium. Clearly the time for the ac to pass from L to R was a matter of seconds and had their helicopter been slightly higher or R of track and not visual with it then there would have been a high risk of collision.

THE PIPER PA28 PILOT reports flying a local night training sortie from Yeovilton, VFR and in receipt of a BS from Yeovilton Approach on 123·3MHz, squawking an assigned code with Modes S and C. The visibility was 20km in VMC and the ac's nav and red anti-collision beacon were switched on. The sortie was to complete the student's Night Rating Training, having completed cct training and solo ccts the previous evening. The flight was flown as a consolidation night NAVEX with initial tracking of the BRI NDB to the NW then tracking the EX NDB to the SW, followed by a reversal of the route with transfers to the appropriate ATSUs en-route. On return to Yeovilton, APP was contacted to the S of Merryfield; a BS and squawk were obtained and their intentions were passed to return to the A/D to land. An E'ly track was established towards Street [8nm NW of Yeovilton] at altitude 3000ft, with a lowering cloud base to the S in the vicinity of the A/D. The cloud base was scattered at around 4000ft with limited cloud at their altitude. Passing S abeam Street, he told his student to request an overhead rejoin at 1500ft at about 7·6 DME and he was aware of the appearance of a lower cloud-base to the S. The controller's response was, "RW09 Right Hand", therefore a track was established to route direct to the aerodrome O/H in a cruise decent aiming to join O/H at 1500ft QFE. Passing 2800ft in descent at 95kt, traffic was noted in their 2 o'clock at a similar level to the S of the AD tracking L to R, which he pointed out to his student. He also noted the cloud layer as being further S and above their level from the reflection of urban lighting. APP then passed TI, "PAR traffic Sea King in your 2 o'clock RW09", which the instructor initially connected with the traffic he had just spotted below them. APP then directed them to, "make yourself No2". After a period long enough for him to discuss the traffic situation with

his student, suggesting that the contact at about 2000ft was possibly been vectored onto a RH base-leg for RW09, he was content with this situation to join O/H into a RH downwind leg. However, APP then advised, "Sea King 1200ft on PAR"; this traffic was then identified by his student in their 2-3 o'clock at about 2·5nm. The instructor judged this would put them onto a reciprocal heading and possibly O/H the PAR traffic if he turned to starboard to join downwind LH for RW09 at this late stage. Therefore, he elected to continue O/H at 1500ft as he judged this would keep them clear of the traffic while maintaining good visual contact. At this point, as they were approaching the O/H at 1500ft just to the W of the intersection of RW04/09, they started to turn to the L to cross over the upwind end of RW09, whilst he remained visual with the traffic as it approached the threshold of RW09, whereupon APP advised, "Sea King conducting missed approach". Consequently, he instructed his student to take up a S'ly track to clear the overshoot; during this period he - the instructor - had continuous visual contact with the Sea King round to his starboard aft quarter just off the tailplane at the point the Sea King crew executed their overshoot at about 50ft. He estimated separation as 1200ft vertically and 1350m horizontally at the CPA. The helicopter passed behind, tracking at R angles to their track, assessing the risk as none. Once S of the C/L he directed his student to descend onto the downwind leg and when they were established mid-downwind at 800-1000ft QFE they heard the Sea King crew report an Airprox as he passed through their 3 o'clock. APP then switched them over to TOWER on 120·8MHz and a normal landing was completed. Taxying back to S dispersal he was requested to contact the DATCO on the landline.

UKAB Note (1): The Yeovilton METAR was: - EGDY 261850Z 36007KT 9999 FEW012 SCT020TCU BKN045 12/10 Q0995 WHT TEMPO 4000 SHRA FEW012 BKN018CB GRN=

UKAB Note (2): Sunset was 1801Z.

THE YEOVILTON APPROACH RADAR CONTROLLER (APP) reports whilst the Sea King was conducting a PAR to RW09 at range 5nm the PA28 flight under a BS requested an O/H join from 6nm NW of the aerodrome. After informing the ADC of the intentions he told the PA28 pilot about the radar traffic and instructed him to report when visual. The pilot reported visual when the Sea King was at 4nm at which point he told the PA28 pilot to make himself No2 to the radar traffic. He received confirmation from the pilot that he would make himself No2. On low approach the Sea King pilot called and APP instructed the pilot to climb to 2000ft. At this point he was unaware that the PA28 was crossing O/H at 1500ft QFE directly in front of the Sea King and still on the Approach frequency thus without permission to cross the Duty RW. Having thought the PA28 flight was already with Tower, owing to the ac being in the cct, he immediately instructed the flight to contact Tower for further instructions.

THE YEOVILTON DUTY AIR TRAFFIC CONTROL OFFICER (DATCO) reports that he was in the Visual Control Position (VCP) when the ADC was informed by APP that the PA28 pilot was conducting an O/H join for visual ccts to the duty RW09. The ADC stated that APP had advised him that the PA28 flight was told to make themselves No2 to the Sea King PAR traffic. As both ac were under the control of APP, he was confident that all deconfliction measures had been considered. The Sea King flight, through Talkdown, was given clearance by ADC to conduct a low-approach. Although he and the ADC observed both ac visually and on the Hi-Brite ATM, it was hard to ascertain the height of the PA28. The PA28 continued to close to the O/H from the NW and cross O/H the RW ahead of the Sea King, which was executing its low-approach and was climbing straight ahead on RW track. The PA28 pilot only free-called the ADC on VHF when the ac turned downwind and was then given instructions to join by the ADC. He made an 'open comment' to the ADC that it did not look right, explaining that if the Sea King crew had executed a Missed Approach because they were in IMC, then the ac would have been potentially climbing up through the joining ac's level. He was then informed by APP that the Sea King crew had queried if an ac had flown through the O/H about 0·25nm in front of their helicopter at a similar height. The PA28 pilot was asked to contact the DATCO on landing. He then informed the Duty Flying Supervisor (DFS) of the occurrence who made note to handover to Lt Cdr Flying and the oncoming DFS the next morning. The PA28 pilot telephoned; he informed the pilot of the occurrence and asked why he did not join No2 to the PAR traffic. The PA28 pilot informed him that it is a Station Flying Club procedure to conduct O/H joins; however, he did inform the PA28 pilot that as a military A/D ATC do not conduct this procedure because of ac conducting IFR climbouts or missed approaches. He asked the pilot what height he was when he turned downwind, to which he replied, "1500ft QFE". The PA28 pilot had attended the night flying brief held in ATC prior to this sortie. Later, the DATCO was contacted by one of the Sea King pilots, who wanted to know what had happened; he explained what he thought had occurred from a VCP perspective, but also explained that APP was already in the process of raising the DASOR for the incident. He informed me that he would talk to the Sea King Capt and they would consider their options regarding submitting an Airprox or not. The PA28 pilot was informed that a DASOR would be raised.

UKAB Note (3): The radar recording does not capture the Airprox. The Sea King fades from radar at 1905:17 approximately 4nm from touchdown RW09 with the PA28 4nm NW of Yeovilton tracking SE'ly in the Sea King's 10 o'clock range 4nm. The PA28 continues towards the O/H fading at 1907:00 with 1·5nm to run.

THE YEOVILTON FLIGHT SAFETY INVESTIGATION reports the incident occurred in the Yeovilton visual cct during a period of Station night flying. At no stage during the instrument approach had the Sea King crew been given TI or advised that the PA28 was joining the visual cct via the O/H. APP had informed the ADC of the PA28's O/H join [1903:45] and that the pilot was visual with the Sea King making a GCA [1905:13]. The PA28 pilot was instructed to make himself No2 to the GCA traffic and acknowledged the instruction [1904:58]. The PA28 pilot reported conducting a visual O/H join and descending to 1500ft QFE and was visual with the Sea King during the approach. The PA28 had descended on the deadside before turning crosswind, crossing the Duty RW and turning to position late downwind RW09 RH. Transfer of control between APP and ADC was late (once the PA28 was established downwind) therefore ADC had not passed cct information to the GCA controller as part of the standard clearance issued at 3nm for the Sea King to low approach. Consequently the Sea King crew had no knowledge of the ac in the visual cct. APP had stopped monitoring the PA28 on radar as he believed the ac was under ADC's control and at no stage during the recovery of the 2 ac did the APP consider that a confliction to their flight profiles might occur. Thus the APP did not impose a climb-out restriction in the event of a missed approach procedure being initiated or attempt to de-conflict the ac. The ADC observed the PA28 approaching the aerodrome and contacted the APP to question whether the PA28 pilot was visual with the Sea King but the ADC did not request that the PA28 flight be transferred to the Tower frequency. When recovering visually, the O/H join method is not a recognised procedure at Yeovilton and the Yeovilton Aviation Orders (YAvOs) clearly state that O/H joins are not permitted due to there being a limited deadside. However, further investigation revealed that the Yeovilton Flying Club (YFC) Order Book 2010, which supplements YAvOs, contravenes this rule as the recommended join in VFR conditions when the aerodrome is open is to be an O/H join at 2500ft. Several factors led to this incident occurring. VFR night flying in the UK is a relatively new procedure (8Jun2012) and ATC is unfamiliar with the integration of Flying Club ac and Station based ac at night. The PA28 pilot requested a VFR join via the O/H as per YFC Order Book; this procedure is not authorised at Yeovilton as stipulated in YAvOs. APP approved this procedure and attempted to sequence the ac by asking the PA28 pilot to report visual and make themselves No2. The PA28 pilot reported initiating a descent to height 1500ft, which is 1000ft below that recommended in the YFC Order Book, and reported visual with the Sea King. APP's attention was then diverted to other ac on frequency and he lost SA, stopped monitoring the PA28's flightpath and subsequently believed the flight to be under the control of the ADC. The PA28 flight continued inbound and remained on the Approach frequency; the pilot reported late downwind to land, which was when the APP realised the frequency error and told the pilot to continue with Tower. The ADC and DATCO, having been passed TI from APP believed that the PA28 would sequence behind the Sea King by converting to a straight-in approach/L base flight profile in the No2 position. Whilst they could see the PA28 approaching the cct it was difficult for them to assess accurately the ac's position and intentions. At no stage were the Sea King crew passed TI or warned of the PA28's proximity.

Five recommendations were made: -

1) Alignment of YAvOs and YFC FOB. The PA28 pilot requested a procedure not authorised by YAvOs while the aerodrome was open for normal operational flying, during a period of night flying. This alignment is to ensure that procedures in YAvOs are not overruled by the lower level orders on the YFC FOB. Although this relates specifically to methods of rejoining the aerodrome whilst open for normal operations and ATC is manned, in order to ensure thoroughness all orders should be reviewed with YAvOs being the primary document. – Action completed 3/12/2012. The YAvOs and YFC have been aligned.

2) Recognition of unusual situation during low arousal. The progression of events from the approval of the PA28 pilot's request for an O/H join, to the point where the PA28 crossed the path of the overshooting helicopter, resulted from lack of SA by the ADC. Although visual with the PA28, clearly no contact had been established and this should have been questioned in a more robust manner as the situation developed. All controllers should be rebriefed on taking appropriate actions in the event of recognising an unusual circumstance that could lead to an unsafe situation developing, particularly during periods of low arousal such as during night flying. Action completed 10/12/2012. The results of the originating report have been highlighted to all ATC staff through formal training briefs (conducted 3 x weekly) and informally through Watch Leaders. Other ATC Incident reports have been promulgated for wider awareness and this has included populating the ATC crewroom with Accident/UKAB reports.

3). Competency of controller requires to be assured. APP did not impose a robust method of recovery for the PA28 in order to ensure separation from the Sea King conducting an IFR approach. The APP requires a period of retraining before acting in a solo capacity as APP/Director.

4). Review mixed operations of YFC and Station based ac during night flying. The PA28 pilot requested a procedure not authorised by YAvOs while the aerodrome was open for normal operational flying, during a period of night flying. Action completed 3/12/2012. Occurrence Review Group accepted that continued mixed operation

5). Review YAvOs 0211 – Fixed-wing recoveries. The progression of events from the approval of the PA28 pilot's initial request for an O/H join, to the point where the PA28 crossed the path of the overshooting helicopter, resulted in lack of SA by the ADC. Although visual with the PA28, clearly no contact had been established and this should have been questioned in a more robust manner as the situation developed. Fixed-wing recoveries are to be reviewed and re-written clearly defining that O/H joins are not permitted when Yeovilton is open or at night. The fixed-wing community operating at Yeovilton are to be involved in the review. Action part completed 30/01/2013. Amendment written, awaiting incorporation into YAvOs.

HQ JHC comments that whilst the closest reported proximity was 100ft V/400m H this could have been an incident with a far worse outcome. JHC welcomes the recommendations made by the investigation, which when enacted should greatly reduce the likelihood of another occurrence of this type. This incident highlights this challenges of integrating GA VFR traffic at night at a military aerodrome (albeit by a military civilian flying club ac) with military traffic undergoing IFR operations at night and should be highlighted across the MOD/GA aviation community to further educate those involved with flying at night of the potential issues of night VFR traffic with IFR/military night flying. Particularly with regards to ensuring that MOU's and local flying club FOB are updated to ensure compliance with the local military flying orders.

NAVY COMMAND comments that the Sea King was conducting a PAR recovery to Yeovilton in contact with the Approach controller and the PA28 from the Yeovilton Flying Club conducted a joining procedure that was not iaw YAvOs, of which they are required to be familiar, which resulted in it crossing the path of a the Sea King conducting a PAR approach. Although the PA28 pilot maintained VFR separation with the overshooting Sea King, a sequence of events in the build up to the incident contributed to the Sea King crew perception that the PA28 was too close. These included the PA28 pilot requesting a procedure that should not have been approved by the APP, who furthermore did not take positive control of the joining PA28 or sequence it against his own IFR traffic. A subsequent delay in transferring the PA28 flight to Tower frequency further exacerbated the issue resulting in reduced SA for the ADC who therefore did not pass the required TI to the Sea King crew who were operating on the GCA frequency. This Airprox would most likely to have been averted if SOPs had been followed by both the PA28 pilot and the APP.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The initial factor which started the evolution to the Airprox was the disconnect between the YAvOs and the YFC FOB. The PA28 pilot was expecting to carry out an O/H join iaw YFC FOB; however, this procedure was not permitted in the YAvOs. Nevertheless, this request by the PA28 pilot, instead of being refused by the APP, was approved. The APP then did not apply positive control to the PA28 flight by issuing instructions to ensure both ac were deconflicted. This resulted in the PA28 flying into conflict with the Sea King on a go-around, which was the cause of the Airprox.

The Sea King crew was undoubtedly concerned when, without any TI, they saw the PA28 approaching from their L and then manoeuvre to pass over the upwind end of the RW ahead of their projected flightpath from L to R. APP had not transferred the PA28 flight to the Tower frequency which would normally occur with about 5nm to run and would lead to the ADC passing TI on cct traffic to the PAR approach traffic with its clearance when this requested by the PAR controller at 3nm. The ADC was initially concerned when he saw the PA28 approaching but his fears were allayed when he was told by APP that the PA28 pilot was visual with the Sea King and would position No2. The PA28 pilot, having been given TI on the Sea King and seen it, was told to "make yourself No2"; he judged that, at that late stage, a R turn to position downwind LH would have placed his ac closer to the helicopter. He elected

to continue towards the crosswind position and then realised that the Sea King was commencing an overshoot so he told his student to track to the S to clear the C/L of the RW. Although this incident had had the potential for a more serious outcome, Members agreed that because the PA28 pilot had maintained visual contact with, and separation from, the Sea King throughout and because the Sea King crew also observed the PA28 crossing ahead, any risk of collision had been effectively removed.

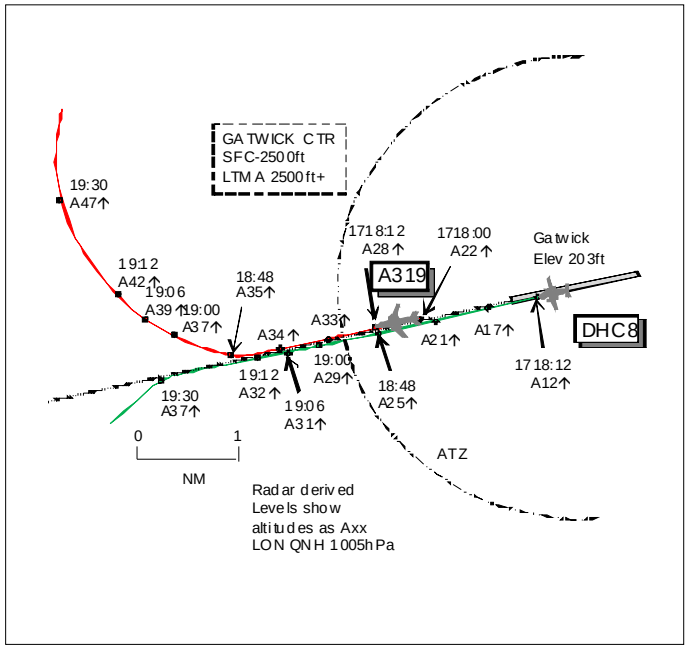
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Yeovilton APP allowed the PA28 flight to carry out an O/H join, contrary to YAvOs, and fly into conflict with the Sea King on a go-around from PAR.

Degree of Risk: C.

AIRPROX REPORT NO 2012154

Date/Time:	3 Oct 2012 1719Z	
Position:	5108N 00017W (3·5nm W Gatwick - elev 203ft)	
Airspace:	CTR/LTMA	(Class: D/A)
Reporter:	LTC SW DEPS	
	1st Ac	*2nd Ac*
Type:	DHC8	A319
Operator:	CAT	CAT
Alt/FL:	2000ft↑ (QNH)	NK (NK)
Weather:	IMC KLWD	NK NR
Visibility:		NR
Reported Separation:	NR	NR
	SW DEPS 400ft V/1nm H	
Recorded Separation:	800ft V/1·5nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LTC SW DEPS reports that the DHC8 flight called on departure from Gatwick following a SAM SID. Without identifying the flight formally she observed the ac to be 400ft, she thought, and approximately 1nm from the previous departing A319 on a DVR SID which was in a R turn. She gave the DHC8 flight an avoiding action L turn onto heading 240° and the ac were seen to pull apart. She asked the DHC8 crew whether they had been visual with the ac ahead and they replied negative.

THE GATWICK AIR CONTROLLER reports the A319 departed on a R turn DVR SID and the DHC8 was departed behind on a SAM SID. The A319 flight was transferred early passing 2300ft with the DHC8 just getting airborne. He noted the A319 GS was slow so he ensured that it was established in the R turn before looking to transfer the DHC8 flight noting that there was 1000ft separation. Shortly afterwards he noted the DHC8 had been turned L off the SID but the next departure was a R turn so would not be affected.

THE DHC8 PILOT reports on departure from Gatwick, IFR and in communication with Gatwick Tower and then London on 134·12MHz, squawking an assigned code with Modes S and C. Gatwick cleared them for departure from the full length of RW26L after having just cleared an A319 for take-off and its wheels had just left the RW. Heading 259° climbing through 2000ft they lost sight of the A319 in cloud but thought nothing of it as it was normal at Gatwick for departures to be close. They started to accelerate to 210kt in the climb to 4000ft on the SAM2M departure as Gatwick handed them over to London. As soon as they selected the London frequency they were given avoiding action onto heading 230° by the controller. They had not received a TCAS warning but the ac ahead was displayed on their TCAS screen. The avoiding action was carried out and then the controller said they would be filing a report owing to Gatwick ATC departing their ac so soon after another ac. He assessed the risk as low.

THE A319 PILOT reports being unaware of an Airprox during their departure from Gatwick so they were unable to provide any detailed information about the incident.

ATSI reports that the Airprox was reported by the LTC SW (Deps) controller in Class A airspace, when avoiding action was given to the DHC8 after departure from London Gatwick Airport, due to the DHC8 having less than the required radar separation (3nm/1000ft) against a previous departing A319.

AIRPROX REPORT No 2012154

The A319 was operating IFR on a flight from Gatwick to Frankfurt and was in receipt of a RCS from LTC BIG on frequency 120·525MHz.

The DHC8 was operating IFR on a flight from Gatwick to Nantes and was in receipt of a RCS from LTC SW (Deps) on frequency 134·125MHz.

CAA ATSI had access to written reports from both pilots, the Gatwick AIR controller, the LTC SW (Deps) controller, area radar recordings, RT recordings and transcripts of the Gatwick Tower frequency and the SW (Deps) frequency together with the unit investigation report from London Terminal Control.

The Gatwick METARs are provided for 1650 and 1720 UTC:

EGKK 231650Z 21008KT 180V240 9999 FEW024 13/09 Q1006= and EGKK 231720Z 22007KT 9999 FEW022 BKN046 13/09 Q1006=

At 1717:15 UTC the A319 became airborne on a DVR8M SID, which requires a climb to altitude 4000ft with a R turn at 2·3DME from I-WW at Gatwick.

At 1717:42 (27sec after the A319 was airborne) the DHC8 became airborne on a SAM2M SID climbing to altitude 4000ft, initially straight ahead before a slight L turn at 8DME from MID. The AIR controller was using reduced separation in the vicinity of the aerodrome. CAP493 Section 1, Chapter 3, Page 1, Paragraph 3.2 states:

> 'In the vicinity of aerodromes, the standard separation minima may be reduced if:
>
> a) adequate separation can be provided by the aerodrome controller when each aircraft is continuously visible to this controller;' or
>
> b) each aircraft is continuously visible to the pilots of other aircraft concerned and the pilots report that they can maintain their own separation; or
>
> c) when one aircraft is following another, the pilot of the succeeding aircraft reports that he has the other aircraft in sight and can maintain own separation.'

At 1718:00 the A319 was transferred to LTC BIG. At 1718:39 the Mode S SFL changed to indicate that the A319 was climbing to 6000ft. The climb rate of the A319 was 896fpm while the climb rate of the DHC8 was 1856fpm.

[UKAB Note (1): The DHC8 first appears on radar at 1718:18 climbing through altitude 1200ft QNH with the A319 1·7nm ahead climbing through 2800ft QNH.]

At 1718:50 the DHC8 was transferred to LTC SW (Deps). The radar recording indicates that the A319 had just started the R turn and was passing altitude 3600ft with the DHC8 1·6nm behind passing altitude 2500ft.

At 1719:05 the DHC8 contacted LTC SW (Deps), *"London (DHC8 c/s) Southampton two mike passing altitude three thousand three hundred climbing four thousand"*. The A319 was in the R turn passing altitude 3700ft with a climb rate of 960fpm with the DHC8 1·5nm behind passing altitude 2900ft with a climb rate of 1696fpm. Low level STCA activated at 1719:10.

The LTC SW (Deps) controller transmitted, *"(DHC8 c/s) avoiding action turn left heading two four zero degrees there's traffic in your one o'clock range of one mile*". This was correctly read back by the crew of the DHC8 at 1719:20. The controller then asked, *"(DHC8 c/s) were you visual with the one ahead"* and the crew replied, *"negative (DHC8 c/s)".*

[UKAB Note (2): The CPA (800ft /1·5nm) occurs during the 2 radar sweeps at 1719:00 and 1719:06, before separation increases to 1000ft/1·6nm at 1719:12 with the A319 turning R through a NW'ly heading, climbing through 4200ft, with the DHC8 climbing through 3200ft. The DHC8's avoiding action L turn is evident on the radar recording at 1719:30.]

The written report from the Gatwick AIR controller stated that the DHC8 was transferred when the A319 was in the R turn and the DHC8 was 1000ft below the A319.

Prior to transferring the A319 and the DHC8, the Gatwick AIR controller was providing reduced separation in the vicinity of the aerodrome. The Gatwick Manual of Air Traffic Services Part 2, Air section, Chapter 3, states that:

'departing aircraft are not to be transferred to TC until suitable separation exists.'

There is no specific guidance as to what constitutes 'suitable' separation. The use of the term 'suitable separation' is less prescriptive than the instructions contained in some other MATS Part 2 of airfields that transfer traffic to LTC. ADCs at Gatwick are expected to use their own judgement and experience to determine an appropriate point for transfer of communication and control to the radar controller. In this case the DHC8 was transferred to LTC when the separation provided was not acceptable to the LTC SW (Deps) controller.

At the point of transfer to LTC SW (Deps) the Gatwick AIR controller was content that adequate separation had been provided between the 2 departures, which the controller believed was confirmed by the information displayed on the ATM – the A319 was in the R turn and the DHC8 was 1000ft below. However, the AIR controller may not have given due consideration to the climb rate of the DHC8 relative to that of the A319 and transferred the DHC8 when vertical separation was eroding. When the DHC8 flight contacted the LTC SW (Deps) controller the 2 ac were 1·5nm and 800ft apart and the LTC SW (Deps) controller took avoiding action.

In sum, an Airprox was reported when the LTC SW (Deps) controller became concerned about the relative distance and positions between an A319 and a DHC8 on departure from Gatwick such that avoiding action was issued to the DHC8. The Gatwick AIR controller had been using reduced separation in the vicinity of the aerodrome but transferred the DHC8 before separation against a preceding A319 was acceptable to the LTC SW (Deps) controller.

Recommendation

It is recommended that both Gatwick and LTC review the wording of the Gatwick MATS Part 2, Air Section, Chapter 3 - 'departing aircraft are not to be transferred to TC until suitable separation exists' - to ensure that either both units have an understanding and acceptance of the term 'suitable' or alternative wording is used to clarify the conditions under which traffic will be transferred to TC.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Controller Members agreed that the spacing was tight when AIR cleared the DHC8 for take-off behind the A319 but the situation was manageable utilising 'reduced separation in the vicinity of an aerodrome' (RSITVOAA). A CAT pilot Member commented that controllers exercising this visual separation should not assume ac performance as crews do have options to adjust their flight profile to suit the conditions at the time. When he saw the A319 commence its R turn, and he transferred the DHC8 to LTC SW Deps, AIR was content that 1000ft vertical separation existed. However, the DHC8 was climbing at a higher rate than the preceding A319. This had led to the DHC8 flight calling on the SW Deps frequency with only 800ft vertical separation, which triggered STCA low-severity alert, and caused the radar controller sufficient concern that she felt that an avoiding action L turn was required. Had the AIR controller retained the DHC8 on his frequency for a short while longer, applying RSITVOAA until radar separation (1000ft/3nm) was ensured after transfer, the LTC controller would not have been placed in that invidious position. Members noted the comment and recommendation made by ATSI with respect to the MATS Part 2 guidance dealing with transfer of ac to LTC with 'suitable' separation existing. This guidance was very much down to individual controller judgement and experience; on this occasion AIR had not ensured separation before transferring the DHC8 to LTC and this had caused the Airprox.

Neither the A319 nor DHC8 crews were concerned with the situation. The early transfer of the DHC8 led to a momentary (~10sec) loss of radar separation (800ft/1·5nm) - the SW Deps controller perceiving 400ft/1nm – before separation was restored. The avoiding action L turn issued to the DHC8 flight does not become evident until after the CPA. Once the A319 had commenced its R turn, the DHC8's straight-ahead track profile required

of the SAM SID meant that the ac were not on converging/conflicting tracks, which allowed the Board to conclude that any risk of collision had been quickly and effectively removed.

The NATS Advisor informed Members that the ATSI recommendation had been received recently and this would be addressed following a Safety Survey to be undertaken later in 2013.

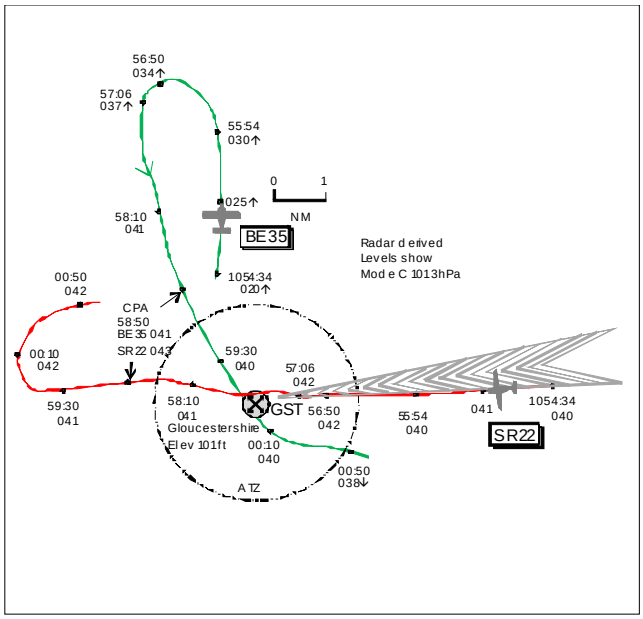
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Gatwick AIR controller did not ensure separation before transferring the DHC8 to LTC SW Deps.

Degree of Risk: C.

AIRPROX REPORT NO 2012155

Date/Time:	4 Oct 2012 1059Z	
Position:	5155N 00213W (2·3nm NW GST NDB - elev 101ft)	
Airspace:	LFIR	(Class: G)
Reporter:	Gloucestershire APP	
	1st Ac	*2nd Ac*
Type:	BE35	SR22
Operator:	Civ Pte	Civ Trg
Alt/FL:	4000ft↓ (QNH)	4000ft (NK)
Weather:	IMC/VMC	VMC/IMC
Visibility:	>10km	NK
Reported Separation:	0ft V/4nm H	NK
Recorded Separation:	200ft V/2·1nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLOUCESTERSHIRE APPROACH CONTROLLER reports that the BE35 pilot reported inbound to GST from the N at 4700ft for booked training NDB/DME approach after being in local area on a BS. The flight was placed under a PS and cleared to GST 4000ft QNH, no delay NDB/DME RW27. At 1041 the BE35 pilot was asked for his intentions and he replied direct outbound then touch and go into cct. At 1042:45 BE35 flight was believed to be beacon outbound, was cleared for the approach. At 1046 a new QNH 1009hPa passed to the BE35 flight which was acknowledged. About 1min later at 1047 the SR22 flight called inbound from Oxford at 4000ft QNH 1009hPa and after ascertaining the BE35's level as 2300ft (in base turn), the SR22 flight was cleared to the GST 4000ft QNH, no delay NDB/DME RW27 (holds required). At 1050 whilst on 4nm final, the BE35 pilot changed intentions for missed approach and back for another one which was acknowledged. Shortly afterwards the EAT for the SR22 was revised to 1111, based on BE35's 2nd approach. At 1054:30 the BE35 pilot recalled on 128·55MHz from the Tower and was placed under a PS and cleared NDB/DME RW27. At 1057 the BE35 pilot's intentions were sought and the pilot reported his distance to GST but on repeating the question, the pilot reported his intentions to touch and go into cct. At 1058 the SR22 was ascertained to be in the hold. Two minutes later at 1100 the BE35 pilot reported beacon outbound at 4000ft (missed approach procedure is to climb to 2800ft QNH). Clarification was sought of the ac's level and then essential TI was passed on SR22 and reciprocally. The SR22 pilot reported that he was 4nm W of GST - neither ac's pilots reported sighting each other.

THE BE35 PILOT reports flying a local sortie from Gloucestershire, IFR and in receipt of a PS from Gloster Approach on 128·55Mhz and then Gloster Tower on 122·9MHz, squawking with Modes S and C. The Wx was IMC in cloud becoming VMC on 'beacon outbound'. At 1040 he requested a practice NDB DME approach for RW27 and at 1041 was cleared to the GST NDB at 4000ft (QNH 1009hPa). He declared his intention after the procedure was for a 'touch & go' into the cct and at 1042 he received clearance for the procedure. At 1048 when 4nm from touchdown he declared his changed intentions to, "missed approach and another NDB DME". The 'missed approach' part of his declaration proved to be an error on his part as in fact he intended to change the original 'touch & go' into a low pass and breaking-off from the procedure in order to repeat again the same NDB DME, i.e. the same NDB DME again as flown at 1041 approaching GST at 4000ft. So instead of 'low pass (or touch & go)' he declared, albeit mistakenly, 'missed approach' meaning he should have returned to the beacon at the published 2800ft which would not have resulted in any conflict. Since the incident, he has listened to the RT tapes at Gloucestershire ATC in order to tie up the actual events with his own recollection. The other ac involved, a SR22, was not seen but was believed to 4nm W of the GST when he reported O/H the GST, beacon outbound,

at 4000ft QNH 1009hPa and 120kt turning onto heading 095°. He initiated a dive to 2800ft on receiving ATC instructions to descend. He assessed the risk as low.

THE SR22 PILOT reports was inbound to Gloucestershire from Oxford, IFR for instrument approach training and in receipt of a PS from Gloster Approach on 128·55Mhz, squawking 7000 with Modes S and C. He was aware of another ac in the procedure, the NDB/DME for RW27, so he was expecting to hold at 4000ft. He received clearance to join the hold at altitude 4000ft and achieved 4000ft before entering the procedural area of GST. This clearance was read back and he did not hear any other ac transmit the same clearance; he made a parallel join to the hold. The Wx was intermittent IMC/VMC. The first time he was aware of another ac at his level was when it's pilot called 'beacon outbound' at the GST at altitude 4000ft, as this formed part of his decision making; at the time his ac was 4nm W of the GST. The controller immediately instructed the other ac's pilot to descend beacon outbound and then informed him of the conflict. Based on his range and the information, he considered it safe to continue to the GST; there were no further issues.

ATSI reports that the Airprox occurred close to the GST(L)NDB at Gloucestershire Airport, within Class G airspace, between a BE35 and an SR22. The CPA occurred at 1058:50UTC, 2·3nm NW of the GST(L)NDB, which is located on Gloucestershire aerodrome.

The BE35 flight was operating locally from Gloucestershire and in receipt of a PS from 'Gloster' Approach on frequency 128·55MHz. The BE35 flight, operating IFR, had just completed a practice NDB(L)/DME approach for RW27. The SR22 was inbound IFR from Oxford in receipt of a PS from 'Gloster' Approach on frequency 128·55MHz. The SR22 was entering the hold at 4000ft for some Instrument Approach training.

Gloucestershire ATSU was providing a split Aerodrome and Approach Control Service from the VCR without the aid of surveillance equipment. The APP was acting as OJTI to a trainee. Gloucestershire is equipped with a Primary Radar System, without SSR surveillance capability and limited coverage due to the narrow beam width, tilt mechanism and radar O/H limitations. The AIP entry for Gloucestershire Airport, page AD 2-EGBJ-1-6 (30 Jun 11) paragraph EGBJ AD2.18 states:

'Radar services (Primary only) within 25nm below FL80, availability subject to manning. Use of 'Radar' suffix denotes availability only. Provision of a specific radar service is not implied.

The Radar room is situated on a floor below the VCR and the radar system has an additional slaved display in the VCR, which is approved for use as an ATM. RW27 was in use for Instrument Approaches and RW22 was in use for the visual cct.

CAA ATSI had access to RTF recordings for Gloster Tower and Approach, together with area radar recording, written reports from the APP and the 2 pilots concerned.

The Gloucestershire METAR was: EGBJ 041050Z 22007KT 180V260 9999 SCT028 13/08 Q1009=

At 1039:51, the BE35 flight reported returning to Gloucestershire at 4700ft, ready to go outbound for the procedure. The APP replied, *"(BE35 c/s) cleared to the Golf Sierra Tango at er altitude four thousand feet no delay expected NDB DME approach runway two seven."* This was acknowledged correctly and the BE35 pilot advised of his intentions after the approach, *"probably a touch and go please and back in the circuit if possible."*

At 1042:40, the BE35 pilot reported beacon outbound and the APP responded, *"(BE35 c/s) cleared NDB DME approach runway two seven report base turn complete."* The BE35 pilot replied, *"Clear for the procedure and er report base turn complete (BE35 c/s)."*

At 1046:10, the BE35 was advised of a new QNH 1009.

At 1046:31, the SR22 flight contacted Oxford Approach and reported, *"(SR22 c/s) S R twenty-two out of La – out of Oxford bound to your field one zero zero seven request NDB hold plus approach and two R Nav approaches (SR22 c/s)."* In response to the APP's requests the SR22 pilot reported at an altitude of 4000ft and the BE35 pilot (in the procedure) reported at 2300ft. The APP responded to the SR22 flight, *"(SR22 c/s) Procedural Service cleared to the Golf Sierra Tango at er altitude four thousand feet* --- (momentary break in transmission) *and er QNH one zero zero niner"*. The BE35 pilot replied, *"One zero zero –",* which was clipped before the SR22 pilot

transmitted, *"Confirm that clearance (SR22 c/s)"*. The APP replied (1048:00), *"(SR22 c/s) clear to the Golf Sierra Tango at altitude four thousand feet no delay expected NDB DME approach Runway two seven."* This was acknowledged correctly and the SR22 pilot read back the QNH 1009.

By 1050:02, the BE35 flight had not reported base turn and the APP advised, *"(BE35 c/s) I see you approaching four miles contact Tower one two two decimal nine fixed wing circuit is active."* The BE35 pilot replied, *"- two decimal nine and I would like to make this one missed approach and another NDB DME if available."* The APP responded, *"(BE35 c/s) Roger."*

The missed approach procedure for the NDB(L)/DME RW27 approach is promulgated in the UK AIP AD 2-EGBJ-8-6 as: 'Climbing right turn onto a track 270°M to 900 then turn right onto 359°M climbing to 2800, then turn right to NDB(L) GST at 2800'. The hold is a 1min LH racetrack inbound QDR 092°. (See Fig 1 below)

In view of the intended missed approach by the BE35, the APP passed the SR22 pilot an amended EAT of 1111.

The ADC was made aware of the BE35's intended missed approach and appropriate instructions were passed to other ac in the RW22 visual cct. The BE35 pilot called on Tower frequency, *"Gloster Tower hello again (BE35 c/s) erm er NDB DME two seven er three miles to run."* The ADC replied (1051:00), *"(BE35 c/s) Gloster Tower cleared low approach and go around runway two seven wind two one zero one one the fixed wing circuit active Runway two two."* This was acknowledged by the BE35 pilot.

At 1051:54 the radar recording shows the BE35 on a 1nm final at FL006 descending (~500ft QNH) with the inbound SR22 positioned 11·4nm E of the airfield tracking W indicating FL040 (~3900ft QNH 1009hPa).

At 1052:12, the BE35 pilot reported going around and shortly afterwards the ADC transferred the BE35 flight back to Approach on frequency 128·55MHz.

At 1054:33 the APP called the BE35 flight*, "(BE35 c/s) Gloster Approach are you on frequency."* The BE35 pilot replied, *"(BE35 c/s) go."* The APP responded, *"(BE35 c/s) Procedural Service and er cleared NDB DME approach runway two seven report beacon outbound."* The BE35 pilot acknowledged, *"Cleared for the er procedure and er report beacon outbound (BE35 c/s)."* The QNH 1009hPa was then passed.

[UKAB Note (1): The radar recording at 1054:34 shows the BE35 2·6nm N of Gloucestershire tracking N indicating FL020 climbing with the SR22 5·7nm to the E of the aerodrome tracking W indicating FL040. Ninety seconds later at 1055:54 the BE35 is seen to commence a L turn climbing through FL030 6·9nm NW of the SR22 which is level at FL040.]

AIRPROX REPORT No 2012155

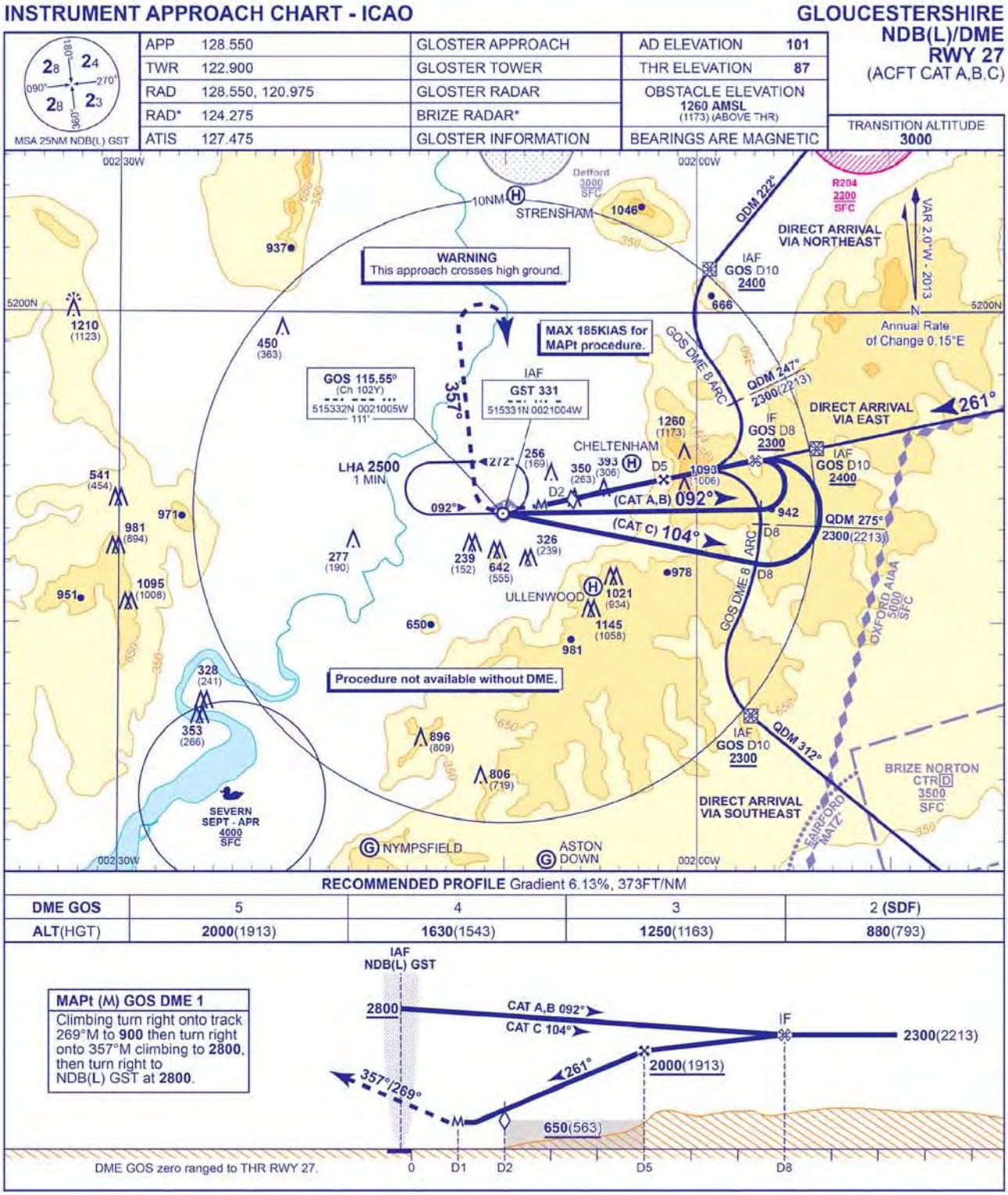


Fig (1)

At 1056:50, the radar recording shows the BE35 in the missed approach procedure 6·8nm N of the airfield in a non-standard L turn passing FL034 in the climb. The SR22 is approaching the GST on W'ly heading at FL042.

At 1057:08, the following RT exchange occurred:

ATC *"(BE35 c/s) request your intentions after this approach."*

BE35 *"(BE35 c/s) is six miles to the north."*

ATC *"(BE35 c/s) roger report your intentions after the approach."*

BE35 *"Say again (BE35 c/s)"*

ATC *"(BE35 c/s) report your intentions after the approach please."*

BE35 *"Intentions after the approach is er to return to the circuit of er righthand circuit* of two two please touch and go into the circuit."

ATC *"Roger"*

ATC *"(SR22 c/s) confirm in the hold now"*

SR22 *"-ffirm (SR22 c/s)."*(Clipped transmission)

[UKAB Note (2): By 1058:10 the BE35, indicating level at FL041, has steadied on a track of 170° with the SR22, tracking 280° and carrying out its parallel entry into the GST hold, crossing through its 12 o'clock range 3·5nm at the same level. Thereafter the BE35 commences a gradual L turn onto a track of 150° towards the GST as the SR22 continues on a W'ly track. The CPA occurs at 1058:50 with the SR22, at FL043, in the BE35's 2 o'clock range 2·1nm, vertical separation 200ft. The ac then diverge until the SR22 commences a R turn to track back towards the GST as the BE35 passes O/H the beacon.]

At 1100:10, the BE35 pilot reported, *"(BE35 c/s) is beacon outbound at four thousand feet on one zero zero nine."* The APP controller replied, *"(BE35 c/s) confirm your level your cleared level is er two thousand eight hundred feet."* There was no response from the BE35 pilot so the APP asked, *"(BE35 c/s) confirm your level.*" At 1100:31, the BE35 pilot reported, *"(BE35 c/s) four thousand feet on one zero zero nine"* and in response the APP instructed, *"(BE35 c/s) roger descend er immediately with the procedure essential traffic in the hold at four thousand feet is a Cirrus S R twenty two.*" The BE35 pilot replied, *"descending (BE35 c/s)".* The APP then advised the SR22 pilot, *"(SR22 c/s) er essential traffic beacon outbound four thousand feet descending it's a Beech Bonanza."* The SR22 pilot replied, *"Roger er (SR22 c/s) we're four miles to the er west of the beacon at the moment four thousand feet."* The APP acknowledged, *"(SR22 c/s) roger".*

[UKAB Note (3): The BE35's descent is seen to have commenced at 1100:50 as its Mode C is showing FL038 descending, the SR22 is in its 6 o'clock range 6nm still in the R turn towards the GST.]

Just after 1102:00 the BE35 pilot reported descending through 3000ft on QNH 1009 and the BE35 completed the instrument approach without further incident.

The ATSU has recommended that as part of unit best practice controllers should, at an appropriate point, include the reiteration of the missed approach level, together with appropriate TI. Since the Airprox, controllers have been made aware of the requirement and the unit MATS Part 2 will reflect these changes at the next update due February 2013.

During the first NDB(L)/DME RW27 approach, the BE35 pilot did not make the requested base turn report. When the BE35 reached a 3nm final, the flight was transferred to the Tower and during the pilot's acknowledgement, the BE35 pilot advised of an intention to carry out the missed approach procedure. CAP 413, Chapter 4, Page 15, Paragraph 1.10.1, states:

'…..When a missed approach is initiated cockpit workload is inevitably high. Any transmissions to aircraft going around shall be brief and kept to a minimum.'

In order to accommodate the missed approach and the additional instrument procedure for the BE35, the APP revised the EAT for the SR22 approaching the GST at 4000ft.

After the BE35 was transferred from Tower to Approach, the flight did not immediately establish 2-way communication with the APP. The APP contacted the BE35 pilot, advising of the PS with a clearance to the NDB

DME RW27 and a request for the BE35 pilot to report beacon outbound. The APP had an expectation that the BE35 pilot would comply with the missed approach procedure, returning to the GST(L)NDB at 2800ft.

The missed approach procedure for the NDB(L)/DME RW27 is a segment of the Instrument Approach Procedure (IAP) and is published on the IAP chart/plate. It is the procedure to be followed when the approach cannot be continued and it is expected that the pilot will fly the missed approach procedure as published (ICAO). The UK AIP Page GEN 3-3-5 (22 Oct 09) paragraph 3.7.4.1 (Instrument Approaches) states:

'Pilots will be expected to be conversant with the correct notified Instrument Approach Procedures detailed in published charts, but on request, in exceptional circumstances, Approach Control will supply the following information:

a. The aid concerned, aircraft category and Final Approach Track;

b. arrival level;

c. type of reversal manoeuvre, including outbound track, length in time or distance, level instructions and direction of procedure turn where applicable;

d. intermediate and final approach tracks and fixes and step down fixes (where applicable) with level instructions;

e. Obstacle Clearance Height;

f. Missed Approach Point and Missed Approach Procedure.'

The BE35 pilot did not comply with the requirement of the missed approach procedure track; *'359^{o}M climbing to 2800, then turn right to NDB(L)GST at 2800'.* The BE35 flight made a non-standard L turn at FL033 and returned to the GST(L)NDB in the climb to 4000ft. It is likely that the BE35 pilot would have heard the earlier call from the SR22 inbound to the beacon at 4000ft together with the clearance and revised EAT issued to the SR22.

When the loss of procedural deconfliction minima became apparent, the APP immediately instructed the BE35 pilot to descend in the procedure and then passed essential TI to both flights. At this point, unknown to the controller, the 2 ac had passed and were diverging.

CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

The Airprox occurred when following the NDB(L)/DME RW27 approach, the BE35 pilot elected to make a missed approach, but did not to follow the promulgated procedure which required a climb to maintain 2800ft. The BE35 pilot climbed to 4000ft and into conflict with the SR22 that had been cleared to the GST at 4000ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members ultimately agreed with the ATSI conclusion as to the cause of the Airprox. However, controller Members were quick to point out that there was an opportunity to break the chain before separation was lost between the ac. After the BE35 pilot had elected to carry-out a missed approach, which was approved by ATC, he did not call on the APP frequency after going-around and being transferred from Tower. This had required a prompt from the APP to elicit whether the BE35 was on his frequency; in response, the BE35 pilot's initial call did not use the standard IFR phraseology which should have included the ac's passing level and its cleared level [CAP413 Chptr 3 Pg 6]. The APP did not challenge the BE35 pilot's transmission or state the ac's cleared level, good defensive controllership, only reiterating the PS and clearing the flight for the NDB DME procedure. Thereafter the seeds were sown for the eventual outcome. The SR22 flight was on frequency but was unaware of the BE35 pilot's climb above 2800ft and when ATC asked the SR22 pilot to confirm that he was in the hold, the pilot replied "affirm", again with no mention of a level by either party. The BE35 pilot's SA should have been updated as to the SR22's presence as the SR22 pilot had called and been cleared to the GST NDB at 4000ft as the BE35 had commenced his 1st approach. As it was, APP was unaware of the confliction until the BE35 pilot reported beacon outbound at 4000ft. By then it was too late. The ac had already passed as the SR22 was carrying out its parallel entry into the

GST hold and the BE35 was tracking back to the NDB from the NW, having erroneously made a L not R turn after following the initial missed approach track to the N. One Member thought that a definite risk of collision existed as luck had played a major part in the incident, the ac passing without any visual sighting by either crew. This view was not shared by the majority; although there had been an element of luck in the proceedings, the actual geometry of the encounter, as revealed by the recorded radar, shows the ac passing over 2nm apart with 200ft vertical separation at the CPA. However the Board unanimously agreed that safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

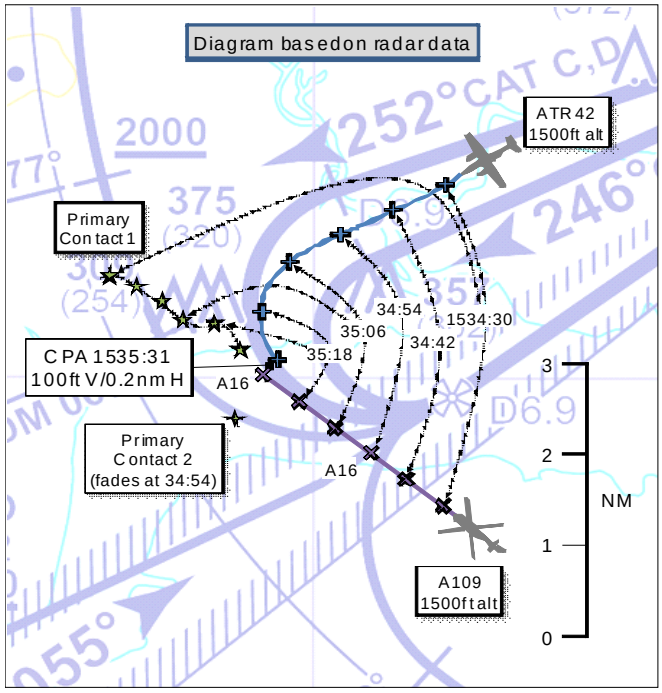
Cause: The BE35 pilot did not follow the standard Missed Approach Procedure and climbed into conflict with the SR22.

Degree of Risk: B.

AIRPROX REPORT No 2012156

AIRPROX REPORT NO 2012156

Date/Time:	6 Oct 2012 1536Z	(Saturday)
Position:	5131N 00028E (8nm SW Southend)	
Airspace:	Lon FIR	(Class: G)
Reporter:	Southend Approach	
	1st Ac	*2nd Ac*
Type:	ATR 42	A109
Operator:	CAT	Civ Comm
Alt/FL:	1500ft (QNH NK)	1500ft (NK)
Weather:	VMC CLBC	VMC NK
Visibility:	10km	NK
Reported Separation:	200ft V/200ft H	2-3nm
Recorded Separation:	100ft V/0.2nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SOUTHEND APPROACH CONTROLLER reports that at approximately 1533 an ATR 42 pilot, under a PS due to radar unserviceability, reported coming 'quite close' to 2 ac whilst in the base turn of the ILS procedure for RW06. Neither of the conflicting ac were on frequency; however, one secondary contact was observed on the A/D Traffic Monitor (ATM) displaying a London Information squawk. The controller contacted London Information and requested control of the contact ac but was informed it had just left their frequency. TI was passed to the ATR 42 pilot who reported 2 ac in sight, one of which he believed to be a M/L. The ATR 42 pilot subsequently reported receiving a TCAS RA; however, he elected to continue with the traffic in sight.

THE ATR 42 PILOT reports carrying out a procedural ILS approach to Southend RW06, operating under IFR in VMC with a PS from Southend APP [130.775MHz]. He was PNF in the L seat, and the First Officer was PF in the R seat. The white ac had strobes and navigation lights selected on. The SSR transponder was selected on with Modes A, C and S and the ac was fitted with an ACAS, also selected on. The PF was turning L through 200° at 150kt and altitude 1500ft [QNH NR], inbound to intercept the RW06 LOC, when they both saw a helicopter in the R 2 o'clock position, slightly high, at a range of approximately 300ft. Immediately afterwards the TCAS alerted with a RA. The PF disconnected the autopilot and started to follow the TCAS RA, which was demanding a 1000fpm descent. However, they were both aware of the proximity of chimney stacks with significant vertical extent so the PF 'continued a high bank turn to the left'. As the helicopter passed behind them the TCAS RA discontinued. They then saw a M/L, as the PF turned to intercept the RW06 ILS, which was also very close.

He stated that if the TCAS RA had not been initially followed he was sure this would have been a much more serious incident, as they probably only had separation of about 200ft from both ac. However, if the TCAS had continued to demand the rate of decent, the ac would have become dangerously close to the structures below.

He assessed the risk of collision as 'High'.

THE A109 PILOT reports transiting from outside the UK FIR to Luton Airport, routeing via the Isle of Grain and Thurrock. He was operating under VFR in VMC 'with ATC London', heading NW at 120kt at 1500ft [Pressure

setting NR]. The grey helicopter had the SSR transponder selected on with Modes A, C and S. The ac lighting and ACAS fit were not reported. He informed ATC of hang-glider traffic crossing from L to R at 1700ft.

He assessed that he crossed 2-3nm behind the ATR 42 and that there was no risk of collision.

[UKAB Note (1): Despite extensive tracing action, regretfully it has not been possible to establish the identity of any M/L pilots operating in the area at the time and date of the Airprox.]

ATSI reports that the Airprox occurred at 1535:31UTC, 8.5nm SW of Southend Airport, within Class G airspace, between an Avions De Transport Regional ATR 42-300 (ATR 42) and an AgustaWestland AW109 SP 'Grand New' helicopter (A109).

The ATR 42 was inbound to Southend Airport on an IFR flight from Dublin Airport and was in receipt of a PS from Southend APP [130.775MHz]. The A109 was operating on a VFR flight from Le Touquet to Luton Airport and had been in receipt of a BS from London Information before being transferred to Farnborough LARS(E). The A109 pilot was in the process of changing frequency when the Airprox occurred.

Southend were providing a split A/D and Approach Control Service without the aid of surveillance equipment. Radar services had been withdrawn due to the unserviceability of the primary radar equipment. The ATM was showing SSR information only.

CAA ATSI had access to RTF recordings for Southend Approach and London FIS, together with area radar recordings and written reports from the Approach controller and the two pilots concerned.

The Southend and Stansted weathers were recorded as follows:

METAR EGMC 061520Z 05004KT 9999 FEW031 13/06 Q1014=

METAR EGSS 061520Z VRB03KT CAVOK 14/07 Q1014=

METAR EGSS 061550Z VRB02KT 9999 FEW031 14/07 Q1014=

The Chatham RPS was recorded as 1009hPa.

Factual History

At 1513:20 the A109 pilot contacted London FIS and reported crossing mid-channel 'at 1500ft'. The pilot was instructed to squawk 1177 with Mode C and a BS was agreed. He was then instructed to report crossing the coast at Dover. Radar showed the A109 had crossed the coastline to the NE of Dover at 1517:06 but no call was received by London FIS. A crossed/broken transmission was received at 1520:20 which may have been from the A109 pilot.

At 1521:42, the ATR 42 pilot contacted Southend APP, squawking 6207 and descending to altitude 4000ft (QNH 1014hPa). He was advised that he was number two in the traffic sequence; the number one aircraft was a Diamond Twin Star DA42 approaching the beacon ahead of the ATR 42 at 3000ft. A PS was agreed and the pilot was instructed to report entering the hold. The controller advised the ATR 42 pilot that, at 4000ft, he would be holding inside CAS (above Southend, Class A CAS, LTMA-3, extends from an altitude of 3500ft to FL195).

At 1522:18, the DA42 pilot reported beacon outbound and leaving 3000ft in the descent. At 1524:50, the ATR 42 pilot reported entering the hold. At 1527:49, the ATR 42 pilot was cleared to commence the reversal procedure and descend to 3000ft prior to going beacon outbound for the ILS procedure approach for RW06. This required the ATR 42 to leave the NDB on a northerly track followed by a R turn, returning to the NDB for the procedure as shown in Figure 1 below.

AIRPROX REPORT No 2012156

Figure 1 – extract from UK AIP page AD2-EGMC-8-1 dated 8 Mar 12

At 1532:20, as the ATR 42 crossed the beacon to go outbound, the A109 was shown tracking NW at 1500ft, 8.8nm to the SSW of the ATR 42. At 1532:42, London FIS instructed the A109 pilot to squawk 7000 and free-call Farnborough Radar on frequency 123.225MHz.

At 1533:29, the ATR 42 was outbound and level at 1500ft in accordance with the procedure, with the A109 in the ATR 42's 10 o'clock position at a range of 5.7nm and altitude 1500ft. The Southend controller's written report indicated that unknown traffic [the subject A109] squawking 1177 (a London FIS squawk) was observed on the ATM to be tracking towards the final approach area for RW06.

At 1533:35 Southend contacted London FIS in order to ask for the aircraft to be transferred to Southend APP. At the same time the A109 squawk changed to 7000 and London FIS reported that the A109 pilot had just changed frequency to Farnborough Radar. Farnborough reported that the A109 had not yet contacted them.

At 1533:39, the Southend controller passed limited TI, *"*[ATR 42 C/S] *there is er traffic er just observed on er the ATM only tracking northwest bound er to cross the final approach shortly at one thousand five hundred feet."*. This was acknowledged by the ATR 42 pilot. Radar showed the two ac converging at a range of 5.2nm.

At 1534:33, the controller updated the TI, *"*[ATR 42 C/S] *that previously mentioned er traffic believe will pass eight miles er to the southwest of the field northwest bound.".* The pilot replied, *"Roger thanks* [ATR 42 C/S]*".* The range between the aircraft was 3.2nm.

At 1534:42 the area radar recording showed the A109 squawking 7000, 2.7nm S of the ATR 42 squawking 6207 (see figure 2 below). Also shown was another slow moving primary contact (P1) in the ATR 42's 12 o'clock position at a range of 2.5nm tracking SE together with an intermittent second primary contact (P2) tracking NW, 2.6nm SW of the ATR 42. Contact P2 faded from radar.

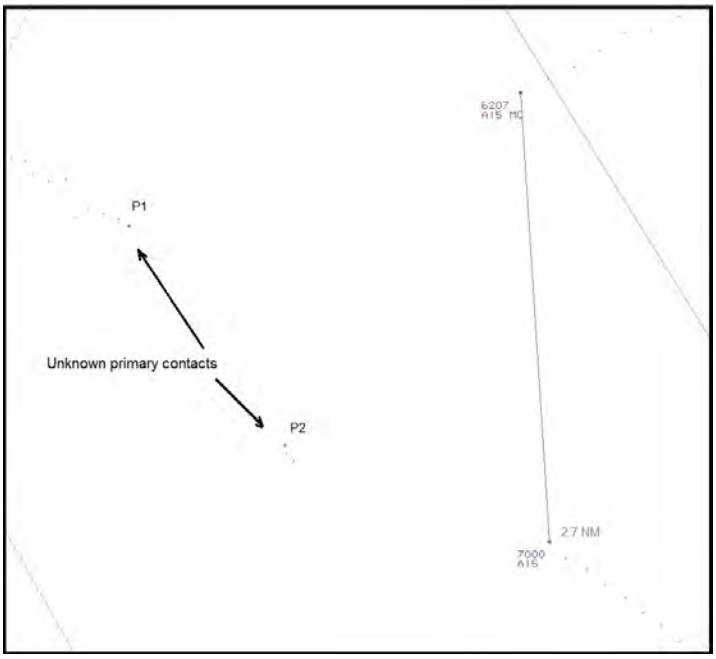


Figure 2 – area radar at 1534:42

At 1535:10, the A109 was in the ATR 42's 10 o'clock position at a range of 1.5nm and the controller asked, "[ATR 42 C/S] *are you visual with that traffic believed maybe on your left hand side."* The ATR 42 pilot responded, *"Affirm* [ATR 42 C/S]*"* and the controller replied, *"Sorry was that affirm?"* The ATR 42 pilot confirmed, *"Visual with the traffic* [ATR 42 C/S]". The other unknown primary contact (P1) was in the ATR 42's 12 o'clock position at a range of 0.9nm. At this point the ATR 42 was shown to commence the LH base turn (see Figure 3).

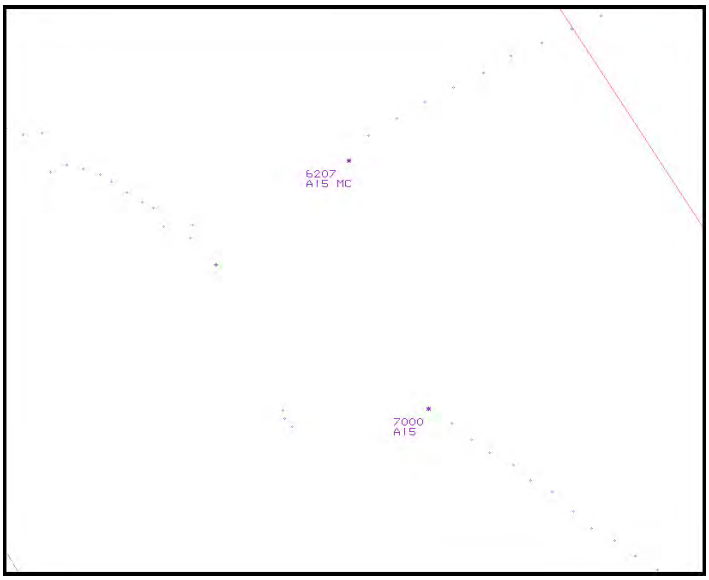


Figure 3 – area radar at 1535:10

At 1535:20, the ATR 42 was in a L turn with the unknown primary contact (P1) 0.4nm SW and the A109 1nm S. As the primary radar was out of service, the Southend ATM would only have shown the two SSR returns and not the two primary contacts. It was not clear which aircraft the ATR 42 pilot had reported in sight.

At 1535:29, the unknown primary contact (P1) is shown 0.5nm W of the ATR 42 and turning away. The A109 is 0.5nm S of the ATR 42 at the same level. The ATR 42 continued in the L turn and at 1535:31 (CPA), the A109, at 1600ft, was shown passing 0.2nm SW of the ATR 42 at 1500ft (see Figure 4).

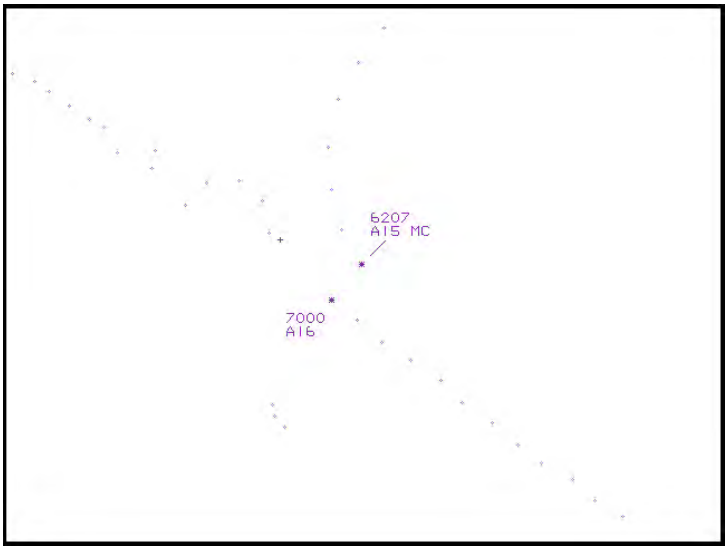


Figure 4 – area radar at 1535:31

The ATR 42 pilot's written report indicated that, as the ATR 42 turned in from the outbound leg, the helicopter was sighted and they immediately received a TCAS RA.

At 1535:57, Farnborough radar contacted Southend and advised that the A109 pilot had just called them. In response the Southend controller reported that the ATR 42 pilot had sighted the A109 and that Farnborough could retain the A109 on their frequency.

At 1536:45, the ATR 42 pilot reported localiser established.

The ATR 42 pilot subsequently reported to ATC that he had sighted two ac tracking NW. The area radar showed that the two ac were the A109 and the primary contact P2, which had faded from radar.

Analysis

The ATR 42 pilot was in receipt of a PS from Southend APP. CAP774 (UK Flight Information Services), Chapter 5, paragraph 1, states:

'A Procedural Service is an ATS where, in addition to the provisions of a Basic Service, the controller provides restrictions, instructions, and approach clearances, which if complied with, shall achieve deconfliction minima against other aircraft participating in the Procedural Service. Neither traffic information nor deconfliction advice can be passed with respect to unknown traffic.

A Procedural Service does not require information derived from an ATS surveillance system. Therefore, due to the ability for autonomous flight in Class F/G airspace, pilots in receipt of a Procedural Service should be aware of the high likelihood of encountering conflicting traffic without warnings being provided by ATC.

Pilots flying in the vicinity of aerodromes, ATS routes, or navigational aids where it is known that a Procedural Service is provided, are strongly encouraged to attempt to establish RTF contact with the notified ATS provider.'

The A109 pilot was between frequencies and not in receipt of an ATS in the period prior to the Airprox. Using the limited radar derived information provided by the ATM, the Southend controller became aware of the presence of a threat. The controller discharged his duty of care by passing a warning and limited information on the unknown traffic [the subject A109] until the ATR 42 pilot reported that he had an aircraft in sight.

The ATM only showed SSR data due to the primary radar being out of service. The Southend controller was therefore not aware of the other primary contacts. It was not clear which aircraft the ATR 42 pilot first sighted. As the ATR 42 pilot started the L turn the primary contact P1 was in his 12 o'clock position at a range of 0.9nm. The ATR 42 pilot's written report subsequently indicated the sighting of two ac tracking NW. It was believed that one

of these was the A109 and the other may have been the primary contact P2, which was tracking NW before it faded from the area radar recordings. The ATR 42 pilot indicated receiving a TCAS RA at the same time as sighting a helicopter, believed to be the subject A109.

CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

Conclusions

The Airprox occurred when the ATR 42 pilot, in receipt of a PS, and the A109 pilot, who was not in receipt of an ATS, flew into close proximity with each other whilst operating in Class G uncontrolled airspace to the SW of Southend Airport.

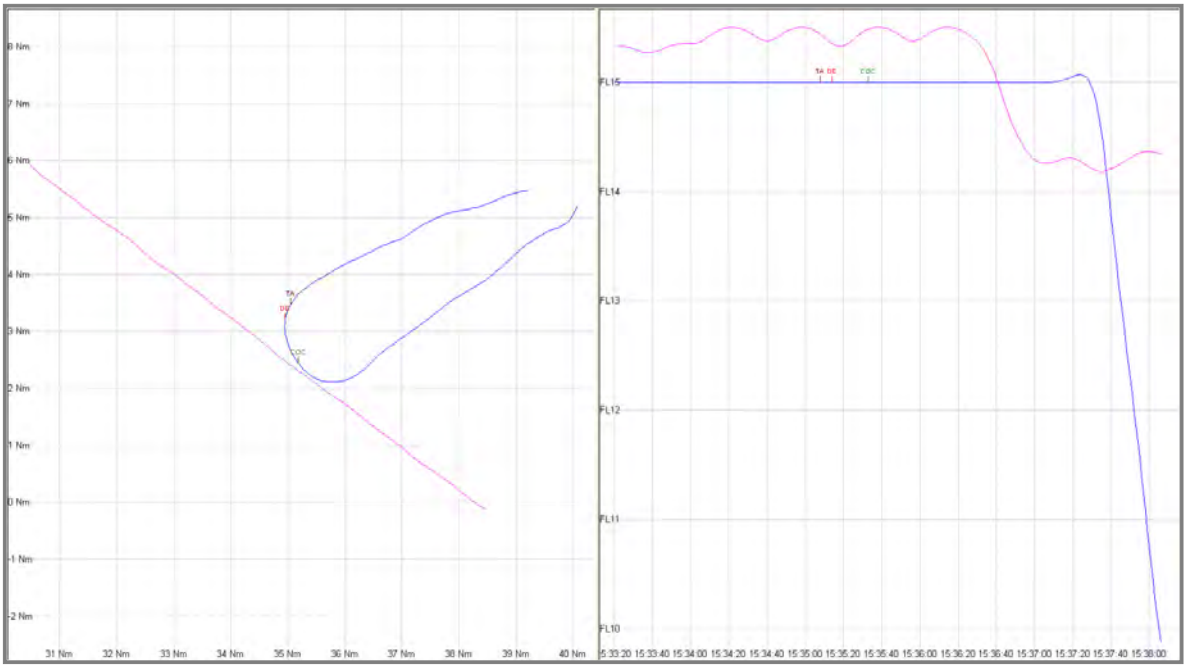
The Southend controller passed a warning and limited TI to the ATR 42 pilot, which probably alerted him to the presence of unknown traffic in the vicinity.

NATS SAFETY INVESTIGATIONS kindly provided a TCAS performance assessment using the InCAS simulation tool and Eurocontrol's Automatic Safety Monitoring Tool (ASMT).

Eurocontrol's automatic safety monitoring tool (ASMT) recorded (via Mode S downlink) a single RA relating to this encounter, a '*descend'* issued to the ATR 42 pilot within the 4 seconds prior to 15:35:18. The encounter was simulated in InCAS using the 25ft altitude reports available from the A109 Mode S. The simulated RA time of 15:35:14 is within the 4 second window that the actual RA would have been issued, based on the time the downlinked message was received by the radars. This suggests a good correlation between the simulation and the actual incident.

The A109 was known to be Mode S equipped because the Mode S address of the transponder corresponding to [the A109 registration] was included in the RA downlink message. Setting the A109 to be TCAS-II equipped in the simulation causes it to receive a '*climb'* RA at the same time as the ATR 42 receives a '*descend'* RA. As no downlinked RA data was received from the A109 it may be assumed that this aircraft was not TCAS-II equipped.

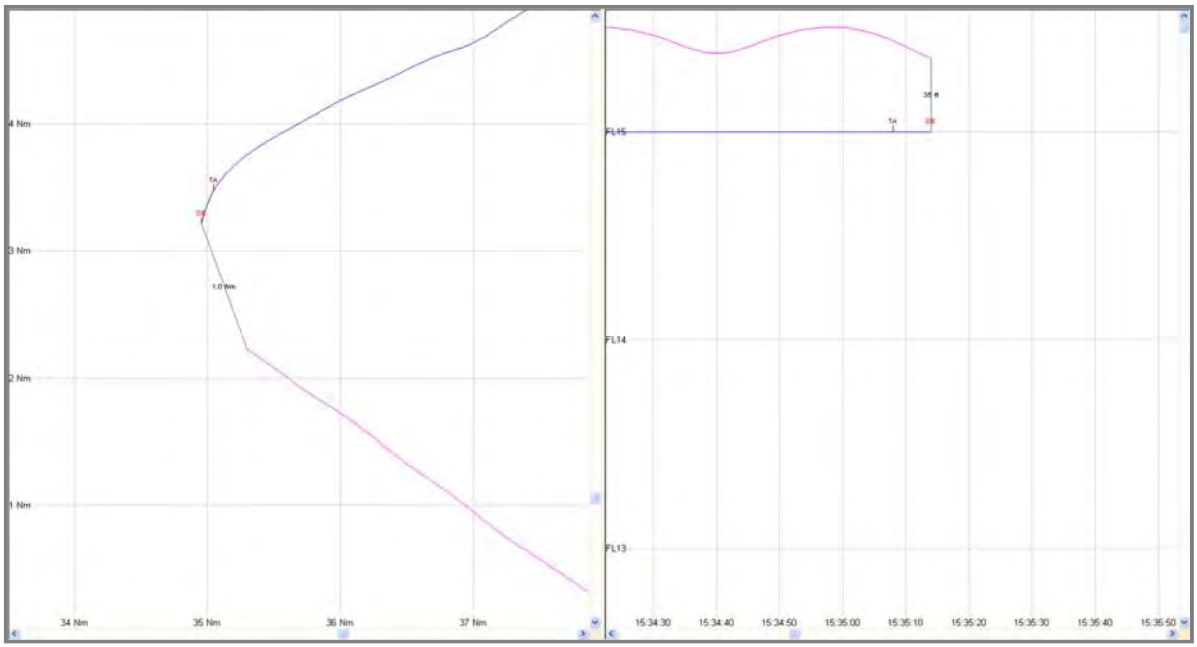
The Mode C data suggest that the ATR 42 pilot took no action in response to the RA. The A109 Mode C changes between 1525 and 1550 during the period when it is in approximately level flight. The InCAS simulation produces a smoothed trajectory based on these data, the effect of which is shown in the figure below. A different interpolation would not change the RA time or type.



Encounter Diagram Based on Heathrow Single Source Radar Data

Note that the small upturn in the vertical trajectory of the ATR 42 prior to descent is an artefact of the interpolation of radar data applied by the simulation; the Mode C data do not show a climb, only a descent.

Alert Time	*Alert Description*	*Altitude (FL)*	*Intruder Range (Nm)*	*Vertical Sep. (ft)*
15:35:08	TRAFFIC ALERT	15	1.45	50
15:35:14	DESCEND	15	1.05	33
15:35:33	CLEAR OF CONFLICT	15	0.37	50



Encounter Diagram Showing The Aircraft Positions at the time of the RA

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, an ATC Unit investigation report from Southend ATC and reports from the appropriate ATC authorities.

[Post-Meeting Note: Although the Southend primary radar had been declared out of service due to poor radar performance it was still on and providing 'patchy primary returns'. The NATS feed from Debden, which included processed primary radar, was being displayed on the ATM but the Debden primary returns were only displayed when associated with a secondary return. The controller's original report stated ATM was displaying an SSR feed and ATSI's subsequent discussion with Southend indicated that the ATM showed only SSR labels. However, it may have been the case that primary radar returns from the malfunctioning Southend radar were also displayed on the ATM. Nevertheless, it was apparent during further discussion with the controller that he had used the observed SSR returns to form the basis of his traffic warnings and did not recall observing any PSR returns.

The controller was not radar qualified and, notwithstanding the MATS Part 1 requirement that an ATM 'must not be used as an ATS surveillance system to provide an Approach Radar Service' the controller used the limited available information to provide a warning to the ATR 42 pilot.]

Members first considered the actions of Southend APP and his use of the ATM. It was confirmed that primary surveillance was temporarily U/S and that Southend did not have regulatory approval to use SSR only. In these circumstances the highest level of service available was a PS. Members questioned the rationale behind not allowing Southend to use SSR-only information. The CAA SRG Advisor pointed out that there is a process for ANSPs to apply for approval to use SSR-only data; this process and the subsequent approval are required before allowing use of SSR-only data in order to ensure its proper use by suitably qualified personnel. The ad-hoc use of SSR data could result in non-qualified or inexperienced personnel using the facility as if it were a radar, with a consequent increase in risk. Whilst this was clear, Members agreed that limiting service provision to a PS was not making the best use of available resources. Controller Members with experience of developing safety cases for regulatory approval of SSR-only surveillance reported that it could be an extended process that consumed significant resource with no guarantee of success. Since there were also implications for ac operators when they are unable to mitigate the risks of flying in Class G airspace by using radar-derived ATS, Members questioned whether regulations could be framed to facilitate the use of SSR-only data for the provision of ATSOCAS in the strictly limited circumstances of a temporary loss of primary surveillance. Members therefore recommended that the CAA review the regulations, processes and approvals encompassing the provision and use of SSR-only data when primary radar data is temporarily unavailable. Returning to the specific circumstances of this Airprox, the Board noted that the Southend APP provided multiple traffic warnings to the ATR 42 pilot based on his observation of the ATM and sought to have the A109 transferred to his frequency. His proactive, conscientious and professional balance between the provisions of a PS and making the best use of available resources was commended by the Board.

Members then turned to the actions of the pilots. It was apparent from the pilot reports and the radar and TCAS simulation data that there was a degree of confusion over the chronology of events. The ATR 42 crew received generic traffic warnings referenced to the airfield and the final approach track before being asked specifically if they were visual with traffic on their L. The crew answered that they were 'visual with traffic'. Given the subsequent flight path of the ATR 42, the Board surmised that the traffic in sight was the primary only contact 0.9nm ahead. It is reasonable to assume that the A109 would have been displayed on the ATR 42's TCAS before the TA and the ATR 42 crew were correct in not manoeuvring on the basis of the azimuth display or on the generation of a TA. It did appear, however, that the ATR 42 crew erroneously correlated the traffic warning and their TCAS TA indications with the primary only contact they had seen on their nose and continued their 'high bank turn to the left' in the belief that they already had the conflicting traffic in sight and that the L turn would resolve the conflict. The TCAS RA occurred 6sec after the TA, some 17sec before CPA and 19sec before 'clear of conflict'. The ATR 42 pilot reports the PF initially followed the RA by disengaging the A/P and following the TCAS RA 'Descend'. The radar replay Mode C indication does not reflect a change in ac altitude. CAT pilot Members understood the captain's concern over the proximity of chimneys below; however, complying fully with the RA command, in the 17sec before CPA, would have increased the mis-distance. It was also pointed out that TCAS II progressively inhibits RAs depending on rad alt output, as follows:

'Increase Descent' RAs are inhibited below 1,450 ft rad alt (± 100 ft).

'Descend' RAs are inhibited below 1,100 ft rad alt (± 100 ft).

All RAs are inhibited below 1,000 ft rad alt (± 100 ft).

Both pilots were operating in class G airspace and were equally responsible for 'see and avoid'; the ATR 42 pilot had right of way over the A109 pilot, until shortly before the CPA. The A109 pilot did not submit a comprehensive report but, from the information available, appeared to be in the process of changing frequency from London Information to Farnborough LARS(E) at the time of the Airprox. Members opined that it was poor airmanship for the A109 pilot to cross the Southend RW06 extended C/L at a range of 8nm without contacting Southend APP. He reported sighting the ATR 42 'crossing 2-3nm behind'; given the recorded mis-distance, it was probable that the A109 pilot did not see the ATR 42 until well after CPA and that this was part of the Cause of the Airprox. The ATR 42 crew reported first seeing the A109 in their 2 o'clock at a distance estimated to be 300ft, shortly before the RA. Since the RA occurred at a range of 1.05nm it seems likely that their sighting was after the RA. Either way, a sighting in the 2 o'clock was too late to take avoiding action and constituted, effectively, a non-sighting and the other part of the Cause.

Whilst the Cause of the Airprox could be established with confidence, the Board was divided on the degree of Risk. On the one hand, although the ac had passed each other at undesirably close quarters, they remained separated by 0.2nm. Conversely, the ATR 42's Mode C did not reflect a change of altitude in response to the TCAS RA 'Descend' and neither the ATR 42 crew nor the A109 pilot saw the other ac in time to take avoiding action. Consequently, by a small majority, the Board judged that there had been a collision risk.

PART C: ASSESSMENT OF CAUSE AND RISK

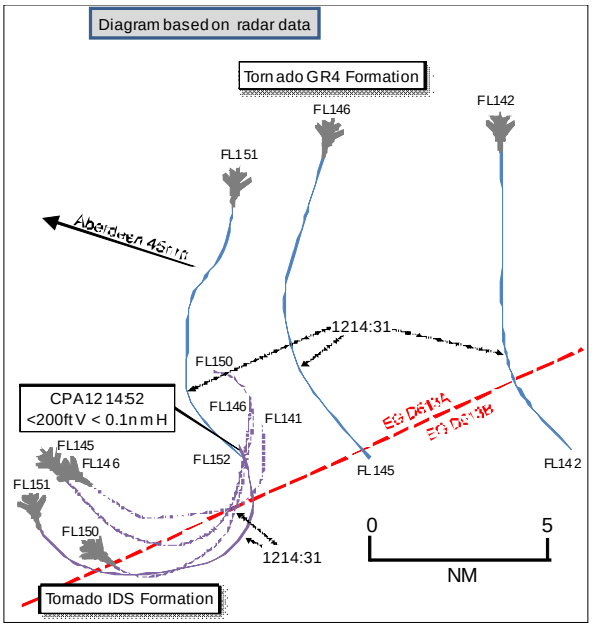
Cause: An apparent non-sighting by the A109 pilot and effectively a non-sighting by the ATR 42 crew.

Degree of Risk: A.

Recommendation: The CAA is recommended to review the regulations, processes and approvals encompassing the provision and use of ATSs employing SSR-only during periods of temporary loss of primary radar.

AIRPROX REPORT NO 2012157

Date/Time:	10 October 2012 1215Z	
Position:	5705N 00110W	(EG D613A)
Airspace:	EG D613A	
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Tornado IDS
Operator:	HQ Air (Ops)	Foreign Mil
Alt/FL:	15150	15200
	QNH (1010hPa)	QNH (NR)
Weather:	VMC CLAC	VMC CAVOK
Visibility:	100km	>10km
Reported Separation:		
	250ft V/100m H	500ft V/250m H
Recorded Separation:		
	<200ft V/<0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports flying as number 2 of a 3 ac formation, itself part of a larger package of 'blue force' ac, during the pre-start 'marshalling' phase of an Exercise CQWI sortie. He was operating under VFR in VMC with a BS from an AWACS ac and was expecting to see other ac in close proximity. The camouflaged grey ac had navigation lights and HISLs selected on. The SSR transponder was selected on with Modes A, C and S. The ac was not fitted with an ACAS. As he tracked S with the other 2 formation ac, 3 other ac were observed closing from the R. After approximately 10sec a fourth ac was observed at a range of 2nm closing rapidly from the R, just below him but not on a collision heading, in a level, hard L turn. The fourth ac, identified as a Tornado IDS, continued its L turn onto what appeared to be a collision heading and the GR4 pilot started a climb. The conflicting ac passed underneath his L wing at an assessed range of 100m and height separation of approximately 250ft. Initially the crew assessed that, although the incident was close, it did not warrant an Airprox and they did not want to stop the exercise. With hindsight, having viewed the HUD video, it was apparent there was potential for collision to have occurred.

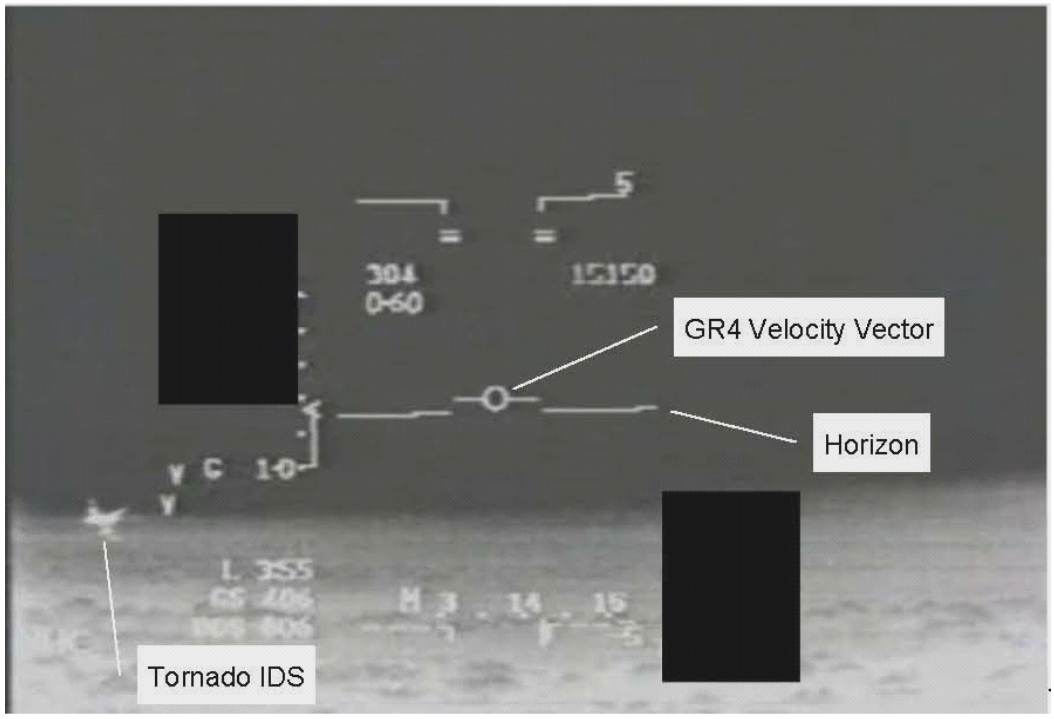
He assessed the risk as Medium.

THE TORNADO IDS PILOT reports committing S-bound as one of a 4-ac formation during Ex CQWI, operating under VFR with 'tactical control' from an AWACS ac. The ac was camouflaged grey with navigation lights and HISLs selected on. The SSR transponder was selected on with Modes A, C and S. The ac was not fitted with an ACAS. After the exercise start, the formation reacted to a simulated threat and turned 180°, on to a N'ly heading. As soon as the threat had ceased to be a factor the formation started to turn back to their original track. At that point he saw a conflicting Tornado at a range of 1nm in his 12 o'clock position and 'eased off' his L turn for deconfliction. After the 2 ac passed, he continued the flight inbound to the exercise target.

He assessed the risk of collision as Medium to High.

[UKAB Note(1): A still frame from the Tornado GR4 HUD video, taken shortly before CPA, is reproduced below:]

AIRPROX REPORT No 2012157



BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred within EG D613A on 10 Oct 12 between a Tornado GR4 and a Tornado IDS; both ac were operating under VFR in VMC in receipt of a BS from a Sentry Weapons Controller (WC) whilst participating in Ex CQWI. All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The WC reported that due to the anticipated complexity of the sortie and the expectation of comms jamming, a BS was applied to all exercise ac. The WC was providing a BS to approx 20 ac comprising the OCA package, all operating within a close proximity (Figure 1 refers).

Figure 1: Screenshot from NATS Radar Replay – the subject ac are at centre in red.

At the time of the Airprox, 5 ac, including the reporting and reported ac, were manoeuvring within a block of airspace approximately 1nm W-E by 2nm N-S, from FL140 to FL152 (Figure 2 refers – subject ac have SSR Mode 3A of 1542 and 1522).

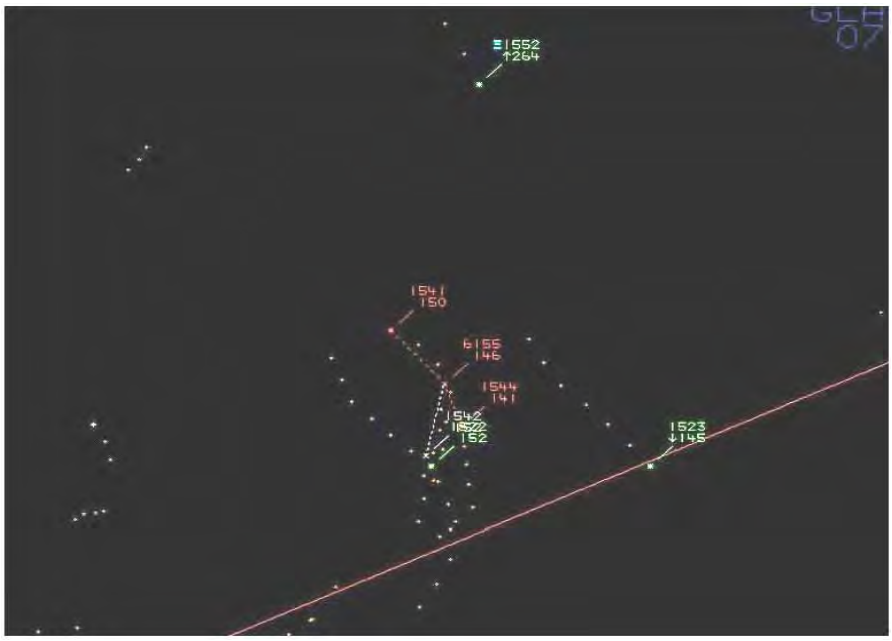


Figure 2: Screenshot from NATS Radar Replay of CPA.

Given his requirement to provide tactical information to the OCA package, the WC was operating on a relatively large range scale, thus his ability to differentiate individual ac within the package was reduced. Consequently, the WC had no opportunity to provide a warning to either crew of their proximity to other ac within the OCA package. It is also reasonable to argue that the crews involved were aware of these limitations and that "see and avoid" was the primary means of deconfliction.

HQ AIR (OPS) comments that the potential for Airprox is always heightened during large exercise activities but deconfliction plans and safe altitudes for the individual elements are considered during the exercise planning process. On this occasion the Tornado IDS formation reacted to a simulated threat and their turn back took them into confliction with the Tornado GR4 formation. Both formations were flying iaw the exercise plan and exercised the 'see and avoid' principle, iaw their operating conditions. The RAF Lossiemouth investigation has identified planning issues and reiterated the need for a Tornado ACAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings, reports from the weapons controller involved and reports from the appropriate ATC and other operating authorities.

The military training Member commented that this kind of event was normally not reported as an Airprox but dealt with at the Exercise debrief level. The debrief and subsequent Lossiemouth Occurrence Review Group Investigation had identified the root cause as inadequate mission planning and the Board accepted this conclusion. A number of other issues were identified in the unit investigation, including the desirability of co-locating all strike package aircrew at the same base during an exercise; the use of VTC for full monitoring of the brief and debrief if aircrew cannot be co-located; fitting of ACAS to participating ac and improvements to computer planning tools to allow visual identification of confliction issues.

Board Members established that the conflicting formation members were operating iaw the regulations and mission plan and agreed unanimously that the Airprox was due to a confliction between the participants whilst they were operating under VFR with a BS and hence were responsible for collision avoidance. Both formation members 'saw and avoided'; it was the GR4 pilot's responsibility to give way initially (Rule 9) and he climbed slightly; the IDS pilot altered his course to the R (Rule 10) as he approached a head-on position, both thereby providing effective and timely actions to prevent ac collision.

AIRPROX REPORT No 2012157

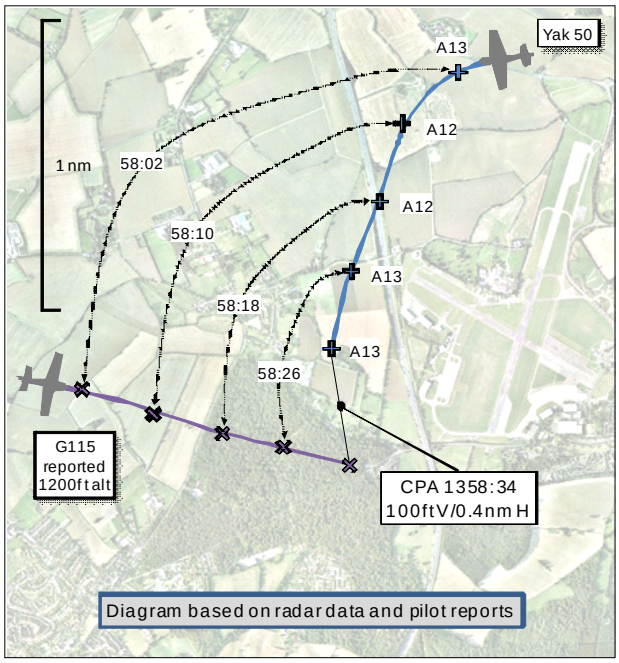
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict between exercise participants.

Degree of Risk: C.

AIRPROX REPORT NO 2012158

Date/Time:	10 Oct 2012 1359Z	
Position:	5133N 00009W (North Weald Base Leg RW02 LH - elev 321ft)	
Airspace:	Lon FIR	(Class: G)
Reporter:	North Weald	
	1st Ac	*2nd Ac*
Type:	Grob 115	Yak 50
Operator:	Civ Pte	Civ Pte
Alt/FL:	1200ft (QNH 1014hPa)	800ft (QFE 1005hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	20km	>10km
Reported Separation:	0ft V/ NR H	100-150ft V 300m H
Recorded Separation:	NR V/0.4nm H	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE NORTH WEALD A/G OPERATOR reports that a Yak 50 pilot radioed ['North Weald Radio' 123.525Mhz] with the intention of carrying out 3 ccts followed by a local flight out to the E. At 1400, when late downwind in the cct at height 800ft [QFE 1005hPa], the pilot reported seeing a Grob G115, transiting over the A/D from NW to SE, on base leg at height 700ft. The Grob pilot had not made RT contact at the time of the incident. The Yak pilot sounded alarmed by his 'sighting of an Airprox' and, in view of a potential confliction, cancelled his cct intentions and departed to the E for a local flight. The Yak pilot subsequently acquired the Grob ac registration, which he relayed to the controller, who telephoned Farnborough Radar to enquire as to whether they had been 'working the Grob'. The Farnborough controller confirmed he had, informing him that the Grob pilot was routeing to Thurrock and return to Panshanger. He requested that they relay a message to the pilot to contact 'North Weald Radio' on his return flight. The Grob pilot contacted 'North Weald Radio' as requested at about 1420 and was advised to establish RT contact whenever transiting O/H to avoid potential conflictions such as had occurred earlier. The Grob pilot stated words to the effect that 'pilots operating in the North Weald circuit should keep a better visual lookout'.

THE GROB 115 PILOT reports conducting a training flight from Panshanger to Thurrock and return. He was operating under VFR in VMC with a BS from Farnborough LARS(N) [132.800MHz]. The white and grey ac had the strobe light selected on, along with the SSR transponder with Mode A selected. The ac was not fitted with an ACAS. Approximately 2nm WNW of the unlicensed A/D at North Weald he saw an ac turning LH crosswind for RW02. Visual contact was maintained and the ac was seen to climb, turn downwind and level off at circuit altitude. He crossed the downwind track for RW02 'abeam the 02 numbers' on a heading of 120° at 90kt and altitude 1200ft [QNH 1014hPa as stated on RT recording], at approximately the same level as the other ac which, at that time, was established LH downwind for RW02, approximately abeam the 'departure end'. He stated that 'no avoiding action was necessary as visual contact was maintained and the continuation of course provided sufficient separation'. He maintained RT contact with 'Farnborough LARS' throughout. Approximately 3min later, '4 miles' ESE of North Weald, he was surprised to see a YAK 50 suddenly in close formation in his 4 o'clock position. The formation lasted approximately 20sec from first noticing him before he broke away behind and below. Separation during this period was no more than 10-15m. He took the same route on the return leg from Thurrock; however, this time a frequency change was made from Farnborough to North Weald Radio before crossing over the A/D. The radio operator at North Weald then advised him of the dissatisfaction that the pilot flying the Yak had

expressed 'with the earlier event'. He contacted the Yak pilot once on the ground at Panshanger. Both he and his student had felt intimidated by the interception of his ac. He did not feel that the original event warranted an Airprox report.

He assessed the risk of collision as 'None'.

THE YAK 50 PILOT reports completing the first of 3 ccts for glide approach and engine failure practice. He was operating under VFR in VMC with an A/G service from 'North Weald Radio'. The green/grey camouflaged ac had the SSR transponder selected on with Modes A, C and S and was not fitted with strobes or an ACAS. When late downwind for RW02 LH, heading 200-205° at 100kt and passing 'abeam the numbers', he dipped his L wing to start the L turn to final, with power at idle. He saw another ac in his L 10 o'clock position passing R to L (SE bound) below him and just on the S boundary of the A/D. He was very surprised to see an ac in this position. He estimated the other ac had passed underneath his track by approximately 150-200ft a few seconds before he made visual contact. He followed the ac to 'check it wasn't Stapleford traffic' and, once seen heading towards the Thurrock area, made a visual identification and relayed the details to North Weald Radio. After a short aerobatic practice he returned to North Weald and heard the Grob pilot call for a transit back through the A/D overhead. The Grob pilot tracked through the O/H again with a direct pass a few hundred feet above his ac mid downwind, whilst making an RT transmission to the effect that 'circuit traffic should keep an eye out for him'.

He considered this event very dangerous given:

1. The type of traffic at North Weald, ranging from ultralight through to fast jet, and the lack of RT call from the Grob 115 pilot to advise of his presence.

2. Without making RT contact the Grob pilot had no idea of the potential ac type(s) on approach. Tracking across finals a few hundred feet from any traffic was very poor airmanship. A Yak 52 with a steep approach would not be far off a direct conflict with this ac. He also noted that Helimed helicopters are based at North Weald.

3. The recent accident at Shoreham demonstrated that, even with 2 ac in RT contact, the dangers of a collision were still high in the cct.

He also questioned why Farnborough didn't suggest to the Grob pilot that he call North Weald Radio on his first transit.

He assessed the risk of collision as 'Medium'.

ATSI reports that the Airprox occurred at 1358:25 UTC, on the SW side of North Weald A/D, within Class G airspace, between a Yakovlev Yak 50 (Yak 50) and a Grob G115 (Grob 115).

North Weald A/D operates as an unlicensed A/D and provides an A/G service on 123.525MHz. North Weald A/D lies beneath the Class D Stansted CTA-2 (1500-2500ft) and is within the Stansted TMZ-2 (SFC to 1500ft).

The Grob 115 pilot was operating VFR on a training flight, routeing from Panshanger to Thurrock and return, and was in receipt of a BS from Farnborough LARS(N) [132.8MHz]. The Yak 50 pilot was operating on a local VFR flight in the visual cct at North Weald A/D and was in communication with North Weald Radio [132.800MHz].

CAA ATSI had access to area radar recording together with written reports from both pilots and the A/G operator at North Weald. Farnborough were not aware of the Airprox and no controller report was received. No RTF recordings were available from Farnborough as the request from ATSI was made more than 30 days after the incident due to the late receipt of pilot reports. ATSI visited North Weald to listen to the RTF recording.

The Stansted Airport weather was reported as follows:

METAR EGSS 101350Z 13005KT 090V170 9999 SCT034 SCT039 13/06 Q1015=

Factual History

At 1351:48 the Grob 115 was first shown on radar, 11.1nm NW of North Weald in the vicinity of Panshanger, squawking 5031 without Mode C level reporting. With regard to access to Stansted TMZ, the London LTC Manual of Air Traffic Services Part 2 at paragraph 5.13.3.3, states:

'Upon receiving a TMZ access request from a Mode A only equipped ac, Farnborough Radar will allocate a discrete squawk and authorise entry to the TMZ without reference to TC Stansted. Farnborough will emphasise the level restriction of such an authorisation i.e. not above altitude 1500ft …'

And at paragraph 5.13.3.4 states:

'Aircraft flying inbound to or flying in the circuit pattern of Wethersfield, Andrewsfield, Hunsdon or North Weald are encouraged to operate a transponder with code A7010 (and Mode C) if so equipped. If Farnborough LARS authorise a Mode A only equipped transit of the TMZ inbound to one of these airfields, Farnborough will instruct the aircraft to select A7010 approaching the boundary of TMZ exempt airspace. It is recognised that this transfer can take place within the TMZ as the pilot might need to change frequency in time to obtain circuit joining instructions.'

At 1354:30 the Grob 115 was shown 7nm NW of North Weald, crossing the lateral boundary of the Stansted TMZ. At 1357:48 the Grob 115 was 1.8nm WSW of North Weald, tracking SE across the S side of the A/D. The Yak 50 was shown 0.6nm N of North Weald, squawking 7010 and turning crosswind for the RW02 LH cct at an altitude of 1100ft.

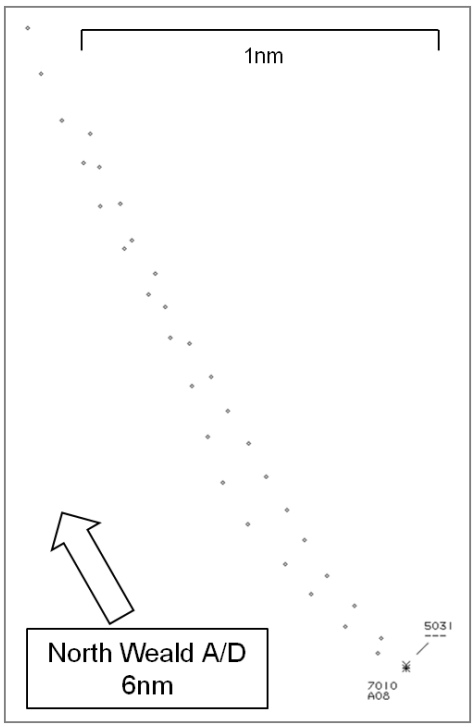
At 1358:00 the Yak 50 pilot advised North Weald Radio of his intention to simulate an engine failure and to overfly the A/D without undercarriage. At 1358:25 the Yak 50 was shown midpoint downwind, indicating 1300ft, with the Grob 115 in the Yak 50 pilot's 12 o'clock at a range of 0.5nm, crossing from R to L towards the RW02 threshold. The Yak 50 pilot reported traffic 'just going crosswind'. The A/G operator replied that the other traffic had not identified itself to North Weald. The Grob 115 pilot's written report indicated being visual with the Yak 50 at approximately the same level.

The CPA occurred at 1358:35, as the Yak 50 pilot continued downwind, with the Grob 115 in his half past 10 position at a range of 0.4nm.

At 1359:03, the Yak 50 pilot cancelled the simulated engine failure and reported heading E to 'come back in a few minutes'. Radar recording showed the Yak 50 pilot turning towards the Grob 115 at a range of 0.9nm. The Yak 50 is shown to follow the Grob 115 on an E'ly track at 1000ft. The Yak 50 pilot continued to follow and manoeuvred behind the Grob 115. At 1401:48, the Yak 50 was shown 0.1nm NW of the Grob 115 at 900ft. The Yak 50 pilot continued to fly parallel to the Grob 115 and at 1402:00 was shown in the Grob 115 pilot's 3 o'clock position at 0.1nm. The two ac continued converging and, at 1402:06, the distance between them reduced to less than 0.1nm. At 1402:14 the radar contacts merge with the Yak 50 indicating 800ft. The Grob 115 pilot's written report indicated his being surprised to see the Yak 50 in close formation, within 10-15m of his ac for 20sec before breaking away behind and below.

[UKAB Note(1): The Stansted 10cm radar recording at 1402:14 is reproduced below:

AIRPROX REPORT No 2012158



The radar contact trail is at 4sec spacing]

At 1402:18, the two ac contacts started to diverge as the Yak 50 commenced a L turn to the NE. The Yak 50 pilot contacted North Weald Radio and advised the operator of the Grob 115 ac's registration.

At 1420:05, the Grob 115 pilot contacted North Weald Radio and reported returning to Panshanger via the North Weald O/H at 1200ft on QNH 1014. North Weald Radio advised that the cct was active with a Yak 50 in the O/H, with which the Grob 115 pilot reported visual. A short discussion occurred and North Weald Radio requested in future that the Grob 115 pilot establish RT contact when transiting ivo the A/D. The Grob 115 pilot responded, indicated that pilots should 'keep their eyes open' and also agreed to call North Weald Radio in the future.

Analysis

The Grob 115 pilot was in receipt of a BS and, given that his ac was not Mode C equipped, would have required Farnborough LARS(N) to approve the transit of the Stansted TMZ. The Grob 115 pilot remained in contact with Farnborough LARS(N).

Under a BS, the Farnborough LARS(N) controller was not required to monitor the flight. There was no indication on radar of activity in the vicinity of North Weald A/D until just prior to the incident. The Farnborough controller would not necessarily have transferred the Grob 115 pilot to North Weald Radio unless it was inbound to the A/D or had requested a change of frequency.

North Weald A/D is an unlicensed airfield and does not have an ATZ. As the Grob 115 pilot approached North Weald the Yak 50 became airborne and commenced a LH cct for RW02. This resulted in the Grob 115 crossing the A/D 0.5nm ahead of the Yak 50 as it routed downwind. The Grob 115 pilot did not make any RT transmissions to North Weald Radio as he transited the A/D O/H. The RoA, Rule 12(1), states:

'(1) …, a flying machine, …flying in the vicinity of what the commander of the aircraft knows, or ought reasonably to know, to be an aerodrome shall:

(a) conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed…'

CAP774, Chapter 1, Page1, Paragraph 2, states:

'Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.'

Subsequent to the Airprox, the Grob 115 pilot continued to the SE, followed by the Yak 50 pilot. The two ac are shown to converge until the radar contacts merge.

[UKAB Note(2): The RoA, Rule 8 (Avoiding aerial collisions) states:

'(1) Notwithstanding that a flight is being made with air traffic control clearance it shall remain the duty of the commander of an aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft.

(2) An aircraft shall not be flown in such proximity to other aircraft as to create a danger of collision.

(3) …, aircraft shall not fly in formation unless the commanders of the aircraft have agreed to do so.']

Conclusions

The Airprox occurred when the Grob 115 pilot, in receipt of a BS from Farnborough LARS(N), transited in close proximity to North Weald A/D as the cct became active and crossed 0.5nm ahead of the Yak 50, which was downwind in the visual cct for RW02 LH.

The radar replay also showed that, after the reported Airprox, the Yak 50 pilot flew into close proximity with the Grob 115.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air-ground controller involved and reports from the appropriate ATC and operating authorities.

The Board's discussion of the Airprox event centred around interpretation of Rule 12 of the RoA. It seemed clear from his report that the G115 pilot was aware of the location of North Weald A/D and that it was his responsibility to conform to the pattern of traffic formed by other aircraft intending to land there or to keep clear of the airspace in which the pattern was formed. The Board noted that there is no definition for the lateral limits of 'the pattern of traffic' and that this would be variable and depend on a number of factors including ac type and RW length. It was also noted that some high-performance ac based at North Weald require a cct pattern much larger than that flown by the Yak 50 pilot. In the absence of RT contact by the G115 pilot with the North Weald A/G operator, which would also have alerted North Weald cct traffic, the G115 pilot was only able to assess whether he was conforming or not by visually acquiring all the traffic in the North Weald cct. In the event, there was only the Yak 50, which the G115 pilot acquired when he was some 2nm WNW of the A/D and with which he maintained visual contact throughout. Given that he was visual throughout, and passed ahead of the Yak 50 with a minimum separation between the ac of 0.4nm, Members were persuaded that the G115 pilot had not contravened Rule 12. However, pilot Members unanimously opined that the G115 pilot had shown poor airmanship in flying so close to the North Weald A/D at cct altitude without RT contact; he would have been much better advised to contact the North Weald A/G Operator to obtain information on traffic in the vicinity of the cct and to state his intentions. This did not occur and the Yak 50 pilot was startled to see another ac 'in the cct pattern'. The radar replay showed the G115 pilot transited through the North Weald cct close to the base leg position, and that the crossing geometry and late sighting had most likely caused the Yak 50 pilot to underestimate the separation. He was, however, undoubtedly concerned by the proximity of the G115. The NATS Ltd Advisor also stated that ac transiting the Stansted TMZ with a service from Farnborough would not normally be handed over to A/Ds in the vicinity of their track. On a BS, the Farnborough controller may advise a pilot of the proximity of North Weald A/D; however, it is the responsibility of the pilot to request to transfer to the North Weald A/G Operator, or to communicate with North Weald on a second radio if available.

The Board also considered the Yak 50 pilot's subsequent decision to obtain the G115 registration details and the manner in which this was achieved. While it was undoubtedly a reaction undertaken in the heat of the moment,

the way in which it was undertaken demonstrated poor airmanship and, given that the radar returns from the ac merged, was likely to have been in contravention of Rule 8 of the RoA. Members noted that the G115 registration details could equally well have been obtained by the Yak 50 pilot at a safe distance, by the A/G Operator during his telephone call with the Farnborough LARS(N) Controller or by subsequent radar tracing of the contact.

Members observed that the Airprox occurred in an area where flights are constrained by the proximity of A/Ds and CAS. In such congested airspace it behoves all pilots to give other ac the greatest possible consideration and, when necessary, to reassure fellow aviators that they have been seen by giving clear signals such as exaggerated wing rocking.

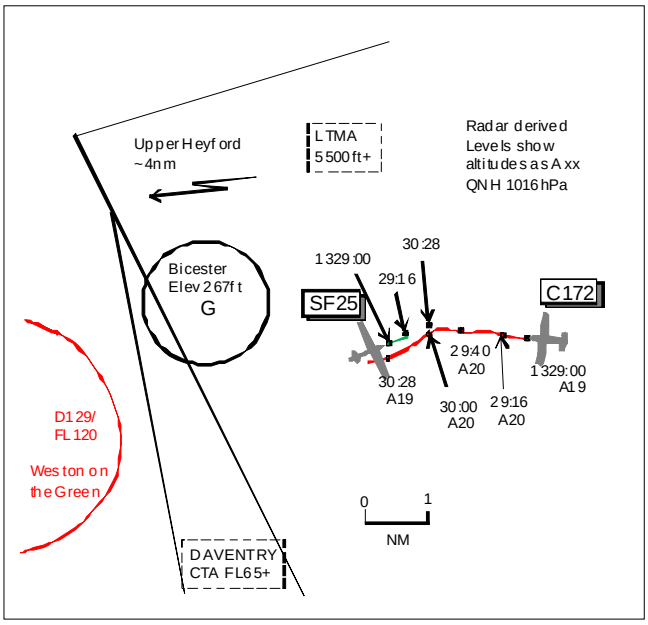
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Yak 50 pilot was concerned by the proximity of the Grob 115 in the vicinity of the North Weald circuit.

Degree of Risk: C.

AIRPROX REPORT NO 2012159

Date/Time:	20 Oct 2012 1330Z (Saturday)	
Position:	5155N 00102W (3·5nm E Bicester G/S - elev 267ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Scheibe SF25C	C172
	Falke M/Glider	
Operator:	Civ Club	Civ Pte
Alt/FL:	2100ft↓ (amsl)	2100ft (QNH)
Weather:	VMC CLNC	VMC HZBC
Visibility:	>10nm	>10nm
Reported Separation:	30ft V/100m H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCHEIBE SF25C FALKE MOTOR GLIDER PILOT reports flying a dual training sortie from Bicester, VFR and in communication with Bicester Gliding on 129·975MHz; no transponder was fitted. The visibility was >10nm in VMC and the ac was coloured white/red with anti-collision beacon switched on. This was an NPPL SLMG instructional flight which involved a series of slow speed handling exercises interspersed with HASELL checks just to the E of Bicester cct/local glider flying area. About 3nm E of Bicester heading 080° at 2100ft amsl and 50kt during the student's nose pitch-down recovery from a stall, a C172 appeared in view ahead about 500m away, above the nose of their ac approaching from their 1 o'clock. They rolled L to increase separation and the C172 pilot appeared to see their ac at the same time as it also rolled L simultaneously. The C172 passed 30ft above and 100m clear on their RHS, its registration was clearly visible. He assessed the risk as medium. He opined that this was a classic example of circumstantial late sightings and effective collision avoidance by both pilots, which highlighted the importance of lookout at all times.

THE C172 PILOT reports flying a local sortie from Wycombe Air Park, VFR and in receipt of a TS from Farnborough LARS on 132·8MHz and then a BS from Oxford Approach on 127·75MHz, squawking with Modes S and C; TCAS 1 was fitted. The visibility was >10nm in VMC and the ac was coloured blue/white with strobes, nav and recognition lights all switched on. At the reported position of the Airprox he was flying at 2100ft QNH and 100kt heading W keeping Bicester glider site on his R and staying in the 'corridor' between Bicester and Weston-on-the-Green with Upper Heyford in view. He thought he changed frequency at this time from Farnborough to Oxford. TCAS was operating at 12nm range but he did not recall having a TCAS contact or seeing any conflicting ac in proximity as he tracked around Bicester and headed N of Upper Heyford, parallel to and N of the RW. On contacting Oxford he was aware of conflicting traffic at Blenheim and during the whole flight had received a number of TIs both from ATC and from TCAS.

ATSI reports that an Airprox was reported 3nm E of Bicester gliding site when a Scheibe SF25C (SF25) and a C172 came into proximity with each other.

The SF25 flight was operating VFR on a training sortie at Bicester gliding site and was in contact with Bicester Gliding on frequency 129·970MHz. The C172 flight was operating VFR to and from Wycombe Air Park (Booker) and had been in receipt of a BS from Farnborough LARS N on frequency 132·8MHz before changing frequency to Oxford Approach and agreeing a BS from them on frequency 127·75MHz.

CAA ATSI had access to written reports from the pilots of the SF25 and the C172, recordings of Farnborough LARS N and Oxford Approach frequencies together with area radar recordings.

AIRPROX REPORT No 2012159

Oxford METARS were not available for the time of the incident - the Luton METARs were:

EGGW 201320Z VRB02KT 9999 FEW010 13/10 Q1017= and EGGW 201350Z VRB03KT 9999 FEW010 13/11 Q1017=

At 1312:00 Farnborough LARS N downgraded the service being provided to the C172 from a TS to a BS due to the C172 leaving solid radar coverage.

[UKAB Note (1): At 1329:00 a pop-up primary-only return appears, believed to be the SF25, 2·9nm to the ESE of Bicester gliding site (Figure 1). The C172 is seen 2·2nm to the E of the SF25 on a W'ly heading level at altitude 1900ft QNH 1016hPa having turned from a N'ly track. The SF25 remains on a track of 080° before fading from radar after the sweep at 1329:16 when 3·2nm ESE of Bicester with the C172, now indicating 2000ft, in its 1 o'clock range 1·5nm.]

Figure 1

At 1329:40 the C172 is 4·2nm to the E of Bicester gliding site, tracking W with Mode C indicating altitude 2000ft. The pilot of the C172 requested to change frequency to Oxford Approach on 127·750MHz. The Farnborough LARS N controller instructed the C172 pilot to squawk 7000 and approved the frequency change.

[UKAB Note (2): The C172 is seen to continue on its W'ly track until 1330:00 when it is seen to turn onto a SW'ly 3·5nm E of Bicester, approximately the reported Airprox position. This alteration of track by the C172 may be the turn observed by the SF25 pilot whilst he turned L to increase separation; the C172 pilot did not see the SF25. At 1330:28, when the C172 is 2·9nm E of Bicester squawking 7000 at altitude 1900ft, a pop-up primary return appears 0·8nm NE of it which may be the SF25, the ac having passed during its radar fade period.]

Between 1330:28 and 1332:55 the C172 tracks W at 1900ft, passing 0·7nm to the S of Bicester gliding site. The radar recordings do not show any other traffic in proximity to the C172 during this time.

At 1332:55 the C172 is 0·8nm WSW of Bicester gliding site at 1900ft and at 1333:10 the C172 flight contacted Oxford Approach.

The Airprox took place in Class G uncontrolled airspace where regardless of the service being provided pilots are ultimately responsible for their own collision avoidance.

Prior to the Airprox the C172 flight was being provided with a BS from Farnborough LARS N which had been downgraded from a TS due to lack of radar cover. There is no requirement to monitor the flight under a BS.

At the reported position of the Airprox the C172 flight had left the Farnborough LARS N frequency and had not yet contacted Oxford approach.

The Airprox was reported in Class G airspace when the pilot of the SF25 observed a C172 in close proximity near Bicester gliding site.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings and reports from the appropriate ATC authorities.

Commensurate with the incident occurring in Class G airspace, both pilots were responsible for maintaining their separation from other traffic through see and avoid. The C172 pilot was transiting the area, threading his way between Bicester and Weston-on-the-Green (WOG), both busy aviation sites where gliding and paradropping/ gliding activity respectively should be expected daily. The gliding pilot Member commented that in addition to careful route flight-planning to avoid glider sites by as wide a margin as possible, the risk of encountering gliders could be further reduced by selecting a cruising altitude clear of the height band where gliders might be anticipated; in thermic weather conditions gliders normally circle to gain altitude beneath convective cloud up to the cloudbase before setting off en route and in search of the next area of lift.. Pilot Members also commented that routeing to the N of Bicester would lead to ac passing further away from the WOG activity and avoiding the 'funnel' effect with Bicester but the ac would pass closer to Croughton HIRTA where due regard needs to be taken against the effects of radio energy transmissions and possible interference to equipment onboard. The Falke pilot was operating autonomously to the E of Bicester and saw the C172 500m away during the recovery from a stall as the ac's nose was lowered, which Members judged to be a late sighting and part cause of the Airprox,. He executed a L turn to increase separation whilst he watched the C172 turn L simultaneously before it passed, he estimated, 100m away on his R. Although he believed the C172 pilot had taken complementary avoiding action, unbeknown to him the L turn observed was purely fortuitous. At the time, the C172 pilot had just 'signed-off' with Farnborough and was changing frequency to Oxford so he may have been heads-in just at a critical time of the Airprox evolution; his L turn was just a navigational adjustment to his flightpath to pass clear of Bicester. The ATS had been downgraded to a BS over 17min before the encounter and, although the C172 was equipped with TCAS1 there was no electronic warning of the Falke, owing to its lack of transponder. The Falke passed unsighted to the C172 pilot, another part cause of the incident.

In assessing the risk, without corroborating evidence of the separation that pertained from the recorded radar as the Falke had faded from radar just prior to the CPA, Members were unsure. Although acutely aware of the difficulties in estimating distances whilst airborne, Members had no reason to doubt the Falke pilot's reported separation particularly when the C172's registration marks could be clearly seen. The Falke pilot had turned L which ensured that the ac were not going to collide; however, with the C172 pilot not seeing the Falke and the timing of his L turn being fortuitous, the Board believed that in these circumstances the safety of the ac was not assured.

PART C: ASSESSMENT OF CAUSE AND RISK

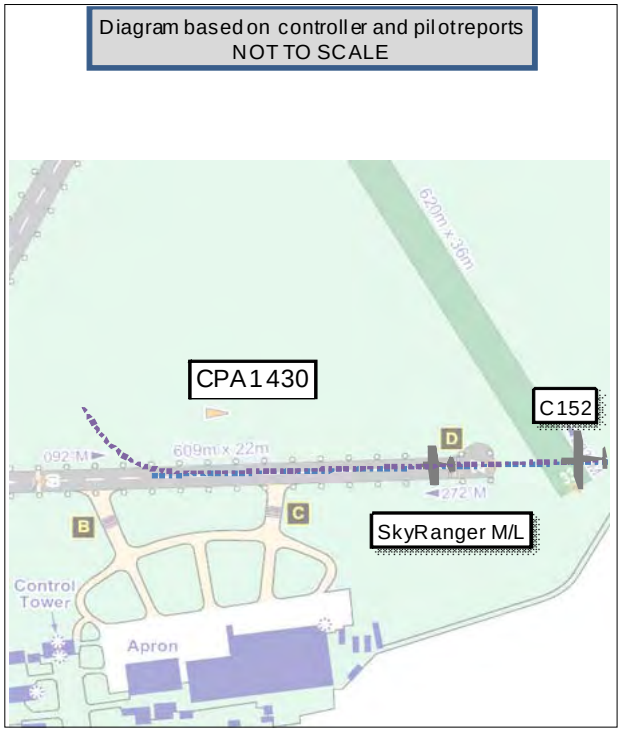
Cause: A non-sighting by the C172 pilot and a late sighting by the Falke pilot.

Degree of Risk: B.

AIRPROX REPORT No 2012160

AIRPROX REPORT NO 2012160

Date/Time:	1 Nov 2012 1430Z	
Position:	5626N 00322W (RW27 Perth/Scone - elev 388ft)	
Airspace:	Perth/Scone ATZ	(Class: G)
Reporter:	A/G Operator	
	1st Ac	*2nd Ac*
Type:	C152	SkyRanger M/L
Operator:	Civ Pte	Civ Club
Alt/FL:	↑500ft↑	↑80ft↑
	QNH (972hPa)	QFE (958hPa)
Weather:	VMC CAVOK	VMC NR
Visibility:	40km	>10km
Reported Separation:	NR	NR
Recorded Separation:	NR	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A/G OPERATOR reports that a M/L pilot reported 'Final' to 'Touch and Go' on RW27. A few seconds later a C152 pilot also reported 'Final' to 'Touch and Go' on RW27. He saw the two ac in close proximity and asked the C152 pilot if he had the M/L in sight. After a delay, and at a distance of about 200m from the threshold, the C152 pilot announced his intention to go around. The M/L pilot performed a 'Touch and Go' while the C152 pilot carried out a late go around over RW27, overtaking the M/L. He observed that the C152 'Go around' appeared to be level and at this point, directly in front of him, he advised the M/L pilot to stop climb in order to avert a collision. He estimated a vertical separation of 10ft with the C152 directly above the M/L. This incident was the culmination of several non-standard joining attempts by the C152 pilot where at no point was he able to see the other 3 ac in the cct in good time. Further confusion may have been caused because the C152 pilot appeared not to allow for the airfield elevation of 400ft.

THE C152 PILOT reports flying in the cct, Downwind (DW) for RW27 RH, operating under VFR. The ac was white and yellow with the beacon selected on, as was the SSR transponder with Modes A and C. The ac was not fitted with an ACAS. He understood from other A/G RT transmissions that he was 'number 2' in the landing pattern and that the ac ahead of him was intending to 'Touch and Go'. He extended DW to 'give greater separation' but on finals it was evident that he was closing on the ac ahead, which he saw at a range of 600m. He asked the A/G Operator whether 'No1 was for touch and go' to which he believed the response was 'no'. He applied full power at approximately 200ft and 500m from RW27 threshold, transmitted '[C152 C/S] going around' and initiated a climb straight ahead followed by a climbing R turn at 500ft. He recalled seeing 'No1' as he climbed out at 70kt on a heading of 270°, but was not aware of the other ac's proximity.

He assessed that there was no risk of collision.

THE SKYRANGER SWIFT M/L PILOT reports tracking towards Perth/Scone A/D from the NE 'at 2500ft', operating under VFR in VMC with an A/G service from Perth Radio [119.800MHz].

[UKAB Note(1): The SkyRanger Swift is a high-wing, tricycle undercarriage 3-axis microlight of fabric covered aluminium tube construction with a MAUW of 450kg, V_{ne} of 111kt and V_{s0} of 34kt. The picture below is not of the subject ac (attribution: Flylight Airsports Ltd).

]

The white ac was fitted with a fin-mounted strobe light but no SSR transponder or ACAS. He heard the subject C152 'announce itself' at approximately his position. The other pilot's radio call was confused, as if he was unsure of what to say. He saw the C152 pass underneath him to the W, 'flying very low'. He performed a standard O/H join and found the C152 was in the cct with him. When DW for a 'Touch and Go', he saw the C152 pilot 'cut the corner' at low level and do a 'Touch and Go' ahead of him. He heard 'a couple more' RT calls from the C152 pilot, not following radio procedures and sounding as if he had not worked out what to say; at one point apologising for this. He then lost track of the C152 and proceeded to do two 'Touch and Goes'. On his third approach, he announced 'final for touch and go 27' and then heard the Cessna pilot announce the same. The A/G Operator told the C152 pilot 'you are number 2'. The C152 pilot replied 'I cannot see him' and, as the M/L pilot neared the threshold, the C152 pilot said 'going around'. The M/L pilot carried on, touched down, accelerated and took off. As he started to climb out, heading 270° at 55kt, the A/G Operator told him, urgently, 'don't climb, don't climb!'. He immediately levelled off, at about 80ft, and looked up in time to see the C152 'peeling up and to the R', on to the live side of the cct, from a position directly above him. The A/G Operator told him afterwards that he assessed they were about 10ft apart at one point; it was only then that he realised 'what a close thing' this had been.

He assessed the risk of collision as 'High'.

[UKAB Note(2): The weather at Dundee A/D, 12nm E of Perth A/D, was recorded as:

METAR EGPN 011420Z 25009KT 9999 FEW006 06/03 Q0972

METAR EGPN 011450Z 24008KT 9999 FEW006 06/03 Q0972

UKAB Note(3): The base of radar coverage in the Perth/Scone A/D area was assessed as 2500ft amsl and consequently there was no recorded radar data pertinent to the incident time and position.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the A/G Operator and the pilots of both ac.

Board Members first considered the events as reported by the Perth/Scone A/G Operator and ac pilots. It was agreed that the reports raised a number of issues but that in the absence of any recorded data the Board would only deliberate on the direct Cause and Risk of the incident.

Members opined that a go-around is an integral part of safe cct operations and must be performed correctly. That is, that the go-around should be made on the dead side, if one exists, and with a positive rate of climb. In this instance it appears that the C152 pilot effectively did neither and consequently flew into confliction with the M/L, conducting a touch and go.

The A/G Operator's vantage point was such that the incident occurred directly in front of him. This, combined with the M/L pilot's reported sighting of the C152, led the Board to conclude that separation had been reduced to the minimum and that the ac flight paths had only just stopped short of an actual collision. The M/L pilot displayed commendable presence of mind in following the A/G Operator's instructions to stop climbing. The A/G Operator acted outwith his responsibilities and authority and in doing so prevented an even more serious occurrence, actions for which he is highly commended by the Board.

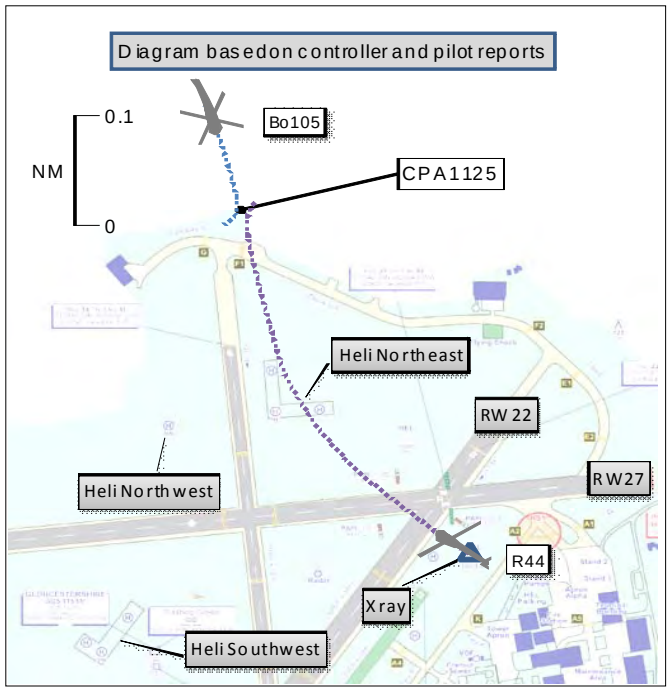
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: During a go-around, the C152 pilot flew into confliction with the SkyRanger, of which he had lost sight.

Degree of Risk: A.

AIRPROX REPORT NO 2012161

Date/Time:	9 Nov 2012 1125Z	
Position:	5154N 00210W (Gloucestershire A/D - elev 101ft)	
Airspace:	Gloucester ATZ (Class: G)	
Reporter:	Gloucestershire ADC	
	1st Ac	*2nd Ac*
Type:	R44	Bo105
Operator:	Civ Pte	Civ Trg
Alt/FL:	150ft	300ft
	QNH (1016hPa)	QFE (NR)
Weather:	VMC CLBC	VMC CLBC
Visibility:	20km	>10km
Reported Separation:		
	150-200ft V	30ft V/50m H
	200m H	
Recorded Separation:		
	NR	



CONTROLLER REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLOUCESTERSHIRE A/D CONTROLLER reports that the R44 pilot taxied but that booking out details had not yet reached him, who enquired whether this was a 'local flight to the north'. The R44 pilot had been given instructions to air-taxi to 'Heli-hold X', but in response to the ADC's question, incorrectly read back 'cross 22 and depart' and immediately transitioned. Pyrotechnic bird-scaring was in progress adjacent to RW18 and another helicopter was hovering at 'Heli Northeast' with the Bo105 pilot flying ccts. As there was no RWY traffic to affect the departure, he elected to allow the R44 pilot to continue his departure. Information was passed on the bird-scaring activity and hovering traffic, which the pilot acknowledged. TI was then passed on the cct traffic, on final approach to 'Heli Northwest', which was not acknowledged. TI was passed to the Bo105 pilot, but as it was passed he was seen to take avoiding action, climbing and turning L, he thought. The R44 pilot then reported having had a 'close encounter with a red air ambulance'. The pilot was advised that he had departed without clearance and Airprox reporting action was initiated.

THE R44 PILOT reports departing Gloucestershire A/D to a private site. He was operating under VFR in VMC in receipt of an A/D Control Service from 'Gloucester Tower' [122.900MHz]. The blue helicopter had a red strobe light selected on, as was the SSR transponder with Modes A and C. The ac was not fitted with an ACAS. He called for clearance for a N'ly departure and was instructed to taxi to 'Xray', a normal procedure. He commented that radio reception was not as clear as usual, that the A/D was busy and that ATC training was being conducted in the Tower, as advised by AFIS information 'Juliet'. Approximately 'half way to 'Xray', he heard his C/S on RT and thought he'd been given clearance to cross RW27 and 22 and take off, a procedure he'd carried out many times before in that direction without incident. He commented that he considered asking ATC to repeat the message, to confirm what he thought had been said, but that the RT was exceptionally busy and, with ATC training taking place as well, he decided not to increase their workload and continued his run. As he started to cross [the RWYs] at low level, ATC advised him 'to be aware of a pyrotechnic team operating on the north east grass area', known as 'Heli Northeast', which was just to the W of his departure track. His attention was then diverted to their activities and, on clearing them, he started his climb out. When he reached the A/D N boundary, heading 355° at 50kt and about 150m E of RW18, he was confronted with a Bo105 helicopter directly ahead, inbound to the A/D and about 150ft above him. He informed ATC of the incident immediately, whereupon he was told that he had not

been given take-off clearance. He noted that, as he crossed the A/D at low level, his view of the incoming Bo105 was obscured by boundary buildings and that his attention was focused on the pyrotechnic team's position.

He assessed the risk of collision as 'Medium'.

He apologised and flew the 5min transit to the private site, where he shut down and telephoned Gloucester ATC. He was informed that they were 'too busy to talk' and, after a further unsuccessful attempt, he conducted his next flying detail and returned to Gloucester A/D. He stated that he had eventually talked with the ATC Controller involved, in order to clarify how the incident had occurred. He was told that the RT call, which he had not heard, was to inform him of the incoming Bo105 and of a pyrotechnic team operating on the N side of the A/D. He queried why the controller hadn't instructed him to stop on hearing his incorrect read-back. The controller stated that, having started his 'run', he was more concerned that he should make him aware of the pyrotechnic team near his intended track. The controller was not aware that he hadn't seen the Bo105. He also queried whether there had been another ac using his call sign, since he had heard it used 'a couple of times', but that its use didn't appear to relate to his flight. The controller could not recall. He stated that he had learned a valuable lesson as to how a number of small errors, individually easily rectified, when brought together, could lead to a chain of events with potentially serious consequences. He also opined that he would have been better advised to ask ATC to repeat the RT transmission, rather than assume its content.

THE BO105 PILOT reports conducting an Operator Proficiency Check (OPC) in the Gloucester A/D RW22 cct, having briefed the student to fly a clear area arrival to Heli Northeast. He was PNF, occupying the L seat, with the student PF in the R seat. He was operating under VFR in VMC with a BS from Gloucester TWR but 'negative R/T' in the cct. The red helicopter had navigation, strobe and landing lights selected on. The SSR transponder was selected on with Modes A, C and S. The ac was not fitted with an ACAS. At approximately ½nm on finals, heading 170° at 60kt, he saw an R44 helicopter, in his L 10.30 position at a range of about 300m, which crossed RW27 from 'point Xray' towards the threshold of RW18, as if to depart the A/D to the N. It became apparent that the 2 helicopters were 'likely to be in close proximity' so he took control, climbed and turned R slightly to effect separation. ATC informed the R44 pilot that he had just taken off without clearance and had also crossed an active RWY (22) without permission.

He assessed the risk of collision as 'High'.

He stated that, in his opinion, had he been flying alone in the R seat a collision would very probably have occurred: an assertion he supported by the fact that the student did not see the R44 until it had passed behind and below them to the N, after the avoidance manoeuvre.

ATSI reports that this Airprox occurred at 1125:08, within the Gloucestershire A/D (Gloster) ATZ, Class G airspace, between a Messerschmitt-Bölkow-Blohm Bo105 DBS-4 (Bo105) helicopter and a Robinson R44 II (R44) helicopter.

Background

The Gloster ATZ comprises a circle radius 2nm, centred on the midpoint of the main RW09/27 and extending to a height of 2000ft aal (elevation 161ft). Other RWYs include 18/36 and 04/22. The Bo105 pilot was operating VFR from Heli Northwest, in the RH visual helicopter cct for RW22 and was on final approach. The R44 pilot had called for lift from the apron on the S side of the A/D (Heliflight one) for a VFR departure to the N. The ATSU was providing a split A/D and APP Control Service from the VCR. Controller training was being provided in A/D control, with a mentor OJTI retraining an experienced controller. Workload was assessed as medium with RW22 in use. The UK AIP, page AD 2-EGBJ-1-7, paragraph 5, states:

'(a) Helicopter circuits operate parallel to and inside fixed wing circuits up to a maximum of 750ft QFE, approaching and departing from the helicopter training areas as follows:

Fixed Wing Rotary

Runway 09/27 Heli Northwest & Northeast

Runway 04/22 Heli Southwest & Northwest

Runway 18/36 Heli Northeast

(b) In order to reduce RT loading and avoid conflict between rotary and fixed-wing circuits, standardised phraseology and procedures are established for helicopter operations. The standardised phrases are assigned the following meanings:

(i) Standard Helicopter Departure: Departure into wind or as required, remaining clear of the fixed-wing runway in use, turning to depart circuit at right angles to runway in use (i.e. beneath downwind leg), not above 750ft QFE, before departing ATZ on required track.

...

(iii) Standard Helicopter Circuits: Circuits to/from most upwind available spot, not above 750ft QFE, negative RT, maintaining a listening watch on ADC frequency.'

CAA ATSI had access to RTF recordings for Gloster Tower and area radar recording, together with the written reports from the two pilots concerned and the Gloster Aerodrome controller. A telephone interview took place with the OJTI controller concerned. The area radar recording showed intermittent traffic in the Gloster circuit, but did not show the Airprox encounter.

The Gloster weather was recorded as follows:

METAR EGBJ 091120Z 21010KT 180V240 9999 FEW020 BKN030 11/05 Q1008=

Factual History

At 1111:48 the Bo105 pilot called for taxi prior to commencing an OPC in the RH helicopter cct for RW22. The Tower controller gave him a clearance to air-taxi to holding point Xray and, at 1114:24, he was cleared to cross RW22 for air-taxi to the helicopter training area 'Heli-Northwest'.

At 1115:45, the Bo105 pilot called at 'Heli-Northwest' ready to commence training. The Tower controller responded, "[Bo105 C/S] *is clear for take-off standard helicopter circuits wind two one zero degrees one zero knots*" and this was acknowledged, "*Clear take off standard helicopter circuits based on two two righthand* [Bo105 C/S]."

The R44 pilot had not previously booked out and, at 1123:03, he established two way RT with the Tower and reported, "*er* [R44 C/S] *R forty four with information hotel at Heliflight one POB ready to lift for flight to the north*". The Tower controller responded, "[R44 C/S] *Gloster Tower lift air-taxi to Xray*" and this was acknowledged, "*Taxi Xray* [R44 C/S]".

As the R44 pilot air-taxied to Xray, the Bo105 pilot was in the RH visual helicopter cct for RW22. In addition, another helicopter was operating at the Heli Northeast training area and pyrotechnic bird scaring was in progress adjacent to RW18. The controller had intended to pass essential aerodrome and traffic information to the R44 pilot prior to approving the crossing of RW22 and then a take-off clearance in accordance with the 'Standard Helicopter Departure' procedure.

When questioned, the OJTI indicated that after the issue of the appropriate information and clearance, his expectation was that the R44 pilot would have crossed RW22, turning L into wind, making an earlier R turn to clear the cct before then turning N. The controller indicated that, as the R44 pilot had not booked out, he wanted to confirm the flight was local i.e. departing from and returning to Gloster. At 1124:28 the Tower controller transmitted, "[R44 C/S] *confirm it's a local flight er*" and the R44 pilot replied, "[R44 C/S] *cross er two two to er flight to north*".

When questioned, the OJTI indicated that the R44 pilot had been air-taxiing quite fast towards Xray (25-30 knots) and when the pilot was asked to confirm it was a local flight, he immediately increased speed and transitioned to cross the RWY. The Tower controller elected to allow the R44 pilot to continue across the RWY and, 5sec after the incorrect transmission, at 1124:40, the controller passed essential aerodrome and traffic information, "[R44 C/S] *the heli-the vehicle at Heli-North will be letting off some pyrotechnics shortly and there's a Schweitzer operating*

from Heli-Northeast and Heli-Southwest". The R44 pilot acknowledged, "*Copied that* [R44 C/S] *I will be clear of that in a few seconds*".

At 1124:56, the following RTF exchange occurred:

Tower"[R44 C/S] *are you visual with the er Bolkow on final Heli South*"

[The OJTI could not recall that Heli South had been specified, instead of Heli Northwest. However the R44 pilot had immediately reported the Bo105 in sight.]

R44"*Visual* [R44 C/S]"

Tower"[Bo105 C/S] *you visual with the departing Robinson*"

[The controller observed the Bo105 taking avoiding action]

R44"*Yes very close encounter* [R44 C/S] *with incoming er* [Bo105 C/S]"

Tower"*And* [R44 C/S] *you weren't actually given a clearance to cross the runway or depart*"

R44"… *begging your pardon* [R44 C/S] *I thought you'd given me clearance*"

The Bo105 pilot's written report indicated that, when on final at 0.5nm, he had observed the R44 on a N'ly track crossing RW27 and converging. The Bo105 pilot continued to monitor the R44 and judged that it was likely to be in close proximity. The Bo105 pilot elected to avoid the R44 by taking control and climbing and turning slightly to the R.

The R44 pilot's written report indicated that, after he had lifted and started to cross the runway he received a transmission about the pyrotechnics. The R44 pilot indicated that his attention was diverted to looking for the pyrotechnic activity, following which he started to climb and observed the Bo105 about 150 feet above. He had reported hearing a similar C/S being used a couple of times previously and wondered if another ac had used it. A detailed analysis of the RTF recordings from 1111:00, until 1126:12, when the R44 was transferred to APP, showed that no other ac had used a similar C/S and that the Tower controller only used the R44 C/S when communicating with the R44 pilot as stated above.

The controller asked the Bo105 pilot to contact ATC after landing and at 1126:12, the R44 pilot was transferred to Gloster APP [128.550MHz].

Analysis

The controller cleared the R44 pilot to hold at Xray with the intention of passing aerodrome and traffic information prior to departure. It is not clear why the R44 pilot misunderstood the transmission "*confirm it's a local flight*" to be an executive clearance, which would have included a take-off clearance and use of the 'Standard Helicopter Departure' terminology and surface wind check. The R44 pilot indicated that he had conducted this same procedure many times. It is possible that he may have been conditioned to expect a crossing and take off clearance at this point.

The controller's normal course of action would have been to correct the read back and reiterate the instruction to hold at Xray. However, the R44 pilot had already started to transition and cross the RWY immediately after making the incorrect transmission. His written statement indicated that, as he crossed the RWY, the Tower controller told him about the pyrotechnics, some 5sec after his incorrect transmission.

The R44 pilot was already crossing the RWY and the controller allowed him to continue. In the limited time available, the controller passed essential information on the pyrotechnics and other ac operating at Heli Northeast and Heli Southwest. The controller then asked the R44 and Bo105 pilots if they were visual with each other.

Conclusions

The Airprox occurred when the R44 pilot mistakenly assumed that he had been given take off clearance and immediately transitioned from air-taxiing to depart, crossing RW22 and into conflict with the Bo105 pilot operating in the 'Standard Helicopter Circuit' for RW22.

The R44 pilot was already crossing the RWY when the controller passed essential TI, asking whether the R44 and Bo105 pilots were visual with each other. Under normal circumstances this would have been passed in a timely manner prior to the issue of a crossing and take off clearance.

The R44 pilot did not book out with ATC in advance and the R44 pilot's first communication with ATC was by RTF requesting lift for departure to the N. This is considered to have been a contributory factor.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, recordings of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controller involved and reports from the appropriate ATC authorities.

The Board first considered the actions of the R44 pilot and agreed with his analysis that a series of relatively small errors, including a lapse of concentration due to familiarity with a seemingly routine procedure, had compounded to result in a serious near-miss with the Bo105. The lack of booking-out notification caused confusion in the ADC's mind, prompting a query over the RT, leading to a misunderstood call and assumption of its content, resulting in commencement of the R44 pilot's T/O. Once the ADC realised the R44 pilot had commenced his T/O, he was faced with the need to make a quick decision to either allow him to continue or to attempt to stop him. He opted for the former course of action and advised the pilot of what he perceived to be the greatest threat, namely the pyrotechnic team at Heli Northeast. ATC Members noted that individual circumstances would indicate a preferable course of action and that the ADC's response allowed the R44 pilot to vacate the A/D; an attempt to halt his T/O had the potential for the helicopter to end up stopping on the busy A/D manoeuvering area and possibly causing further confliction. The ADC then questioned whether the helicopter pilots were visual with one another, with the Bo105 pilot taking avoiding action first and resolving the confliction.

The Board considered this Airprox to be the result of a series of interlinked errors, resulting in the R44 pilot departing without clearance. He had, by his own admission, some misgivings about the clarity of RT before he commenced his T/O and in the process has been afforded the opportunity to learn a valuable lesson. The Board unanimously agreed that although avoiding action was taken, safety margins had been much reduced below the normal.

PART C: ASSESMENT OF CAUSE AND RISK

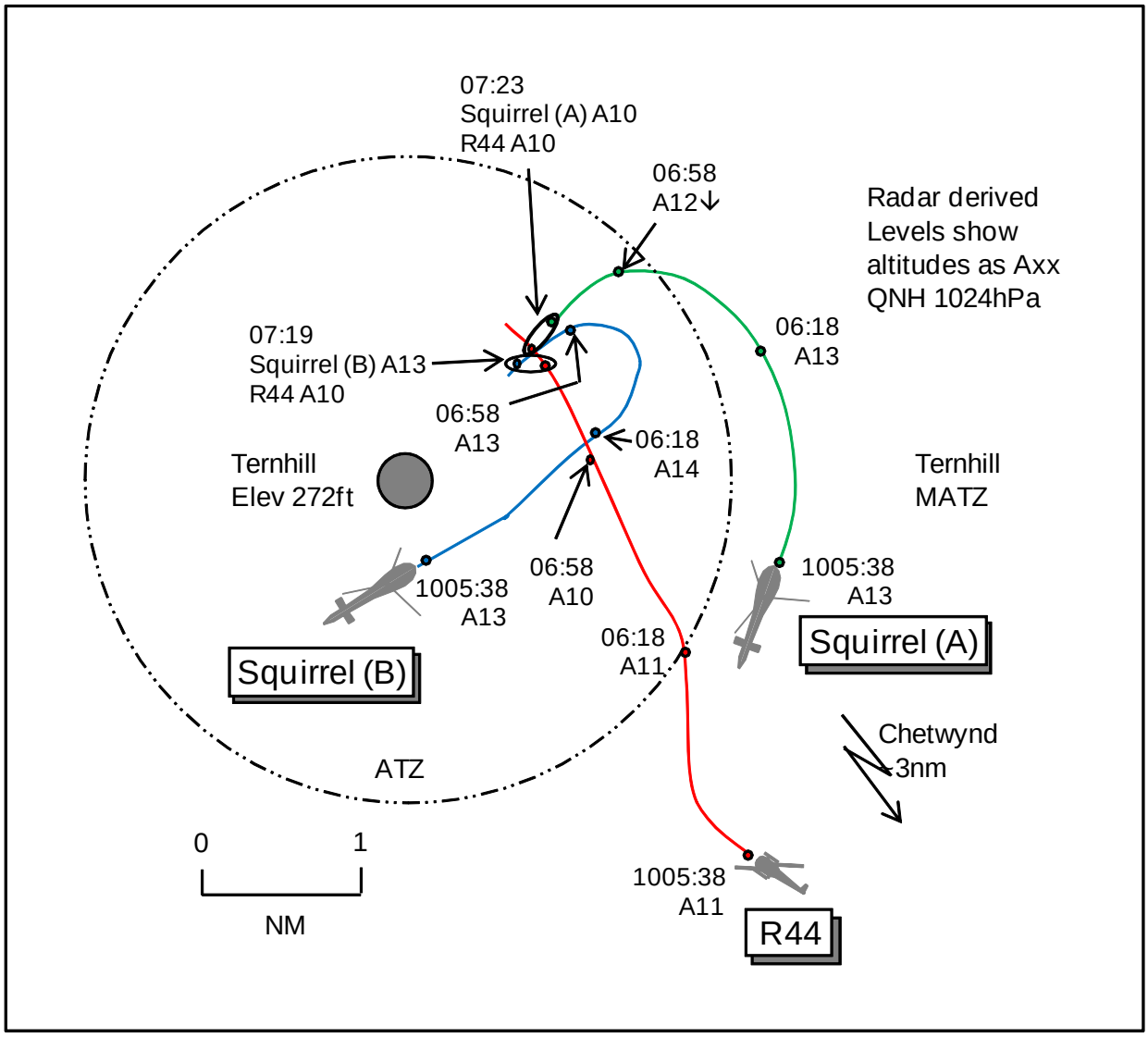
Cause: The R44 pilot departed without clearance and flew into conflict with the Bo105 on final approach.

Degree of Risk: B.

AIRPROX REPORT No 2012163

AIRPROX REPORT NO 2012163

Date/Time:	13 Nov 2012 1007Z		
Position:	5253N 00231W (1·2nm NE Ternhill - elev 272ft)		
Airspace:	Ternhill ATZ	(Class: G)	
	Reporting Ac	*Reporting Ac*	*Reported Ac*
Type:	Squirrel (A)	Squirrel (B)	R44
Operator:	HQ Air (Trg)	HQ AIR (Trg)	Civ Comm
Alt/FL:	700ft↓	1000ft	800ft
	QFE (1013hPa)	QFE (1013hPa)	(QFE)
Weather:	VMC CLBC	VMC CLBC	VMC NR
Visibility:	30km	50km	30km
Reported Separation:			
	100m	300ft V/behind H	100ft V/200m H
Recorded Separation:			
	CPA 1 300ft V/0·2nm H		
	CPA 2 Nil V/0·2nm H		



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL (A) PILOT reports a dual training sortie from Shawbury, VFR and in receipt of a BS from Ternhill Tower on 376·4MHz, squawking 0221 with Modes S and C. The visibility was 30km flying 2000ft below cloud in VMC and the helicopter was coloured black/yellow with 2 HISLs switched on. Whilst joining Ternhill on a GH refresh sortie, responses to a PINS ac were heard from ATC, indicating that the ac was operating on VHF. Following the VHF conversation ATC put out a broadcast on UHF, informing those operating at Chetwynd and Ternhill that there would be a PINS ac crossing the ATZs initially W'ly through Chetwynd, followed by a S to N transit of the Ternhill ATZ. This was followed by another transmission announcing that the PINS ac would be not above 1000'. It was at this point that a question was raised in the ac commander's head as to the safety of having an ATZ crosser below 1000', across the active RW with both ccts active (one with EOLs). To add to the safety concern, the crossing ac would be operating on a different frequency. It was at this point that the ac commander highlighted his concerns to ATC. Concurrent with the completion of the transmission whilst heading 220° at 90kt and 700ft QFE descending, the PINS ac was spotted in approximately the 11 o'clock position at approximately 100m, if not closer, at the same level. This did not correlate with the expected position of the PINS ac, which was reported to have been transiting the Chetwynd ATZ at around that time. The ac commander then put out a second call, to get another Squirrel in area L to go-around from an EOL that would have placed him close to the passing PINS ac, which they did. The PINS ac, a white/blue coloured R44, passed from L to R at approx 100m, banking away slightly once their helicopter was seen, and departed the area to the N. The ac commander filed an Airprox with ATC at the time. The remainder of the sortie was aborted and the ac returned to Shawbury without further incident. On landing the Executive Flying Supervisor was advised, along with SATCO, of what had occurred. He assessed the risk as very high.

THE SQUIRREL (B) PILOT reports flying dual QHI training sortie from Shawbury, VFR and in communication with Ternhill Tower on UHF. The visibility was 50km flying clear below cloud in VMC and the helicopter was coloured black/yellow. He joined the Ternhill cct to conduct 2 EOL sorties. From the outset it was obvious that the RT from ATC was not as fluid as usual; regularly 2-3 RT calls were made by Tower where one would normally be sufficient. He was working in the 22 L cct to the triangle with another Squirrel (C) in the same cct also conducting EOLs. At about 1005Z ATC made a call that a Pipeline Inspector ac would be conducting an ATZ crossing of Chetwynd W'bound and then crossing the Ternhill ATZ. Subsequently ATC made another call that the ATZ crosser would be at 1000ft and below; he was turning final as this was unfolding. Given the disposition of Chetwynd and Ternhill, he presumed the ATZ crosser was in the vicinity of Chetwynd and therefore 5min away from Ternhill. He scanned the horizon in that direction but saw nothing of concern. Immediately after the last ATC transmission that the ATZ crosser would be at 1000ft or below, Squirrel (A) flight, in area R, asked on the frequency if having the ATZ crosser transiting through 2 active ccts was a good idea. At this point Squirrel (C) flight called "Final 180 EOL to the triangle" and then his (Squirrel (B)) student, a QHI, called "final EOL for the triangle". It then became obvious that Squirrel (A) pilot was alarmed by what he had seen and called, "Squirrel (C) c/s overshoot" but in the confusion Squirrel (C) pilot did not hear this call, nor did he overshoot. Electing not to allow the student QHI to enter autorotation, Squirrel (B) pilot took control, flew through at 1000ft and repositioned on final. Having not seen anything of concern he then continued and the student conducted an EOL iaw the sortie profile. During this manoeuvre Squirrel (A) pilot stated he wished to, "file against the ATZ crosser", overshot his approach and returned to Shawbury. On completion of the sortie Squirrel (B) pilot was made aware that the ATZ crosser had passed close behind his helicopter about 300ft lower; however, he had not seen the ATZ crosser at any stage.

THE R44 PILOT reports en-route from Coventry to Sandtoft, VFR and in receipt of a BS from Ternhill Tower on 122·1MHz, squawking 0036 [pipeline conspicuity] with Modes S and C. The visibility was 30km clear below cloud in VMC and the helicopter was coloured white with nav, landing and strobe lights all switched on. The flight was a routine inspection of a government owned pipeline, Stourport to Ellesmere Port, flying at 500ft MSD therefore typically 600-800ft agl at 90-110kt. Initially he contacted Shawbury LARS when E of Telford [11nm SSE Ternhill] and was told to, "standby". They called him back as he passed Lilleshall [9nm SSE Ternhill] and he requested MATZ and ATZ transit of Ternhill. He was told to contact Ternhill Tower and he did so and repeated his request. At the ATZ boundary he reported his position and was given TI on 4 ac and, "ATZ transit approved". He could see all 4, 1 on the ground, 1 in a climb and 2 over Market Drayton. One over Market Drayton [Squirrel (B)] was higher and passed O/H whilst the second to his R [Squirrel (A)], was slightly lower (100ft) than him. He kept checking its position, it seemed slow, and did not think a collision was likely but on passing he did think it was closer than expected (200m) and commented so to his observer. A company SMS (safety management system) entry was made. Having spoken to Shawbury ATC it appeared there had been an assumption that the pipeline helicopter

would be at 200ft agl at 60kt whereas the reality is 600ft agl and 110kt. A local agreement has been made to inform Shawbury by telephone in advance of flights through Ternhill ATZ/MATZ. He assessed the risk as none.

THE SHAWBURY APPROACH CONTROLLER reports the incident occurred towards the end of an initially quiet session with Zone, Director and Low-Level frequencies bandboxed to the Approach position when traffic levels increased to a manageable medium/high level. During this period he received a freecall request for a BS from the R44 flight and, although not positively identified, the presence of a 0036 squawk and a correlating DF trace indicated the ac was in the area NE of Telford. On that basis, and due RT loading at the time, he asked the R44 flight to standby while he continued to work through other traffic. On returning to the R44, which had tracked about 3nm NNW, he ascertained that the pilot wanted to route through Chetwynd and on through Ternhill ATZ. He established a height 'not above' on Shawbury QFE and elected immediately to pass the flight onto Ternhill for actual crossing clearance as it was apparent they were active at the time. In the time taken to cover this RT exchange and the liaison call to Ternhill the helicopter was finally told to contact Ternhill when it was bearing 210° from Chetwynd range 2nm tracking NNW. He subsequently handed over the control position to a colleague and was later informed of the incident.

THE SHAWBURY ATC SUPERVISOR reports that owing to controller sickness the section was undermanned and, as there was little flying at Shawbury, all of the radar frequencies were selected on the Approach position. At the time of the incident he was away from the ACR dealing with other issues.

THE TERNHILL TOWER CONTROLLER reports that he was screening a UT controller in the Ternhill ADC position. At the time there were 4 ac in at Chetwynd and 3 in at Ternhill, conducting ccts and EOLs. They received a call from Shawbury Approach warning of a pipeline inspection ac, an R44, wishing to pass O/H Chetwynd and through the Ternhill ATZ not above 1000ft, and to listen out on VHF as the ac was on that frequency. During this call, Squirrel (A) flight called to join at Ternhill and the UT controller passed joining instructions. The R44 pilot then called on VHF, stating his intention to fly from S to N through the Ternhill ATZ not above 1000ft. The UT controller asked the PINS R44 pilot to confirm his intentions; he responded that he would transit S to N, passing 1nm to the E of the airfield. The UT controller informed the R44 pilot that there were 4 ac in at Chetwynd and 4 at Ternhill, to which the R44 pilot replied he was visual with all 4 ac. The UT controller then confirmed that the ATZ transit was approved, to which the R44 pilot responded he was 2nm S. The UT controller then broadcast on the Ternhill and Chetwynd frequencies that there was an ATZ crosser, proceeding W through the Chetwynd O/H and then S to N through Ternhill, not above 1000ft. They then attempted to spot, using binoculars, the R44 making its transit. They spotted him much closer and travelling much faster than anticipated, apparently on a track between the airfield and 2 ac on finals for area L and R, 1 for an EOL to area L, 1 final for normal ccts to area Right. The R44's flightpath was taking it right in front of these ac very shortly. When the EOL flight [Squirrel (B)] called final, Squirrel (A) pilot warned Squirrel (B) pilot, he thought, to go around and the R44 continued through and was sent back to Shawbury Zone. Squirrel (A) pilot reported his intention to file an Airprox for this incident.

BM SAFETY POLICY AND ASSURANCE reports that this Airprox occurred between 2 Squirrel helicopters (A and B) operating independently within the Ternhill visual cct and an R44 conducting a pipeline inspection.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

At the time of the incident, RW22 was the designated duty RW at Ternhill; however, given its use as a RW RLG, Ternhill has a number of operating surfaces available as depicted at Figure 1.

Figure 1: Operating Surfaces at Ternhill.

In addition to providing an Aerodrome Control Service at Ternhill on UHF 'Stud 7', the ADC also provides a BS (effectively an A/G service) to ac operating at Chetwynd field on a separate UHF (Stud 8 'Chetwynd Radio'). Two controllers are rostered to operate at Ternhill, with the additional controller providing the ability to 'split' the Ternhill Tower and Chetwynd Radio tasks during periods of increased workload. Figure 2 depicts the respective locations of Shawbury, Ternhill and Chetwynd; Chetwynd lays 6nm SE of Ternhill. No Hi-Brite VRD is available to the Ternhill ADC.

Figure 2: Local Area Map.

The ADC position was manned by an ab-initio trainee conducting his 4th day of training at Ternhill and an instructor; Ternhill was the trainee's first exposure to live controlling since graduating from the Joint Air Traffic Control Course. The instructor reported that the workload for the trainee was high to medium with a high level of task complexity. Four Squirrels were operating at Chetwynd on Stud 8 and 4 Squirrels were operating at Ternhill on Stud 7.

The incident sequence commenced at 1000:19 as the R44 flight called Shawbury Approach/Radar (RAD) for a, "…*Zone transit, Basic Service*." RAD noted a 'Pipeline' squawk NE of Telford and, correlating this with a DF trace associated with the R44 flight's transmission, instructed the R44 pilot to, "*standby*" in order to allow them to complete a pre-note on unrelated LARS traffic from Brize Radar; at this point, the R44 was 13·1nm SSE of Ternhill. Due to low traffic levels at Shawbury that were expected to require surveillance-based ATS, RAD was 'bandboxed' with DIR, Zone and Low-Level. RAD described their workload as 'high to medium' with 'routine' task complexity. Although it has not been possible to determine conclusively the number of ac that RAD was providing with an ATS, analysis of the tape transcript indicates that at least 3 ac were in receipt of a BS on Low-Level and 3 ac were in receipt of an ATS on Zone; based on analysis of the radar replay, there were approximately 5 ac operating within the Shawbury visual cct. The Supervisor was unavailable throughout the incident sequence dealing with an unrelated, non-operational matter elsewhere within the Tower. Although the Supervisor has reported that, 'due to controller illness, the section was undermanned', this did not drive the decision to 'bandbox' the radar positions and would not have impacted the unit's ability to deliver ATSs until the lunch period.

RAD completed the prenote from Brize Radar at 1000:45 but then became involved in exchanges of RT with 2 flights on Low-Level and 2 further flights on Zone. RAD was able to return to the R44 at 1001:55 asking them to, "*pass message*"; at this point, the R44 was 10·2nm SSE of Ternhill. The R44 pilot replied, *"(R44 c/s) R44, Coventry to Sandtoft, we're at 1300 feet 1-0-1-3, we'd like to transit through Ternhill MATZ and ATZ, entering at Chetwynd and exiting to the north, ah, transit, Basic Service."* RAD answered, *"(R44 c/s) Basic Service, maintain squawk, request your operating height not above, Shawbury Q-F-E 1-0-1-3*?" The R44 pilot read back the QFE and reported that they would be, *"not above 1000 feet*" which was acknowledged by RAD. Immediately thereafter at 1002:43, RAD became engaged in an exchange of RT with an ac on the ground at Shawbury conducting radio checks, delaying them contacting Ternhill until 1003:12; at this point the R44 was 7·6nm SE of Ternhill, tracking NNW'ly, indicating 1200ft.

Having requested the Ternhill ADC to, *"turn on 1-2-2 decimal 1* [NATO Common Tower VHF*]"* RAD advised the ADC of a, *"Chetwynd and Ternhill Crosser, not above 1000 feet Q-F-E is (R44 c/s)…R44 helicopter, 2 miles south of Chetwynd, coming to you now"* which was acknowledged; the landline call was terminated at 1003:30. At 1003:35, RAD instructed the R44, *"for Chetwynd and Ternhill cross, contact Ternhill Tower 1-2-2 decimal 1"*; at this point, the R44 was 6·9nm SE of Ternhill and approximately 2·4nm SW of Chetwynd, tracking NNW'ly, indicating 1200ft.

At 1003:52, now 6·4nm SE of Ternhill, the R44 pilot contacted Ternhill TWR requesting *"…zone transit."* The ADC transmitted on both VHF and Stud 8 requesting the R44's, *"routeing and height not above."* The R44's pilot replied at 1004:04 that they were, *"not above a thousand, 1-0-1-3, I'm just to the W of Chetwynd (unreadable) zone transit through the er eastern edge of the A-T-Z, about a mile east of the airfield, then we vacate to the north with Zone."* However, Squirrel (A) pilot transmitted a request to join the Ternhill cct on Stud 7 at 1004:10, thus stepping on the majority of the R44 pilot's transmission. The ADC replied to the R44 flight, initially incorrectly transmitting on Stud 8 at 1004:20, then on VHF at 1004:26, *"(R44 c/s) roger, after, say again after not above 1000 feet?"* The R44 pilot restated that they were, *"entering the MATZ just to the west of Chetwynd, route vaguely north through the ATZ at Ternhill, one mile* [at this point, the ADC transmitted on Stud 7 to Squirrel (A), "*station calling, standby*"] *and then out towards Beaston Castle."*

At 1004:32 there was an unreadable transmission on Stud 7 from a flight, followed by a reply on Stud 7 from the ADC instructing the flight to, "*standby.*" The ADC then replied to the R44, initially incorrectly transmitting on Stud 7 at 1004:42, then on VHF at 1004:43, *"(R44 c/s) roger.*" Immediately thereafter, between 1004:48 and 1005:28, the ADC was involved in exchanges of RT with Squirrel (A) flight and 1 other Squirrel within the Ternhill cct.

At 1005:43, the R44 pilot advised the ADC that they were, *"just approaching the ATZ boundary, confirm er transit?"* At this point the R44 is 3nm SE of Ternhill, tracking NNW'ly, indicating 1200ft. The ADC did not immediately reply to the R44 flight but transmitted on Studs 7 and 8 and VHF at 1005:50, *"all stations, all stations, pipeline inspection helicopter, routing west through Chetwynd MATZ then routeing through Ternhill ATZ."* Around 8sec after that transmission, the ADC added on Stud 7, *"all stations, all stations, that is not above 1000 feet."* There then followed

a number of transmissions on the 3 frequencies in use, as the ADC tried to authorise the R44 flight's transit on VHF (at 1006:16) and ensure that he had provided the 'height not above' information on all frequencies in use. The ADC's instructor reported that following this, they 'attempted to spot, using binoculars, the R44 making its transit. We spotted him much closer and travelling much faster than anticipated, apparently on a track between the airfield and 2 ac on finals'. The unit investigation determined that the speed (reported as 105kt airspeed) and height of the R44 surprised the controllers as they were expecting a pipeline inspection to be completed at a much lower height and at around 60kt.

At 1006:16 the ADC transmitted on VHF, *"(R44 c/s) A T Z penetration approved"*. The R44 pilot acknowledged, *"A-T-Z penetration approved (R44 c/s) I'm about 2 miles now and visual with your multiple rotary traffic*"; the R44 was 2·1nm ESE of Ternhill, tracking N'ly, indicating 1100ft. The ADC replied that they, *"…believe there's four at Chetwynd and will be four at Ternhill*" and the R44 pilot confirmed that he was, *"visual with the four at Ternhill."* At that point, the R44 was 1·7nm ESE of Ternhill, tracking NNW'ly, indicating 1100ft. Squirrel (B) was 1·2nm N of the R44, commencing a left hand turn towards finals, indicating 1300ft; Squirrel (A) was 1.8nm NNE of the R44, commencing a LH turn towards Ternhill, indicating 1300ft; a 3rd Squirrel (C) was manoeuvring 2.4nm WSW of the R44 positioning for finals; a 4th Squirrel 1·9nm SSW of the R44, tracking ENE'ly, indicating 1300ft had no part in the Airprox.

[UKAB Note (1): Following the R44 pilot's report of, *"…visual with the four at Ternhill"* the pilot of Squirrel (A) at 1006:56 questioned the wisdom of ATC to, *"…have an aircraft go through Ternhill and Chetwynd at the (unreadable) height er with other ac operating at that height and then dropping (unreadable)"*.]

The pilot of Squirrel (A) stated in their DASOR that, as they highlighted their concerns over the transiting R44, at approximately 1007:10, they visually acquired the R44 in their 'approximately 11 o'clock position, at approx 100m if not closer'. Comparison of the radar, RT transcript and DASOR shows that lateral separation between the R44 and Squirrel (A) at this point was 0·7nm. At 1007:11, immediately following the Squirrel (A) pilot's last transmission, Squirrel (C) flight (SW of Ternhill) reported, *"finals 1-80 engine off for the triangle*"; Figure 3 depicts the building incident geometry at this point. Squirrel (A) pilot immediately transmitted to Squirrel (C) flight at 1007:14, *"(Squirrel C c/s) standby go-around*" which was not acknowledged by either the ADC or Squirrel (C). The Unit's investigation determined that the pilot of Squirrel (A) erroneously believed that Squirrel (C) was Squirrel (B) ahead of them. At 1007:19, Squirrel (B) pilot reported, *"…finals, engine off for the go-around*"; Figure 4 depicts the incident geometry at that point. Due to further exchanges of RT, Squirrel (B) pilot's finals call was not acknowledged by the ADC.

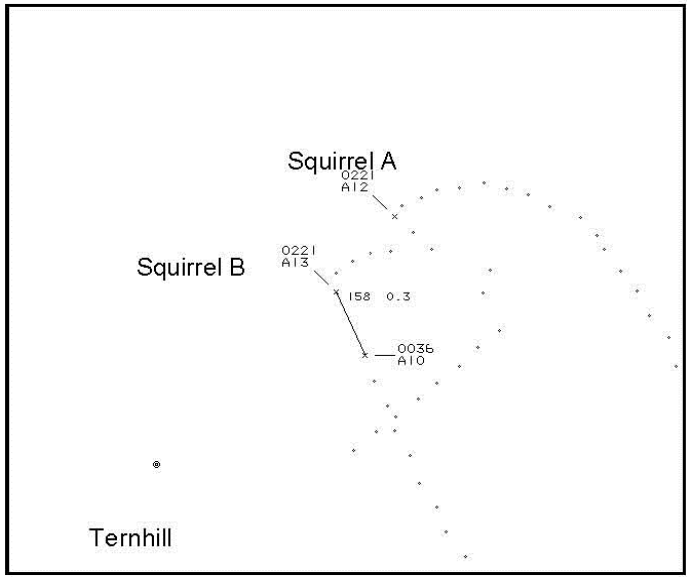


Figure 3: Incident Geometry at 1007:11

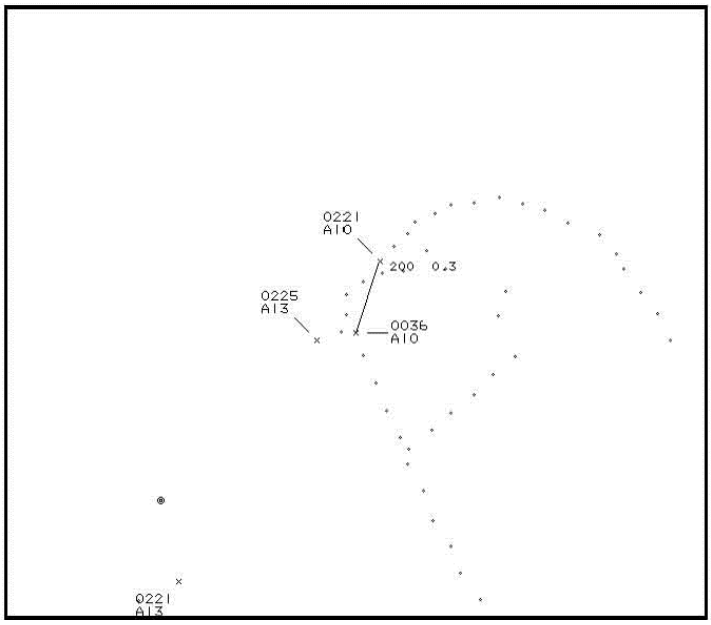


Figure 4: Incident Geometry at 1007:19

The CPA with Squirrel (B) occurs between radar sweeps at 1007:17 as the R44 crosses 0·2nm behind the Squirrel indicating 300ft below; the crew of Squirrel (B) did not visually acquire the R44. As can be seen in Figure 4, the PSR and SSR return of Squirrel (B) was subject to significant track jitter and code garbling following the Airprox. The CPA with Squirrel (A) occurs at 1007:23 as the R44 passes 0·2nm ahead of the Squirrel at the same indicated height. The R44 pilot stated in their report that Squirrel (A) was 'slightly lower' than them and 'seemed slow'; they did not 'think a collision was likely but on passing did think it (Squirrel A) was closer than expected'.

It is worthy of note that in completing the unit's investigation, the R44 pilot was contacted and stated that they had not submitted details of their flight through the PINS and cited its lack of utility as the reason.

Given that the R44 pilot was visual with Squirrel's (A) and (B) throughout the incident sequence and their comments highlighted above, it seems that the R44 flew sufficiently close to Squirrel (A) to cause its pilot and, to an extent, himself concern. However, there are a number of ATM related aspects that warrant further examination.

The unit's investigation reported that RAD's description of the R44's position to the ADC at 1003:21 as "*2 miles south of Chetwynd*" degraded the ADC's situational awareness and that RAD's 'rushed handover' of the R44 to the ADC reduced the time available to the ADC to 'manage' the R44's transit; however, both of these assessments were made without the benefit of a radar replay. Analysis of the replay demonstrated that RAD's report of the R44's position as "*2 miles south of Chetwynd*" was relatively accurate. Moreover, BM SPA contends that, given that the R44 pilot's initial contact with the ADC occurred when the ac was 6·4nm SE of Ternhill and 3min 25sec prior to the CPA, sufficient time existed for the ADC to have affected a plan to integrate the R44. Finally, whilst BM SPA does not consider the decision to 'bandbox' RAD, DIR, Zone and Low-Level as 'good practice' given the volume of Shawbury traffic operating in the area, this was neither a causal nor contributory factor in this Airprox. Specifically, given that the demands on RAD's time were all on the Zone and Low-Level positions, positions which would routinely be 'bandboxed', the workload for a 'split' Zone/Low-Level position would have been identical to that faced by RAD in this instance.

Based on the ADC's 'all stations' ATZ crossing transmission at 1005:50, it is clear that the ADC team had not assimilated the positional information given to them by the R44 pilot at 1004:26 and 1005:43 and that their mental picture of the situation reflected that the R44 was approaching Chetwynd. Unfortunately, the lack of a Hi-Brite VRD at Ternhill meant that the ADC team was wholly reliant on visual scan to acquire the R44 and to update their mental picture of its location. It is noteworthy that the absence of a Hi-Brite display at Ternhill was cited as a contributory factor in the investigation of Airprox 086/11. As a consequence of their incorrect mental picture, the ADC team focussed their lookout on the Chetwynd area and, given the restricted field of view of binoculars and the angular difference between Chetwynd and the R44's track, they were unable to visually acquire the R44 until a late stage. Although it has not been possible to determine when the ADC team sighted the R44, the unit's investigation

determined that it was too late for them to have issued an additional warning to the Squirrel crews operating at Ternhill. Subsequent to the Unit's investigation, the ADC instructor has stated that they felt somewhat reassured about the developing situation, by the R44 pilot's statement that he was visual with the Ternhill traffic, believing that the R44 pilot would sequence himself with the existing cct traffic. What is clear from analysis of the transcript is that the ADC was struggling to manage the 3 separate frequencies and that, as a result of the frequency separation between the R44 and the Squirrels, the Squirrel pilots' SA was severely affected. Previous Airprox have highlighted the weakness of the current MASCOT communications system and its inability to cross-couple frequencies; this Airprox provides further evidence for the requirement to provide frequency cross-coupling functionality within MASCOT.

Notwithstanding the fact that the ADC team were unable to update their SA of the R44's position, they did not impose active deconfliction measures to integrate the R44 with the Ternhill visual cct traffic. One option could have been to have instructed the Squirrels to maintain cct height until the R44 had cleared the ATZ; however, a better option may have been to have effected such deconfliction, having elicited from the R44 a specific transit height, rather than relying on a broader 'operating height not above'. This would have provided additional benefit such that a more specific ATZ crossing broadcast could have been made to the Ternhill visual cct traffic, thus aiding the development of their SA.

Finally, although the ADC was not required to engage with the Chetwynd traffic during the incident sequence, controller workload is based on a number of factors including the complexity of the task, task loading and the individual's perception of their ability to manage the task. Given the ADC trainee's inexperience and that they had 9 speaking units on 3 separate frequencies, it is possible that the ADC trainee was nearing overload and that this was exhibited through their frequency management errors during the incident sequence.

Whilst the R44's crew were visual with the Ternhill visual cct traffic, the R44 was flown close enough to Squirrel (A) to cause its crew concern. Moreover, whilst active deconfliction measures could have been implemented by the Ternhill ADC team, they were not. Finally, the ADC team had not utilised the information from the R44 to update their mental picture of its position and thus were unable to provide accurate information to the Ternhill visual cct traffic.

In mid-2012, following a period of incident trend analysis, the RAF ATM Force Cmd requested the Air Defence and Air Traffic Systems (ADATS) Design Team (DT) to investigate the feasibility and safety implications of frequency cross-coupling through MASCOT. An initial technical trial has been completed which highlighted a number of technical, safety and data assurance issues. The ADATS DT is continuing to work alongside the MASCOT system contractor to develop a technically compliant solution.

The Unit investigation team made a number of recommendations that have been accepted by the Unit Occurrence Review Group (ORG). Significant amongst these from an ATM perspective was that a review of the practice of 'bandboxing' would be conducted.

RECOMMENDATIONS

BM SPA supports the recommendations made to and agreed by the RAF Shawbury ORG and in addition, the Stn Cdr at RAF Shawbury has been requested to:

a. Investigate the provision of a Hi-Brite VRD at Ternhill RLG.

b. Review the practice of combining Ternhill Tower and Chetwynd Radio positions and the associated operating procedures and airspace deconfliction measures.

c. Review the ATC Sqdn's training package to ensure that information on Pipeline inspection helicopters and their potential routeings and handling is included.

d. Review the original unit investigation with regards to the new information derived from the NATS radar replay.

Given this and other related incidents, the ATM Force Cmdr has been requested to conduct a Force-level Safety Survey, to review the practice of 'bandboxing' with a view to providing additional guidance to units.

AIRPROX REPORT No 2012163

OUTCOMES

BM SPA received a reply from Stn Cdr RAF Shawbury stating that they agreed with the additional recommendations and advising of progress already made against those recommendations; specifically that:

	Recommendation	Action Undertaken
1	Provision of HI-Brite VRD at Ternhill.	a.. Engineering Change Request (ECR) submitted in 2010. b. Cost approx £82k CDel and £3k RDel but Business Case stalled owing to lack of funding. c. New ECR to be submitted with improved safety assessment.
2	Review practice of combining Ternhill and Chetwynd positions and associated operating and airspace procedures.	a.' Splitting Out' of Ternhill and Chetwynd was at the discretion of the controller. A maximum number of total speaking units (6 ac) has now been included in the ATC Order Book but does allow for controllers to split out the 2 positions prior to the number being reached. b. ATZ crossing procedures have been reviewed and strengthened with a greater emphasis on the radar controller gaining approval for an ATZ transit prior to the ac being handed to the Ternhill controller.
3	ATC Training Package for PINS ac.	a. All controllers have been re-briefed on pipeline ac. b. Whilst discussion of pipeline ac was part of the training package, it has now been formally included as a training objective and must be signed off by a SQEP controller.
4	Review of original investigation.	This has been passed to the chair of the ORG to action.

Stn Cdr RAF Shawbury also highlighted their concern over the R44 pilot's statement 'that they had not submitted details of their flight through the PINS' because of 'its lack of utility'. BM SPA would like to request that the Board includes the utility of the PINS in their deliberations over this Airprox.

HQ AIR (TRG) comments that the PINS system was introduced decades ago following near misses between military fast jets and PINS helicopters and functioned by increasing awareness amongst aircrew of the potential presence of PINS helicopters. The current proliferation of PINS operations means that it is normal for PINS to be notified as active in all areas, creating a persistent but non-specific warning. It is hoped that a new online planning and deconfliction system will allow PINS operators to input their routes much more specifically, with a commensurate increase in awareness by military crews. In this sense, the concerns of the operator over the utility of PINS notification are valid.

This incident raises questions over the control of an ATZ and a visual cct by ATC. An ATZ is designed to protect the aerodrome users from passing traffic. In this case, this protection was breached when the R44 was permitted to enter, into conflict with the established traffic; the hazard was immediately apparent to the pilot of Squirrel (A) from ATC's transmissions. Arguably, the R44 pilot might have been expected to visually deconflict in any case, but this did not happen and the chosen flightpath was into direct conflict with traffic established in the pattern to land. The lack of planning for a sortie profile that clearly required a flight through a congested MATZ/ATZ, presumably following a pipeline of some kind, is of concern.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of all 3 ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was clear that there had been a breakdown in information flow between all parties involved. With the Squirrel helicopters operating on UHF and the R44 on VHF, it was imperative that information exchanged between aircrew and ATC, which was then subsequently rebroadcast to the respective parties, was timely and accurate. The R44 pilot had contacted Shawbury Approach and passed his flight details which led to Shawbury notifying Ternhill of its position and its imminent transfer to the Ternhill frequency. The R44 pilot then called Ternhill and passed his flight details again as well as an update of his position. This flight was a routine and regular occurrence so should have not been a surprise to Ternhill ATC. Owing to frequency congestion some of the information was lost but eventually the R44 called approaching the ATZ boundary requesting an ATZ transit. This updated position was not assimilated by the ADC as his next 2 all-stations broadcast erroneously inferred that the R44 was in the Chetwynd area tracking towards Ternhill not above 1000ft. Unfortunately, Squirrel (A) pilot used this information to update his mental air picture, content that the R44 was quite some distance away so that he would be able to complete his approach before the R44 crossed through the final approach track. Following these 2 transmissions, the ADC approved the R44's ATZ transit without placing any restrictions on the flight or giving positive instructions to its pilot to ensure the R44 was deconflicted from, or integrated with, the Squirrel traffic in the cct. Members agreed that this was the cause of the Airprox. With the apparent high workload of the ADC trainee, Members wondered why the screen controller had not intervened to resolve the deteriorating situation. The trainee was having difficulty in relaying information on 3 separate frequencies, which had led to transmissions having to be repeated; Members agreed that cross-coupling, had it been available, would have improved the SA of the aircrew. The R44 pilot was given TI on the 4 helicopters in the cct area and he reported visual with all 4. Unbeknown to both Squirrel (A) and (B) pilots, the R44 was now within the ATZ on a conflicting track. Squirrel (A) pilot was surprised when the R44 suddenly appeared in his 11 o'clock before it quickly crossed ahead at close range. From the radar recording it appeared that the R44 was flying about 300ft below both Squirrels (A) and (B) when they commenced their final approach; however, Squirrel (A) then commenced a descent towards the R44. Members commended Squirrel (A) pilot for broadcasting an alert to Squirrel (B) ahead but unfortunately he used Squirrel (C) c/s. Squirrel (B) pilot was concerned by (A)'s transmission and elected to maintain height as the R44 passed behind and below, unsighted to him. Although the R44 pilot had seen both Squirrels (A) and (B) and was maintaining his own separation from them, it appears he was slightly caught out by Squirrel (A)'s flightpath as it passed close to his R and slightly below. Three Board Members believed that the visual sightings by both Squirrel (A) and R44 pilots had ensured that the ac were not going to collide, risk C. This view was not shared by the majority who agreed that the dynamics and geometry were such that safety margins had been eroded below those normally expected during the encounter, risk B.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Ternhill ADC allowed the R44 to enter the ATZ but did not integrate it safely with cct traffic.

Degree of Risk: B.

AIRPROX REPORT No 2012164

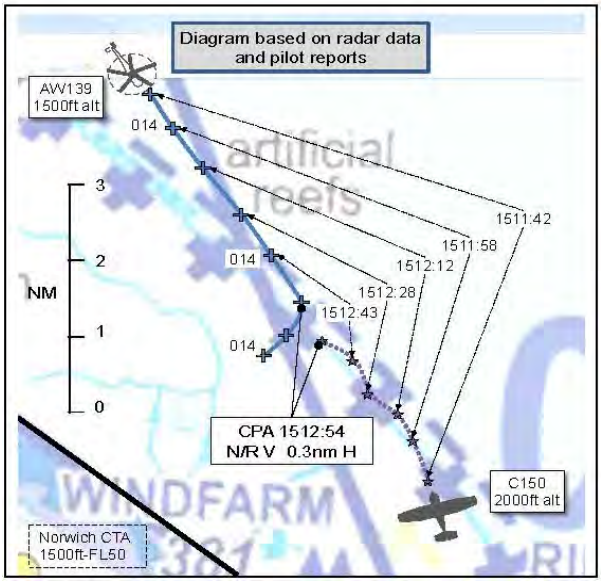
AIRPROX REPORT NO 2012164

Date/Time: 15Nov20121510Z
Position: 5245N 00139E (8nm NNE of North Denes)

Airspace:	(Class: G)	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	AW139	C150
Operator:	CAT	Civ Trg
Alt/FL:	1500ft	2000ft
	RPS (1017hPa)	QNH (1021hPa)
Weather:	VMC/CAVOK	VMC/NR
Visibility:	20km	

Reported Separation: 150ft V/0.75nm H

Recorded Separation: 0.3nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AW139 PILOT reports returning to North Denes from an off-shore gas installation, cruising at 1500ft on the RPS of 1017hPa, heading 170° at 140 kt. The helicopter was red, white and blue with HISLs, navigation lights and two landing lights on and a serviceable TCAS1 system fitted. The pilot reports flying IFR in VMC, clear of cloud with 20km visibility. Anglia Radar was providing a TS on 125.275MHz; the ac was squawking A0263 with Modes S and C turned on.

The pilot reports seeing a high wing, single engine aircraft that he thought to be a small Cessna in his 1130 position, slightly above and on a reciprocal heading. The Airprox occurred 8nm N of North Denes and he reports that he initiated a 90° R turn, following which the other ac started to turn L towards him and he lost sight of it as it passed behind his helicopter. The pilot reports first sighting the C150 at a range of 1-2nm and estimated the minimum separation distance as 0.75nm horizontally and 150ft vertically; no contact was shown on TCAS.

THE C150 PILOT reports flying a blue and white ac on a training sortie from Beccles with a passenger/student who wished to take some photographs during the flight. He was flying VFR in VMC receiving a BS from Norwich APP on 119.35MHz; the ac was not equipped with a transponder.

The pilot reports that he had no recollection of the Airprox.

THE NORWICH APPROACH CONTROLLER reports that he was providing a BS to the C150 on 119.35MHz but he has no recollection of the event and he was unaware of the Airprox at the time.

NORWICH ATC INVESTIGATION reports that due to a complex traffic situation in Class D airspace and the need to monitor airways joining instructions and co-ordination with other ATC agencies, the pilot of the C150 was told to standby following his first call at 1502:02. APP only responded when the pilot called again at 1511:00, during which time the aircraft had progressed north along the coast. APP made an assumed identification of the C150 based on a position report. Notwithstanding this, APP twice issued timely and accurate traffic information to the C150 pilot on the AW139's position.

APP was correct to issue a traffic warning to the C150 pilot in accordance with 'safety of life' requirements under BS. The correct phrase of 'traffic believed to be you' was not used and the presumed identification was later reinforced when APP issued a joining clearance to the C150 pilot. Nonetheless based on the C150 pilot's reported information, track progress, speed and headings there is little doubt that APP had identified the correct aircraft.

THE ANGLIA RADAR CONTROLLER reports that he was controlling the AW139 on 125.275MHz, 9nm NNW of North Denes under a TS, when the pilot reported taking avoiding action against a light ac. He recalls that the pilot filed an Airprox on his frequency and reported that the conflicting ac was 200ft above him tracking from S to N.

The controller reports that he did not observe any primary radar contact until approximately a minute after the Airprox when he observed a contact 2nm N of the reported Airprox position tracking N.

ATSI reports that the Airprox was reported by the pilot of an AW139 against a C150 in Class G airspace, 8nm N of North Denes Airport.

The AW139 was operating IFR, returning to North Denes from an offshore gas installation and was in receipt of a TS from Anglia Radar on frequency 125.275MHz.

Another helicopter, an EC155, which was conflicting with the AW139, was in receipt of an Offshore DS from Anglia Radar on frequency 125.275MHz.

The C150 was operating VFR on a flight to and from Beccles Airfield and was in receipt of a BS from Norwich Radar 119.350MHz.

CAA ATSI had access to written reports from the pilots of the AW139 and the C150, the Anglia Radar and Norwich Radar controllers, area radar recordings, Anglia Radar recordings, RTF recordings of both Anglia Radar and Norwich Radar frequencies and also the unit investigation report from Aberdeen (where Anglia Radar is based).

The North Denes METARs are provided for 1450 and 1520 UTC:

EGSD 151450Z VRB02KT 9000 NSC 10/08 Q1021 NOSIG= and EGSD 151520Z VRB03KT 8000 NSC 10/08 Q1021 NOSIG=

At 1433:45 UTC the pilot of the AW139 contacted Anglia Radar. The AW139 was identified and informed that the service was being provided using SSR only. The Aberdeen Manual of Air Traffic Services Part 2, Section GEN, Annex A states:

'In the Anglia Radar Area of Responsibility **only**, when the controller informs a signatory helicopter in surveillance cover that it is identified, this is notification that the default FIS (in this case Offshore Deconfliction Service) will be provided, unless the controller states otherwise. When the default FIS is provided, the controller will not state the service. The Offshore Deconfliction Service will commence from the time the pilot is informed that the helicopter is identified and will continue until:

i. The pilot is advised of a change of service, or

ii. The aircraft leaves the Anglia Radar Area of Responsibility, or

iii. The aircraft leaves the frequency.'

At 1502:10 the pilot of the C150 contacted Norwich Radar and was instructed to standby.

At 1506:45 the Anglia Radar controller called the pilot of the AW139 to advise that there was an EC155 inbound to Norwich that might affect the descent of the AW139 and asked if the pilot of the AW139 was happy to expedite descent to 500ft. The pilot of the AW139 replied that they would be using RW09 at North Denes and would like 1500ft. The Anglia Radar controller replied that the AW139 should maintain 2500ft until they had crossed the EC155 and the pilot of the AW139 replied that they were maintaining 2500ft.

At 1508:50 (Figure 1) the AW139 was tracking SSE at 2500ft with the EC155 at 1500ft on its LHS. The primary return from the C150 can be seen on the coast as indicated.

Figure 1 Anglia Radar 1508:50

At 1509:45 the Anglia Radar controller established that the EC155 had the AW139 in sight and gave the AW139 descent to 1500ft.

At 1510:50 the C150 pilot called Norwich Radar again and was instructed, "*pass your message*". The C150 pilot advised that they were out of Beccles and flying northbound around the coast abeam Hickling at 2000ft on QNH 1022hPa and requesting a BS. The Norwich Radar controller replied that there was a helicopter inbound to North Denes in the C150's, "...*twelve o'clock five miles reciprocal same level, is a helicopter inbound to North Denes.*" The C150 pilot replied that he was looking and a BS was agreed.

At 1511:40 the Norwich Radar controller instructed the C150 pilot to squawk A7370 if he was transponder equipped; to which the pilot replied that the C150 was negative transponder. The Norwich Radar controller updated the TI on the helicopter stating that it was "*twelve o'clock three miles has descended 1600ft*". The C150 pilot acknowledged the transmission and stated that he was at 2000ft. Figure 2 shows the Anglia Radar display at 1511:40 highlighting the lack of conspicuity between the C150 primary return and the coastline map.

Figure 2 Anglia Radar display at 1511:40

On Figure 3, also at 1511:40, the Primary return of the C150 has been highlighted.

Figure 3 Anglia Radar display at 1511:40

At 1511:45 the AW139 crew reported visual with the EC155 and the service was changed to a TS.

[UKAB Note (1): ANGLIA RADAR was providing an Offshore DS until this point.]

At 1512:40 the Norwich Radar controller advised the pilot of the C150 that the AW139 was about to fly underneath the C150 and that the AW139 was believed to be 400ft below.

At 1513:00 the AW139 pilot advised the Anglia Radar controller that they were taking evasive action from a fixed wing ac a couple of hundred feet above, which was travelling S to N. The Anglia Radar controller acknowledged the transmission and advised that nothing was seen on radar.

[UKAB Note (2): The CPA measured on the radar recording at 1512:54 is 0.3nm H, but the primary return of the C150 is lost for one radar sweep immediately after that point so it may be marginally closer. The Mode C of the AW139 is FL014 and the C150 reported level at 2000ft on QNH 1021hPa giving a calculated vertical separation at the CPA of 360ft.]

At 1513:15 the AW139 crew advised Anglia Radar that the traffic was just behind them and that they had lost visual contact. At 1514:00 the Anglia Radar controller advised the pilot of the AW139 that he could see a primary contact tracking NW that was probably the traffic.

The incident took place in Class G airspace where both pilots were ultimately responsible for their own collision avoidance.

The unit investigation stated that the Anglia Radar controller did not see the primary return of the C150 at any time prior to the incident. When the AW139 reported taking evasive action the controller replied that nothing was seen on radar. Although the white primary return from the C150 could be seen on the Anglia replay it followed the coastline (also in white on the video map) very closely and is somewhat indistinct (see Figures 1, 2, and 3) particularly in comparison to other primary returns and secondary returns on the situation display. According to the unit report PSR clutter over the sea caused by both wave tops and wind turbines is not uncommon on the Anglia Radar sector. It is also possible that the controller may have subconsciously filtered out the target. Before the Airprox occurred the Anglia Radar controller's focus was on the confliction between the EC155 and the AW139, which may have reduced the possibility of seeing the primary return from the C150.

The Norwich Radar controller gave TI on the AW139 to the C150 pilot. The Norwich Radar controller noticed the confliction after the C150 pilot called for a BS and described their position and level. The squawks of all Anglia Radar helicopters are converted in the Norwich RDP so the Norwich Radar controller was aware of the identity and level of the AW139 from the Mode C of the AW139 before passing TI. Conversely, the Anglia Radar controller was not aware of the presence of the C150 and an indistinct primary return with no associated secondary information was the only indication available to the Anglia Radar controller that there was conflicting traffic.

An Airprox occurred when an AW139 and a C150 came into proximity with each other 8nm N of North Denes Airport. The Norwich Radar controller passed TI on the AW139 to the C150 pilot. The Anglia Radar controller was not aware of the presence of the C150 and therefore was not able to provide TI to the AW139 crew.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Whilst the Board noted that there was a considerable delay between the C150 pilot's first call and the provision of a BS by Norwich APP they also noted that the controller had been busy with other tasks. There was some discussion about the provision of TI by Norwich APP under a BS; the Board agreed that the TI provided was accurate, timely and appropriate under the 'safety of life' requirements of a BS and that Norwich APP had acted correctly in choosing to pass TI. Given the TI provided, the weather conditions and the CPA, some members of the Board expressed surprise that the pilot of the C150 did not achieve visual contact with the AW139.

The Members felt that the initial sighting distance of 1-2nm reported by the AW139 pilot was quite normal in Class G airspace given the geometry of the encounter and that if the AW139 crew had received TI on the C150 it was possible that they may have adjusted their course to prevent the encounter becoming so close. The Board noted that the Anglia Radar controller was controlling a large area of airspace and was also focussing on deconflicting the AW139 from another helicopter. Members were clear that the colour of the coastline on the Anglia Radar display would have made it very difficult for the Anglia Radar controller to spot the primary return of the C150, especially so given that the Anglia Radar controller had to divide his attention at the time. The Board concluded that the Anglia Radar map was a significant factor contributing to the lack of TI provided to the AW139 crew and the display design should be reviewed.

There was some discussion about the circumstances when a controller should limit radar services but it was concluded that the level of clutter reported and observed on the radar recordings would not warrant Anglia Radar imposing a limitation.

In assessing the Risk, Members noted that the C150 pilot did not see the A319, at any stage. However, based on his reported altitude and QNH, the C150 pilot was some 400ft higher than the A319. Moreover, the helicopter crew had spotted the C150 early enough to take effective avoiding action that resulted in a minimum recorded horizontal separation of 0.3nm. The Board was satisfied, therefore, that A319 crew had removed any risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In the absence of TI the AW139 crew was concerned by the proximity of the C150.

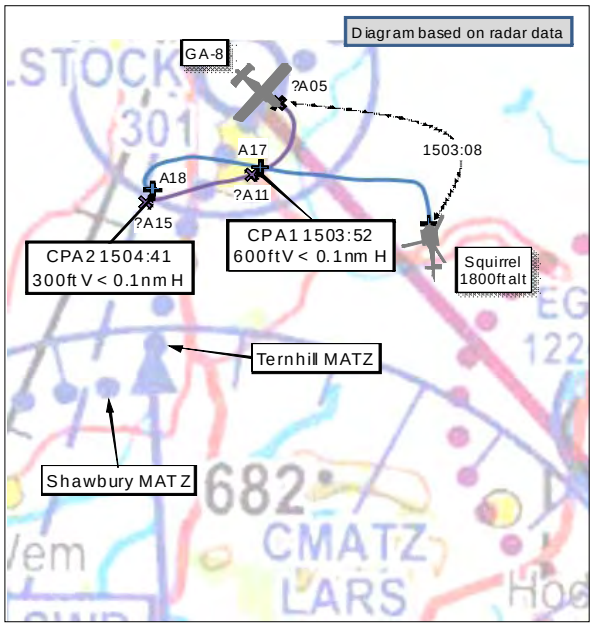
Degree of Risk: C

Recommendation: The current RDP design for the Anglia Radar sector highlights the coastline in white, which is the same colour as radar tracks. NATS Ltd is recommended to amend the RDP to provide greater clarity between radar tracks and map features.

Post UKAB Note: Following further investigation, NATS Ltd report that the media used for the AIRPROX investigation shows the radar map and the ac returns to be coloured white; this is not the case with radar display that the controller actually sees. The coastline, as displayed to the controller, is shown in beige but there is also a cyan coloured line along this section of the coast which denotes the boundary of the Anglia Offshore Safety Area (OSA); this combination of colours created the impression of white on the media used for the Board. NATS Ltd have concluded that the removal of the cyan line from the coastal boundary (whilst retaining it in the offshore areas) would not reduce the ATCOs' knowledge of the extent of the OSA, and may increase the possibility of the ATCO identifying a slow moving aircraft following the coastline. Consequently, NATS Ltd have accepted the recommendation and will take appropriate action to amend the way the maps on the radar displays.

AIRPROX REPORT NO 2012165

Date/Time:	15 Nov 2012 1505Z	
Position:	5255N 00240W (7nm N RAF Shawbury)	
Airspace:	Shawbury AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Squirrel HT1	GA-8 Airvan
Operator:	HQ Air Trg	Civ Club
Alt/FL:	1500ft (QFE 1011hPa)	1200ft (QFE 1002hPa)
Weather:	VMC CLAC	VMC CAVOK
Visibility:	50km	10km
Reported Separation:	200ft V/300m H	100ft V/600m H
Recorded Separation:	300ft V/0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL HT1 PILOT reports conducting an instrument flying training sortie, positioned on L base at height 1500ft (QFE 1011hPa) in the RW18 radar pattern. He was operating under IFR in VMC, 500ft above cloud in 50km visibility, with a TS from Shawbury APP [282.000Mhz]. The black and yellow helicopter had HISLs, landing lamp and navigation lights selected on. The SSR transponder was selected on with Modes A and C; the ac was not fitted with an ACAS. Whilst monitoring his student, he completed a visual scan and sighted a FW piston ac in his 1 o'clock position, approximately 500ft below him in a shallow climb passing from R to L. This ac passed out of view below him and he informed ATC of its presence. ATC confirmed that they were not in communication with the FW ac. Shortly afterwards he was directed on to a S'ly heading and visually reacquired the FW ac, which was still climbing, in his low 10 o'clock position. Having assessed a risk of collision (the FW ac was maintaining a fixed position in his windscreen) he initiated a LH level turn through 360°, at 90kt, to pass behind the other ac. On completion of the turn, the FW ac was seen to be co-altitude, but still climbing, in his 2 o'clock position at a safe distance.

He assessed the risk of collision as 'Low'.

THE GA-8 AIRVAN PILOT reports conducting a parachute drop flight, climbing out from Tilstock A/D RW14 after checking that Shawbury had been informed of his parachuting operations. He was operating under VFR, in VMC, with a BS from Shawbury [133.150MHz]. The white ac had strobe lights selected on, as was the SSR transponder with Modes A, C and S. The ac was not fitted with an ACAS.

[UKAB Note(1): The GippsAero GA-8 Airvan is a single-engine piston, high-wing, fixed tricycle undercarriage, utility ac of Australian design and manufacture. It has a MTOW of 1814kg, V_{ne} of 130kt and V_{s0} of 57kt (the picture below is not of the subject Airvan, attribution GippsAero):

AIRPROX REPORT No 2012165

]

He called Shawbury [APP] on passing height 2-300ft [QFE 1002hPa, elevation 301ft] and requested a BS. He noted that the controller queried whether he needed a squawk, which he thought unusual as he always used code 0033 for 'parachuting at Tilstock'. He explained this to the controller, made a R turn to an approximate heading of 240° and continued climbing. At 'about 1200ft agl', one of the skydivers on the R side of the ac said that he could see a helicopter. He rolled the ac L, to raise the R wing, in an attempt to gain visual contact but was unable to see the helicopter. He stated that 'one or two seconds later' he saw a blue and yellow helicopter on the R, at a range of about 600m, paralleling his course, slightly ahead and above, which then passed behind him.

He assessed the risk of collision as 'Medium'.

[UKAB Note(2): The Shawbury weather was reported as follows:

METAR EGOS 151450Z 15007KT 7000 HZ FEW009 SCT250 08/05 Q1020 WHT TEMPO SCT009 GRN

METAR EGOS 151514Z 13007KT 6000 HZ BKN009 SCT250 07/05 Q1020 GRN NOSIG]

THE SHAWBURY APPROACH CONTROLLER reports that she was the approach controller monitoring all frequencies with [the subject Squirrel] in the instrument pattern 'turning in for RW18 from the E at 1500ft at approximately 6 miles'. The Airvan pilot called on Zone frequency, requesting a BS. No primary contact or squawk was seen when he called and she applied a BS when the squawk was seen. She passed TI on the Squirrel to him on VHF whilst, at the same time, the Squirrel pilot reported a FW a/c in close proximity, on UHF. When able, she reported that it was an Airvan, climbing out from Tilstock. As a consequence of operating both VHF and UHF frequencies, she was unable to receive from one ac whilst transmitting to the other and was therefore not sure of the order of events. She turned the Squirrel pilot in for his approach, noting that he had 'initiated his own orbit' prior to this. She stated that she was not aware that 'Tilstock was becoming active', and that once this was known, an avoid was 'placed on the screen' and subsequent ac vectored in from the W.

She perceived the severity of the occurrence as 'High'.

THE SHAWBURY SUPERVISOR reports that he was the SUP at the time of the incident. Tilstock Parachute centre, sited approximately 7nm N of RAF Shawbury, was regularly active for parachute dropping and notified RAF Shawbury of intended activation by telephoning the RAF Shawbury Switchboard. The radar screens have a red circular overlay applied, with a 2nm radius centred on Tilstock, so any traffic being fed in for an instrument approach to RW18 is kept clear of the site. On this day, due to poor weather, Tilstock had not become active in the morning. About an hour prior to the incident, a phone call from Tilstock was received 'through the Switchboard'. Afterwards, the assistant said, 'Tilstock trying to become active', he thought, which he interpreted as meaning they were not active yet and would tell Shawbury if they were about to launch their ac. As such, he did not order the avoid overlay to be selected for the screens and did not ensure that APP was informed. After the incident he checked with the assistant who said she had confirmation from Tilstock at the time of the call that they were active and were attempting to launch an ac. No previous launch from Tilstock had taken place that day.

THE SHAWBURY FLIGHT OPERATIONS ASSISTANT reports that she had just taken over as the Switchboard Operator when she took a telephone call, at approximately 1230, from 'a lady at Tilstock' informing her that they were 'trying to become active up to FL100'. On receipt of this information she 'passed it down' to the approach room and received acknowledgement. After receiving the acknowledgement she took no further action and sometime later was informed that there had been an incident.

BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred on 15 Nov 12 between a Squirrel helicopter, operating IFR in receipt of a TS from Shawbury APP, and an Airvan operating VFR from Tilstock airfield in receipt of a BS from Shawbury APP.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Information

Both crews reported VMC with the Squirrel crew reporting 50kms visibility with no Wx or cloud. The Squirrel was crewed by a QHI and a student. Due to low traffic levels, APP was 'bandboxed' with DIR, Zone and Low-Level; whilst BM SPA does not consider this degree of 'bandboxing' to be 'good practice' it was neither causal nor contributory to this Airprox. Shawbury APP described their workload and the task complexity at the time of the Airprox as low and was providing a TS to one further ac, in addition to the 2 involved in the incident.

The incident sequence commenced at 1502:28 as APP instructed the Squirrel to, "*turn left heading 2-8-0 degrees*"; the Squirrel was operating within the radar training cct at Shawbury and being vectored to RW18. At this point, the Squirrel was 2nm SE of Tilstock, heading 010° at height 1500ft (QFE 1011hPa); on the radar replay, the Squirrel indicated 1800ft based on a QNH of 1021hPa, thus verifying the SSR Mode C information.

Given Tilstock's proximity to RAF Shawbury (7nm N Shawbury), a Letter of Agreement exists between RAF Shawbury and Skydive Tilstock to deconflict the 2 operations. At the time of the incident, the agreement required Tilstock to contact Shawbury ATC to advise them of the commencement of operations. In turn, Shawbury ATC would activate a red avoid symbol over Tilstock on their surveillance displays and vector IFR traffic around it.

At 1503:00, the L turn instructed by APP to the Squirrel at 1502:28 becomes evident on the radar replay; the Squirrel was 1.4nm ESE of Tilstock. Almost simultaneously, at 1503:01, the Airvan called APP on the Zone VHF, "*Shawbury, good afternoon,* [Airvan c/s] *Tilstock*"; the Airvan is not visible on the radar replay and, based upon APP's DASOR, neither was it visible on their surveillance display. Shawbury APP replied to the Airvan and the Airvan pilot requested a, "*Basic Service please*". As this request was being made, at 1503:08, the Airvan appears on the radar replay ½nm N of Tilstock, tracking SE'ly, indicating a climb through altitude 500ft (200ft Shawbury QFE, corresponding with the Airvan pilot's report). Simultaneously, the Squirrel had steadied on 280°, 1.4nm ESE of the Airvan.

Shawbury APP then applied a BS and asked the Airvan, "*do you require a squawk or have you got your own squawk on*?" Whilst this response was not in accordance with CAP 413 Chapter 6 Section 1.17, outlining the standard RT to be used on initial contact, it is likely that APP was surprised by an ac free-calling from Tilstock, when they had not been notified that the site was active. Thus APP was trying to determine whether the Airvan was a para-dropping ac, or a GA departure. During APP's reply, the Airvan commenced a L turn to track SSW'ly.

At 1503:16, the Airvan replied, "*we're parachuting squawk, 0-0-3-3*" which was acknowledged by APP, followed by a request for the Airvan to, "*pass your details*." At 1503:23, the Airvan pilot replied, "*Er, Airvan out of Tilstock, we're parachuting and we'll be to Flight Level 100, we'll change and inform you when we're 2-way with Scottish*." Subsequent to their investigation, the unit has confirmed that it was during this transmission that the Airvan began to paint on APP's surveillance display. Immediately after this transmission, APP passed a traffic warning to the Airvan about the Squirrel stating that there was a, "*Shawbury rotary, er just to the south-east of you, half a mile, er radar er inbound radar*". At this point, the Airvan was 0.4nm WNW of the Squirrel, tracking SW'ly, indicating a climb through altitude 900ft (600ft Shawbury QFE). Immediately after this transmission, at 1503:41, the Squirrel instructor transmitted, "*Approach,* [Squirrel C/S] *just got what appears...*[rendered unreadable by the Airvan transmitting on VHF; unfortunately, the Airvan's transmission was also unreadable]." This transmission corresponds with the Squirrel pilot's DASOR, following their first sighting of the Airvan in their '1 o'clock, approx 500ft below, in a shallow climb, passing from right to left'. Figure 1 depicts the incident geometry at this point.

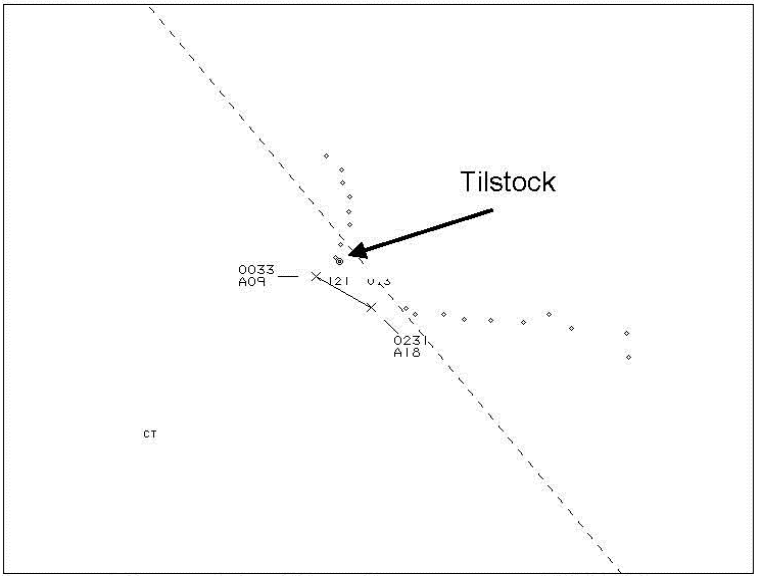


Figure 1: Incident Geometry at 1503:41

At 1503:47, APP requested the Squirrel pilot to, "*say again*" and he reported, "*one fixed wing about 500ft below us*." APP replied, "*yeah, it's the er parachute aircraft at Tilstock, he's just called me*", which was acknowledged by the Instructor pilot. The Airvan passed 0.1nm ahead and 600ft below the Squirrel between radar sweeps at 1503:52. At 1504:00, APP instructed the Squirrel pilot to, "*turn left 1-9-0 degrees*" which was read-back by the student pilot; Figure 2 depicts the incident geometry at that point. The 'live-mic' then recorded APP stating that, "*Tilstock's active, have we been...err. Well, he's just airborne so...*" Whilst it has not been possible to determine conclusively who APP was addressing, it is believed to have been the ATC Supervisor.

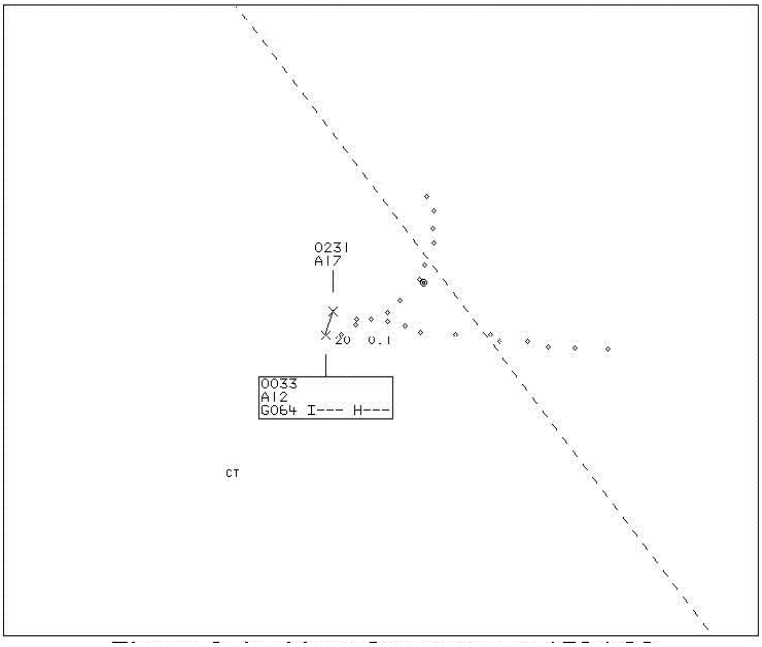


Figure 2: Incident Geometry at 1504:00

At 1504:25 the Squirrel's left-hand turn becomes evident on the radar replay followed, at 1504:27, by the Instructor pilot advising APP that they were, "*orbiting left, that fixed wing in the climb*"; Figure 3 depicts the incident geometry at that point.

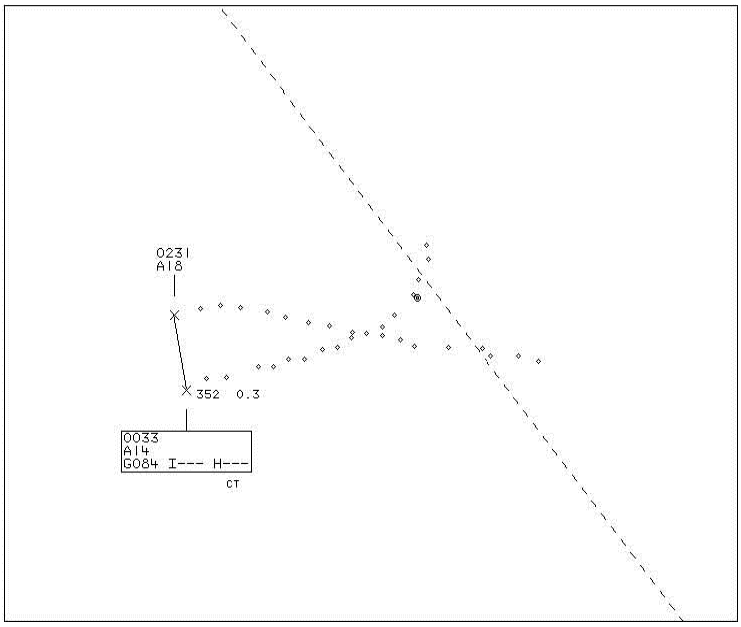


Figure 3: Incident Geometry at 1504:27

In reply, APP asked the Instructor whether the Airvan was, "*just to the north of you now*", who replied that the Airvan was, "*about 300 metres in the 12 o'clock and 200 feet below me*" which was acknowledged by APP. The CPA occurred between radar sweeps at 1504:41 as the Squirrel passed 0.1nm NE of the Airvan, 300ft above; Figure 4 depicts the incident geometry immediately after that point.

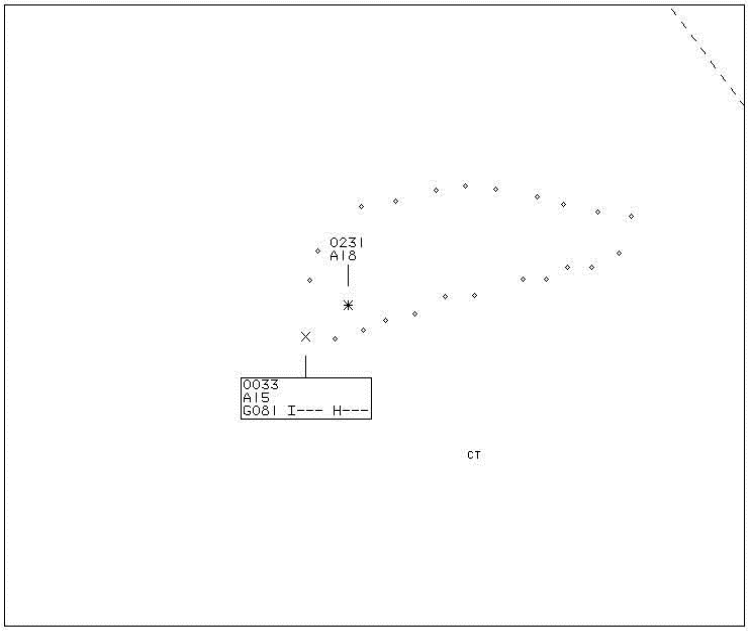


Figure 4: Incident Geometry at 1504:43

The Squirrel Instructor pilot reported that he had lost sight of the Airvan as it passed beneath his ac (at 1503:50) and reacquired it after being instructed to, "*turn left 1-9-0 degrees*" at 1504:00. The Airvan pilot reported that at about height 1200ft [approximately 1500ft on the radar replay] one of the skydivers sitting on the RH side of the ac said he could see a helicopter. One or 2sec later the Airvan pilot saw a blue and yellow helicopter paralleling his track, slightly ahead and above to his R, which then passed behind him. Based upon this description, it

appears that the Airvan pilot first visually acquired the Squirrel at approximately 1504:27 (as shown at Figure 3), after the first pass at 1503:50.

The ATC Supervisor reported that Tilstock had not been active that morning due to poor weather and that around an hour prior to the incident, the ATC Switchboard Assistant had received a call from Tilstock. Unfortunately, the Switchboard's landlines are not recorded, nor is there provision for a 'live-mic' function on that position. The ATC Supervisor recalled that the Switchboard Assistant had, as a result of the call from Tilstock, informed them that 'Tilstock was trying to become active' which they interpreted as them not being active yet. As a result, the ATC Supervisor did not direct that the Tilstock 'avoid' symbol should be activated on the surveillance displays, nor was APP informed about the conversation with the Switchboard Assistant.

Analysis

Whilst technically the instruction by APP to the Squirrel at 1504:00 to, "*turn left 1-9-0 degrees*" vectored the Squirrel into confliction, BM SPA contends that this would be an unfair summation of this Airprox event. Given the representation of the 2 radar contacts to APP, it is likely that the contacts had merged, or at best significantly overlapped, on the surveillance display at the point that the instruction was passed. This would explain APP's query at 1504:32 as to whether the Airvan was to the N of the Squirrel; unfortunately, given the likely confused presentation of the situation on APP's surveillance display, it is unlikely that the Squirrel Instructor pilot's reply would have assisted APP in updating their mental picture. Moreover, in the absence of contradictory information from the Squirrel crew, it is unlikely that APP would have assimilated that they would have lost sight of the Airvan as it passed beneath them, albeit for a short period. Consequently, from APP's perspective, the Squirrel's crew were visual with the Airvan and, believing the Squirrel to be S of the Airvan, a heading of 190° was the best means of deconflicting the ac. A hindsight bias argument could be made that APP could have requested the Airvan to have levelled-off below the Squirrel; however, APP was faced with a rapidly developing situation and, given their understanding of the relative geometry of the ac and that the Squirrel crew had reported visual with the Airvan, believed that they had achieved a sensible course of action to deconflict the ac.

The root cause of the incident lies in the format and content of the liaison conducted between Tilstock, the Switchboard Assistant and the ATC Supervisor. Whilst it has not been possible to determine conclusively what was said between these 3 parties, what is clear is that Tilstock's activation was not communicated effectively. Consequently, APP was unaware of Tilstock's activation and vectored the Squirrel through the Tilstock overhead.

Conclusion

A breakdown in communication between Tilstock, the Shawbury Switchboard Assistant and the ATC Supervisor caused a loss of situational awareness for Shawbury APP, resulting in the Squirrel being vectored through the Tilstock overhead, bringing it into conflict with the Airvan. The conflict was resolved by the Squirrel's Instructor pilot.

Outcomes

RAF Shawbury conducted a thorough incident investigation and made a number of recommendations to adapt both local procedures and their Letter of Agreement with Skydive Tilstock. The majority of these recommendations have been accepted by the Stn Occurrence Review Group and are being implemented, with Skydive Tilstock's agreement. Notable amongst these is that the Letter of Agreement is being amended such that ac departing Tilstock will not climb above 1000ft agl until 2-way RT with Shawbury Zone has been established and ac are given positive clearance to climb.

This Airprox event adds further support to the recommendation made by BM SPA to the ATM Force Cdr following Airprox 2012163 to task a Force-level Safety Survey, to review the practice of 'bandboxing' with a view to providing additional guidance to units.

HQ AIR TRG comments that APP attempted to pass relevant TI to the Squirrel pilot and to the Airvan pilot. Visual sighting appears to have been coincident with this TI and the crew took appropriate avoiding action when required. The incident highlights the potential for otherwise sound preventative measures to be eroded by poor communication.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Board Members agreed that the root Cause of this incident was a breakdown in communications between Tilstock Parachute Centre and RAF Shawbury ATC. ATC Members opined that the occurrence could have been prevented by the Shawbury SUP following up the message from Tilstock which, as reported, left some ambiguity as to whether the parachute centre was active or not. Shawbury APP was surprised by the presence of the Airvan and, although TI was passed, the situation was exacerbated by the mix of VHF and UHF RT transmissions. Shawbury APP then attempted to gain SA on the relative positions of the 2 ac but did not have sufficient radar resolution or traffic position information to avoid subsequently vectoring the Squirrel into conflict with the Airvan. Both pilots were operating in class G airspace with equal responsibility to 'see and avoid'. The Airvan pilot had right of way at CPA 1 and the Squirrel pilot had right of way at CPA 2. The Squirrel pilot gained visual contact first and was able to effect deconfliction by orbiting L at CPA 2.

Board Members commented that although the root cause was quickly identified, this Airprox displayed a number of causal factors which served to illustrate the classic accident 'chain of events'; in this case broken by the Squirrel pilot's lookout.

The Board was satisfied that, given the communication breakdown, the Squirrel pilot provided effective and timely action to prevent ac collision.

PART C: ASSESSMENT OF CAUSE AND RISK

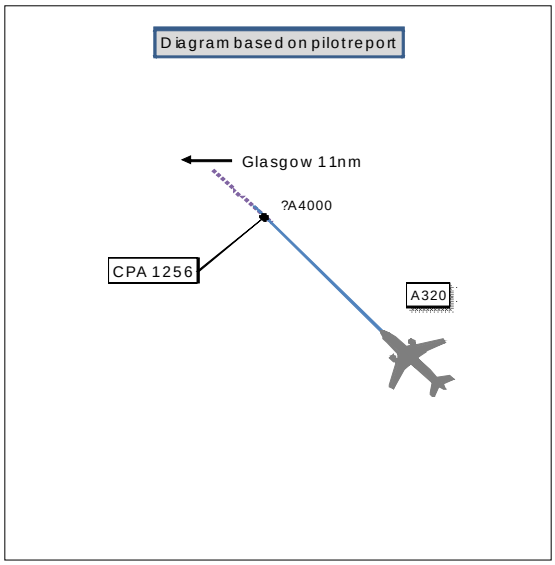
Cause: A breakdown in communications resulted in a conflict in the vicinity of the Tilstock freefall parachute drop zone.

Degree of Risk: C.

AIRPROX REPORT No 2012166

AIRPROX REPORT NO 2012166

Date/Time:	2 Dec 2012 1256Z	(Sunday)
Position:	5551N 00406W	(GOW 090 11nm)
Airspace:	Glasgow CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	A320	Unknown
Operator:	CAT	NR
Alt/FL:	4000ft	NR
	QNH(1015hPa)	QNH(NR)
Weather:	VMC NR	NR
Visibility:	>10km	NR
Reported Separation:		
	300ft V/0m H	NR
Recorded Separation:		
	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports descending on final descent into Glasgow, operating under IFR in VMC with a RCS from Glasgow APP. The landing lights were selected on, as was the SSR transponder with Modes A, C and S; the ac was fitted with an ACAS. Passing altitude 4000ft (QNH 1015hPa) at 240kt, in clear conditions with the sun behind them, both he and the PNF saw an object 'loom ahead' at a range of about 100m. The object passed directly beneath before either of the crew had time to take avoiding action or had 'really registered it' although they were both agreed that it appeared blue and yellow (or silver) in colour with a small frontal area but that it was 'bigger than a balloon'. The estimated mis-distance was 300ft.

He assessed the risk of collision as 'High'.

THE GLASGOW INTERMEDIATE APPROACH CONTROLLER reports that an A320, about 11nm E of Glasgow at altitude 4000ft under a RCS, was being vectored for a ILS approach to RW23 when the pilot asked if he was 'talking to anything in the area' as he had 'got quite close' to a blue and yellow ac, travelling in the opposite direction, which had passed just below him. The controller stated that he was not talking to anyone else in that area and that nothing was seen on radar. Search action was taken with no result and the A320 pilot stated his intention to file an Airprox.

ATSI reports that an Airprox was reported by the pilot of an Airbus A320 when the ac, inbound to Glasgow, passed an object in the vicinity of Baillieston (13nm east of Glasgow) at an approximate altitude of 3500ft.

Meteorological data for Glasgow was recorded as follows:

METAR EGPF 021250Z 06002KT CAVOK 01/M00 Q1015=

Factual History

At 1249:30 an A320 pilot called Glasgow Approach on track LANAK in the descent to FL070. The A320 was 47nm from touchdown via an ILS approach to RW23. At 1251:40 the A320 pilot was instructed to continue on his present heading and descend to altitude 5000ft (QNH 1015hPa). Further descent to 3500ft was given 2 min later.

At 1255:20 the following exchange between the A320 pilot and Glasgow APP took place:

A320: "*Glasgow Approach* [A320 C/S]"
EGPF: "[A320 C/S] *pass your message*"

A320: "*Er yeah we just had something pass underneath us quite close* [1255:30] *and nothing on TCAS have you got anything on in our area*"
EGPF: "*Er negative er we've got nothing on er radar and we're n- not talking to any traffic either*"
A320: "*Er not quite sure what it was but it definitely er quite large* [1255:40] *and it's blue and yellow*"
EGPF: "*OK that's understood er do you have a an estimate for the height*"
A320: "*Maybe er* [1255:50] *yeah we were probably about erm four hundred to five hundred feet above it so it's probably about three and a half thousand feet.*"

Figure 1 below shows the Prestwick (ACC) Multi Tracking Radar picture at 1255:20. The A320 is transponding Mode A code 4226. The distance between each marker in the replay trail history is equivalent to 4sec. The Figure shows no other track histories within the immediate vicinity of the A320 at this time. There is an unidentified track history 1.3nm E of the A320's position 28 seconds earlier, but no surveillance data to suggest a detectable object passing underneath the A320.

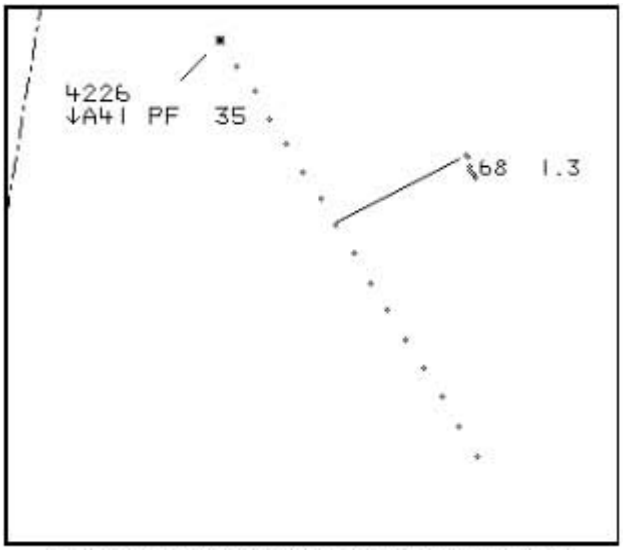


Figure 1: 1255:20 UTC (Prestwick MRT)

Additionally, a further detailed review of individual radar sources did not yield any conclusive radar data that matched the A320 pilot's description of the encounter. The ATC unit's own radar replay also showed no surveillance traces in the immediate vicinity of the A320 at the time.

Once on the ground the A320 pilot gave a further description of the event to the Glasgow Aerodrome Controller:

A320: "…*we seemed to only miss it by a couple of hundred feet it went directly beneath us … wherever we were when we called it in it was within about ten seconds"; "… couldn't tell what direction it was going but it went right underneath us*"
EGPF: "*do you suspect it might have been a glider or something like that*"
A320: "*well maybe a microlight … it just looked too big for a balloon.*"

Conclusion

The pilot of an A320, inbound to Glasgow, gave a contemporaneous account of his ac's encounter with an untraced object at 3500ft. Investigation of the available surveillance sources was unable to trace any activity matching that described by the A320 pilot. Additionally there was no other information to indicate the presence or otherwise of activity in the area.

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PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the A320 pilot, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

The Board initially considered likely candidates for the untraced ac. The A320 crew had not been able to assimilate any information regarding the shape of the untraced ac in the fleeting glimpse they had, reporting only a likely colour. Members were of the opinion that, in the absence of a primary radar return, it was unlikely that the untraced ac was a fixed-wing or rotary-wing ac or man-carrying balloon. It was considered that a meteorological balloon would be radar significant and unlikely to be released in the area of the Airprox. A glider could not be discounted but it was felt unlikely that one would be operating in that area, both due to the constrained airspace and the lack of thermal activity due to the low temperature. Similarly, The Board considered that a hang-glider or para-motor would be radar significant and that conditions precluded them, as they did para-gliders or parascenders. Members were unable to reach a conclusion as to a likely candidate for the conflicting ac and it was therefore felt that the Board had insufficient information to determine a Cause or Risk.

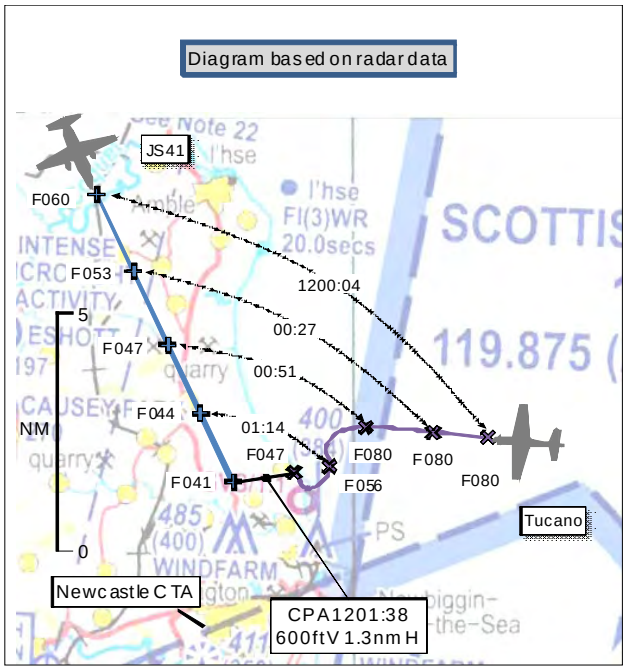
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: D.

AIRPROX REPORT NO 2012167

Date/Time:	4 Dec 2012 1202Z	
Position:	5514N 00133W (12.5nm NNE Newcastle A/D)	
Airspace:	Scot FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	JS41	Tucano T Mk 1
Operator:	CAT	Mil Trg
Alt/FL:	3800ft	5000ft
	QNH (999hPa)	RPS (NR)
Weather:	VMC NR	VMC NR
Visibility:	>10km	NR
Reported Separation:		
	NR	NR V/2nm H
Recorded Separation:		
	600ft V/1.3nm H	
	0ft V/2.7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JS41 PILOT reports flying the final descent into Newcastle A/D. She was operating under IFR in VMC with a RCS from Newcastle APP, she thought [124.375MHz]. The white and blue ac had navigation, conspicuity and strobe lights selected on, as was the SSR transponder with Modes A, C and S. The ac was fitted with TCAS II. When 9nm NE of Newcastle A/D, heading 165° at 220kt and descending through altitude 3800ft, she was informed by Newcastle APP of a 'light ac' turning away from her. She saw the ac about 4nm to the E, which appeared to both crew to be doing aerobatics. A short while later she received a TCAS TA and then RA 'monitor vertical speed', indicating a 2900fpm RoD, followed by 'climb climb'. She reported the Airprox to Newcastle APP.

She assessed the risk of collision as 'Low'.

THE TUCANO PILOT reports commencing his descent into low level after a medium level transit from his home base. He was operating under VFR in VMC with a TS from Newcastle RAD [284.600MHz]. The black and yellow striped ac had navigation, landing and strobe lights selected on, as was the SSR transponder with Modes A and C. The ac was fitted with TCAS I. He had been cleared to descend from FL110 with descent stopped at FL80 due to Jetstream traffic in his 1 o'clock position at 'about 6nm and 5000ft'. He was approaching his low level entry point and, content that there were sufficient large gaps in the cloud below him to descend through, he informed Newcastle RAD that he 'was VMC' and was continuing en-route. The controller asked him to remain on frequency in order to update him on the previously notified traffic. As he had informed the controller that he was VMC and continuing en-route, he believed he was now in receipt of a BS and that the controller was 'just keeping [him] on frequency to provide updates on the Jetstream'. He did not believe the Jetstream to be a factor, as his SA put the ac several miles to the NW, and he descended rapidly through a gap in the cloud in order to set up for entry to low level, a high workload part of the sortie. He remained VMC throughout the descent, but with some of his attention focused on 'the navigational aspects' of the sortie. He then overheard an RT exchange between the Jetstream pilot and Newcastle RAD from which he understood that the Jetstream pilot was 'going to have to file an Airprox' because she had 'received a TCAS TA' as he passed through her level at 5000ft. He did not see the Jetstream but noticed on TCAS that it was just inside 2nm range; he did not receive a TA throughout the incident.

He assessed the risk of collision as 'Low'.

THE NEWCASTLE APPROACH CONTROLLER reports the JS41 pilot was inbound to Newcastle on a DS, heading 160° and descending to altitude 3500ft. The Tucano pilot was on a TS, requesting to go low level to the

N and cleared to descend to FL80 until clear of the JS41. When the Tucano pilot requested to go en-route he gave him an update on the JS41 and passed the Tyne RPS. He requested the Tucano pilot to advise him when going en-route, which he acknowledged, replying, "*wilco*". He observed the Tucano descending and immediately gave TI to the JS41 pilot on the Tucano who then advised him of the TCAS RA. He acknowledged this and confirmed that the Tucano pilot was still on frequency. The JS41 pilot confirmed that she had the Tucano in sight during the descent.

ATSI reports that an Airprox was reported by the pilot of a British Aerospace Jetstream 41 (JS41) when it received a TCAS RA against a Tucano T1 (Tucano) at 1201:30 in Class G airspace, 12.6nm NNE of Newcastle A/D.

Background

The JS41 pilot was operating IFR on a flight from Aberdeen to Newcastle and was in receipt of a DS from Newcastle APP on frequency 124.375MHz, which was cross-coupled with frequency 284.600MHz. The Tucano pilot was on a flight operating from RAF Linton-on-Ouse and was in receipt of a TS from Newcastle APP on frequency 284.600MHz.

CAA ATSI had access to written reports from the JS41 and Tucano pilots and the Newcastle Approach controller together with area radar recordings and RTF recordings from Newcastle APP.

The Newcastle weather was recorded as follows:

METAR EGNT 041150Z 28007KT 9999 FEW035 03/02 Q0999=
METAR EGNT 041220Z 28005KT 9999 FEW015 03/02 Q0999=

Factual History

At 1148:10, the Tucano pilot, level at FL110, contacted Newcastle APP requesting a TS. Newcastle APP replied that he was identified on transfer and agreed a TS, instructing the pilot to report ready for descent. At 1155:30, the JS41 pilot, descending to FL120, contacted Newcastle APP requesting a DS. This was agreed and the JS41 pilot was subsequently given descent to FL70.

At 1157:20, the Tucano pilot informed Newcastle APP that he would be ready for descent in one minute's time. The controller replied, "*Roger report ready*".

At 1157:30, the JS41 pilot was instructed to fly heading 160° and given descent to altitude 5000ft [QNH 999hPa].

At 1158:00, the Tucano pilot reported ready for descent and the controller instructed him to descend to FL80, which was read back correctly.

At 1158:22, the JS41 was 24.6nm N of Newcastle, tracking 160°, and the Tucano was 19.9nm NE of Newcastle tracking W.

At 1159:00, the JS41 pilot was instructed to descend to altitude 3500ft.

At 1159:30, the Tucano pilot was instructed to maintain FL80 on reaching and was given TI on the JS41. The Tucano pilot read back, "*maintaining eigh- fli-er flight level eight zero*".

At 1200:10, the Tucano pilot reported to the controller that he was, "*VMC and continuing en-route er thanks for the service*". The controller updated the TI on the JS41 and passed the Tyne pressure setting, stating, "*taking your own terrain clearance*". The Tucano pilot replied that he had copied the traffic and read back the new pressure setting. The controller instructed the Tucano pilot to squawk 7000 and report when going en-route. The Tucano pilot replied, "*-service squawking seven thousand er wilco* [C/S]".

At 1200:36, the Tucano was indicating FL079 tracking W with the JS41 6nm NW, descending through FL051 on a converging track.

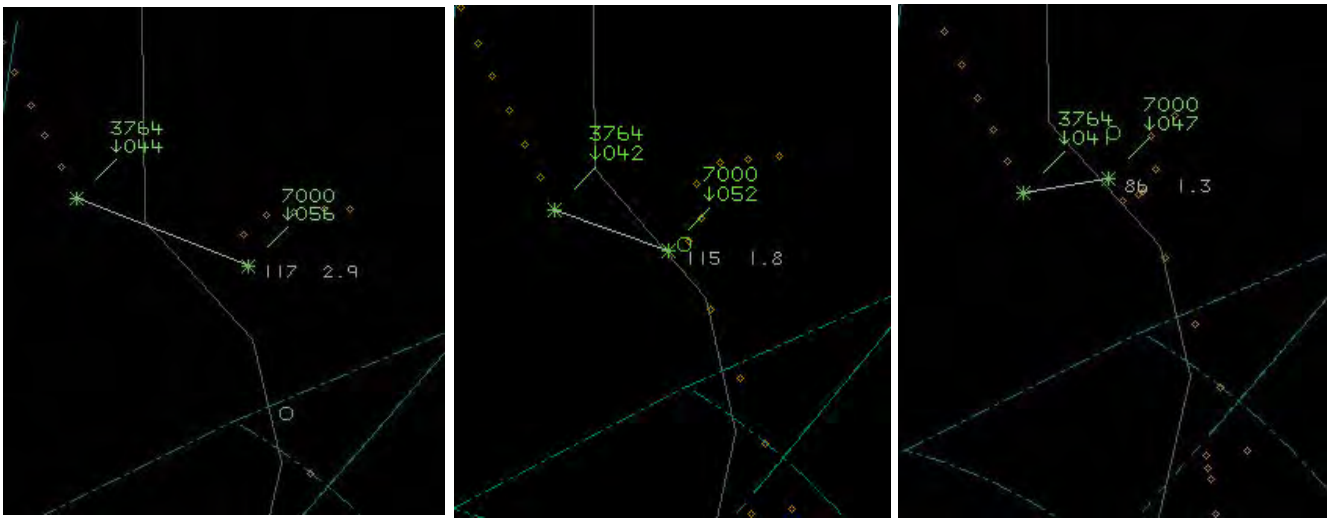
At 1201:00, the Tucano was indicating FL067, descending. The controller transmitted to the JS41 pilot, "*Tucano ac just to the er southeast of you by about two and a half miles manoeuvring he's turning left to go eastbound descending through your level very shortly er he's indicating five thousand two hundred feet*".

At 1201:20, the Tucano pilot had turned L and was at FL056 at a range of 2.9nm from the JS41; he appeared to be turning away. The JS41 pilot acknowledged the TI and the controller advised that, "*he's just clearing your left hand side he's in your eleven o'clock range of three miles*".

At 1201:30 the Tucano pilot was in a RH turn, 1.8nm ESE of the JS41, descending through FL052, while the JS41 pilot was descending through FL042. At 1201:35 the JS41 pilot advised the controller that she had received a TCAS RA.

The controller acknowledged the TCAS RA by replying, "*roger*". At the end of that transmission the Tucano pilot was tracking N and passed down the LH side of the JS41 at a range of 1.3nm. The controller asked the Tucano pilot if he was still on frequency. The Tucano pilot replied that he was but that he was going en-route. The controller requested the Tucano pilot to remain on frequency due to the TCAS RA reported by the JS41 pilot.

The screenshots below, using the Great Dun Fell radar, show the sequence of events between 1201:20 and1201:40.



At 1202:00, the JS41 pilot reported clear of conflict.

During a telephone interview with ATSI, Newcastle APP stated that when the Tucano pilot requested to go en-route and the controller updated the TI on the JS41, he had expected that the Tucano pilot would avoid the JS41. When the Tucano pilot descended and turned L, the controller believed that he was in the process of doing so. The controller expected the Tucano to then continue E-bound and turn L towards the Amble lighthouse, which would have taken him behind the JS41. When the Tucano pilot turned R the controller was not sure if he was still on frequency and decided that passing TI to the JS41 pilot on the Tucano position was the best course of action.

The written report from the JS41 pilot stated that ATC advised her of a light ac turning away to the E. When the crew saw the traffic it appeared to be conducting aerobatics. After watching the ac 'for a minute' the crew observed the Tucano making a series of tight turns. They subsequently received a TCAS RA.

The written report from the Tucano pilot stated that he was in receipt of a TS from Newcastle APP outside CAS and had been given descent to FL80 from FL110. He was aware that the descent had been restricted due to a Jetstream 6nm away at 5000ft. He was approaching his low level entry point and was content that there were sufficient gaps in the cloud to descend through, so he informed the controller that he was VMC and going en-route. He believed that the controller asked him to stay on frequency to update the TI on the JS41. The Tucano pilot believed in retrospect that he and the controller had different ideas of the service being provided; the pilot believed that the service had changed to a BS as he had informed the controller that he was VMC and going en-route. The

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Tucano pilot descended in a gap to set up for the low level entry, whilst remaining VMC. He noticed on TCAS that the JS41 was just inside 2nm but he did not receive a TA.

Analysis

Both ac were operating in Class G airspace where, regardless of the service being provided, pilots are ultimately responsible for their own collision avoidance.

The Newcastle Radar controller had previously instructed the Tucano pilot to stop descent at FL80, due to the inbound JS41, which the Tucano pilot was aware of. The controller was providing a Deconfliction Minima of 3nm or 1000ft between the 2 ac. CAP493, the Manual of Air Traffic Services, Section 1, Chapter 5, Page 10, Paragraph 10.1.5 states:

'Aircraft under Deconfliction Service. If the intentions of the Mode C transponding aircraft are not known, the vertical deconfliction minima must be increased to 3000ft ...'

When the Tucano pilot stated he was going en-route the controller passed updated TI on the JS41 and had an expectation that the Tucano pilot would avoid it. However, the 2 ac were converging and the controller did not further agree co-ordination with the Tucano pilot. CAP 774 Chapter 1, Page 2, Paragraph 6, states:

'Agreements can be established between a controller (not a FISO due to limits of the licence) and a pilot on a short-term tactical basis, such that the operation of an aircraft is laterally or vertically restricted beyond the core terms of the Basic Service or Traffic Service. This is for the purposes of co-ordination and to facilitate the safe use of airspace, particularly those airspace users with more stringent deconfliction requirements. In agreeing to a course of action, pilots must take into account their responsibilities as defined under the Rules of the Air, including that for terrain clearance. Unless safety is likely to be compromised, a pilot shall not deviate from an agreement without first advising and obtaining a response from the controller. Controllers shall remove restrictions as soon as it is safe to do so.

Agreements may be made which restrict aircraft to a specific level, level band, heading, route, or operating area. Controllers should be aware that not all requests for an agreement will be accepted and they should try to take account of the pilot's operating requirements whenever possible. Consequently, controllers should avoid excessive or unnecessary use of agreements and be prepared to act accordingly if an agreement is not met.'

When the Tucano pilot turned L and descended the controller passed TI to the JS41 pilot but believed that the Tucano was turning away from the JS41. The controller was not expecting the Tucano pilot to then turn R, towards the JS41, and was unable to take any action to assist the JS41 pilot in discharging her collision avoidance responsibility due to the limited time available.

Conclusion

The Airprox occurred when the controller allowed the 2 ac to continue on converging tracks, without agreeing co-ordination with the Tucano pilot, which resulted in loss of the deconfliction minima and prompted a TCAS RA.

[UKAB Note(1): A TCAS Performance Assessment of the incident was provided by NATS Ltd. Note that as no TCAS RA events were downlinked, there are none included in the simulation.

Date: 04/12/2012 12:02

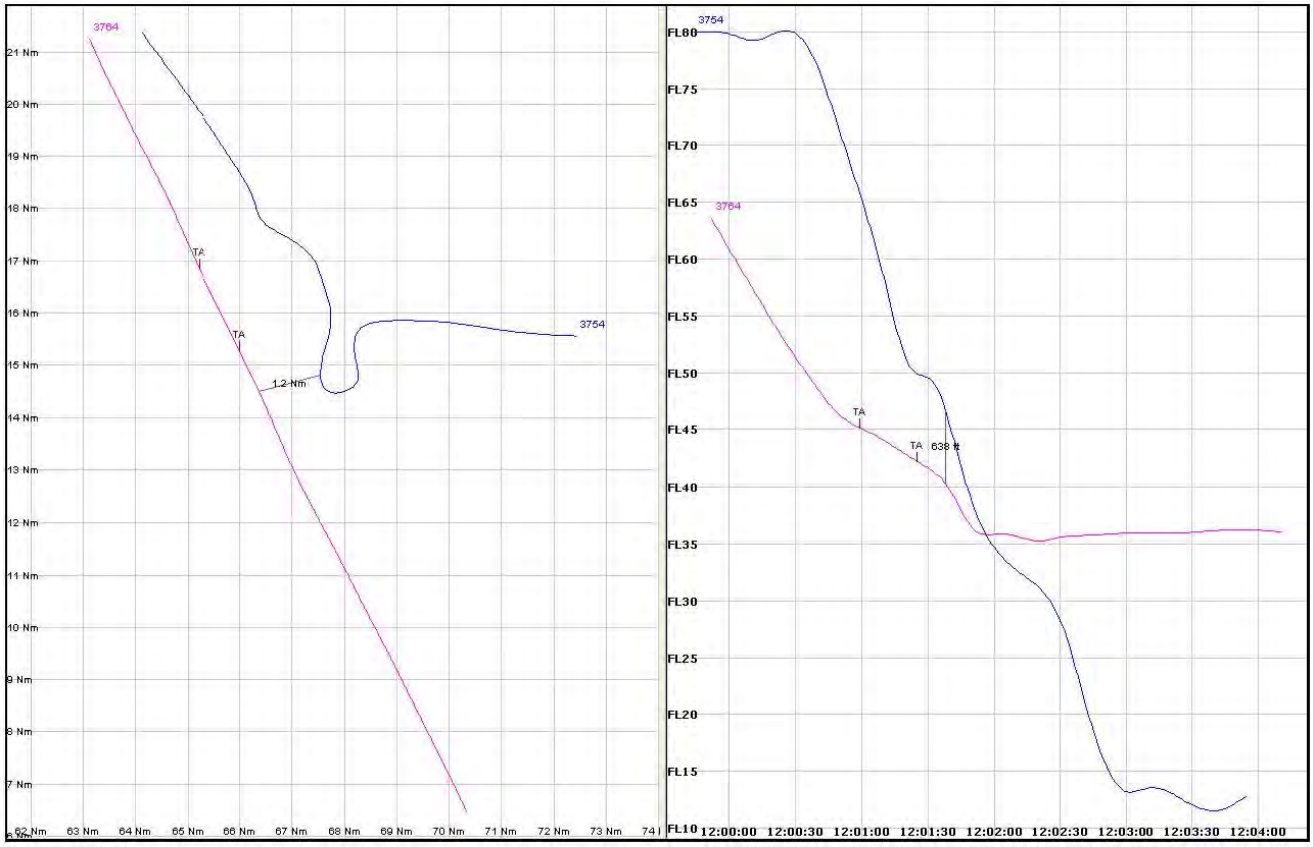
Mode A code for A/C 1: 3764

Mode A code for A/C 2: 3754, then 7000

Mode S Downlink

No TCAS RAs were recorded via Mode S downlink.

InCAS Simulation



InCAS Alert Statistics

Mode A: 3764

Alert Time	*Alert Description*	*Altitude (FL)*	*Intruder Range (Nm)*	*Vertical Sep. (ft)*
12:00:59	TRAFFIC ALERT	45	3.39	2063
12:01:25	TRAFFIC ALERT	42	2.19	731

Mode A: 3754

Alert Time	*Alert Description*	*Altitude (FL)*	*Intruder Range (Nm)*	*Vertical Sep. (ft)*
This aircraft was not TCAS II equipped				

Closest Point of Approach (CPA)

CPA Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
12:01:38	1.21	638

Minimum Lateral Separation

Min. Latsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
12:01:38	1.21	637.93

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Minimum Vertical Separation

Min. Vertsep Time	*Horizontal Sep. (NM)*	*Vertical Sep. (ft)*
12:01:56	2.66	11.15

Assessment of TCAS Performance

Eurocontrol's automatic safety monitoring tool (ASMT) did not record any RAs relating to this encounter. The encounter was modelled in InCAS using MRT data (Multi Radar Track) in order to capture both sections of the Tucano track before and after its SSR code change.

As no TCAS RAs were recorded via Mode S downlink it was assumed that at least one aircraft was not TCAS II equipped. The Tucano was modelled as Mode S only and the JS41 was modelled as TCAS II equipped.

InCAS simulation suggests a geometrical CPA of 1.21nm and 638ft at 12:01:38.

InCAS simulation based on the stated equipage assumptions suggested that the JS41 pilot received two TAs at 12:00:59 and 12:01:25. Approximately 40 seconds after the second TA, the JS41 pilot levelled-off at a Mode C altitude of 3,600ft. At this point the pair were over 3.5nm apart laterally, and diverging both laterally and vertically.]

HQ AIR (TRG) comments that the Tucano pilot assessed he could continue safety in VMC without an ATS and that he had enough separation based on TI and TCAS to descend clear of the JS41. The student pilot was re-briefed after the event that a better course of action would have been to ensure lateral separation before attempting the descent. In this case, continuing the turn to the L would have maintained greater separation. CAP774 requires pilots under an ATS who have made an agreement with their controller not to deviate from that agreement without first informing and gaining an acknowledgement from the controller; whilst the Tucano pilot did not specifically state he would descend below FL80 it is clear that the controller understood that this was his intention. The Tucano TCAS alerts are triggered at much closer range than other systems to avoid nuisance warnings and in recognition of the increased manoeuvrability over a commercial airliner. However, it provides a significant increase in situational awareness.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board initially discussed the JS41 pilot's reported belief that she was under a RCS. Civilian pilot Members noted that confusion could be caused when pilots left CAS, passing from a RCS to ATSOCAS, with pilots mistakenly believing they were still under a RCS. It was opined that this misapprehension can be mitigated by controllers' meticulous use of the phrase 'leaving controlled airspace'. In this case it was noted that the JS41 operating company regularly flew 'off airways' on this route and that the JS41 pilot may have been using RCS 'in a generic sense'; alternatively, as she had requested a DS on first contact with Newcastle and the Airprox occurred shortly before the JS41 entered CAS, the reference to RCS may have been a memory/reporting error. The Board noted that the JS41 pilot correctly reported the TCAS RA and clear of conflict on the RT.

Turning to the actions of the Tucano pilot, a military pilot Member opined that he could have assisted the situation by electing to continue his L turn or by turning R instead of L. He also pointed out that the Tucano pilot's SA was such that he did not believe the JS41 to be a factor and that the Newcastle APP had cleared him en-route, passing the RPS and instructing him to squawk 7000. ATC Members noted that the controller was providing an excellent service and had achieved a deconfliction plan when the Tucano pilot agreed to maintain FL80 but by subsequently clearing him en-route he had changed his deconfliction minima from 3nm and 1000ft (co-ordinated ac) to 3nm and 3000ft (intentions of the Mode C transponding aircraft not known). At that stage he was working under the belief, in hindsight mistaken, that the Tucano pilot would affect deconfliction. Whilst this belief may have been based on previous 'normal' military traffic behaviours, he had rendered his original deconfliction plan invalid. Finally, ATC Members were concerned at the lack of avoiding action to the JS41 pilot once the Tucano had flown within deconfliction minima.

In assessing the Cause and Risk, the Board agreed that once the controller had cleared the Tucano pilot en route he no longer had a deconfliction agreement and that he then did not take further action to achieve deconfliction minima, albeit there was limited time available. Despite this, the controller's TI enabled the JS41 pilot to gain visual contact with the Tucano turning L over 2nm away. Given this visual sighting and the separation ranges and altitudes shown on recorded radar, the Board concluded that safety margins were not significantly reduced.

PART C: ASSESSMENT OF CAUSE AND RISK

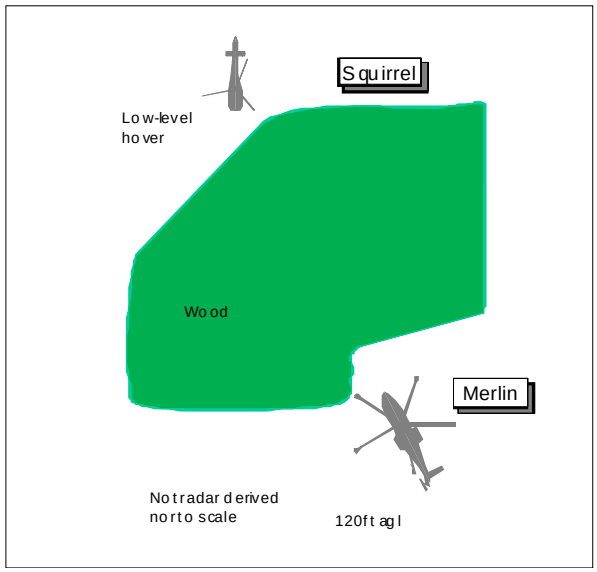
Cause: In the absence of an agreement with the Tucano pilot, the controller did not take further action to achieve deconfliction minima.

Degree of Risk: C.

AIRPROX REPORT No 2012168

AIRPROX REPORT NO 2012168

Date/Time:	30 Nov 2012 1203Z	
Position:	5114N 00118W (13nm W Odiham)	
Airspace:	UKDLFS LFA1	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Merlin	AS350 Squirrel
Operator:	HQ JHC	HQ Air (Trg)
Alt/FL:	120ft (agl)	Low-hover (agl)
Weather:	VMC NR	VMC NR
Visibility:	10km	10km
Reported Separation:	100ft V/Nil H	70ft
Recorded Separation:	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MERLIN PILOT reports en-route from Odiham to Benson, VFR and in receipt of a BS from Odiham on 372·375MHz, squawking 3646 with Modes S and C. The visibility was 10km in VMC and the helicopter was coloured green with upper and lower HISLs, nav and 2 landing lights all switched on. While transiting at 120ft agl, heading 340° and 130kt, the centre seat Capt spotted a military Squirrel helicopter approximately 3nm away in their 11 o'clock. The LHS HP took padlock [responsibility for maintaining visual contact] and manoeuvred the ac to position away from the conflicting traffic. The Squirrel was operating at very low-level and seemed to approach to a hover in an open field and begin a spot-turn. Whilst crossing a small wood [OS Grid Ref provided, wood 0·5km S of Laverstoke] the LHS pilot noticed a 2nd Squirrel helicopter pass directly underneath by about 100ft. This Squirrel was hovering at the far side of (behind) the wood and was completely hidden to the crew until they were O/H. The crew checked to ascertain the Squirrel was not affected by their downwash before continuing towards Benson. He assessed the risk as medium.

THE AS350 SQUIRREL PILOT reports flying an instructional Recce Patrol sortie as No2 in formation from Middle Wallop, VFR and listening out on the Low Flying Common frequency, squawking 2676 with Mode C. The visibility was 10km in VMC and the helicopter was coloured black/yellow with anti-collision, strobe and landing lights all switched on. As he was the Patrol 2IC he was in a low hover when the Patrol Commander gave him a threat call on a Merlin before it was about to pass O/H. At the time his helicopter was positioned behind a wood, in his 12 o'clock, and he did not see the Merlin so he stayed in that position as told to do so by the Patrol Commander. He then turned though 180° and saw the Merlin 50m to the N flying away, estimating it had passed about 70ft above. Their formation had made several calls on the Low Flying Common frequency but had heard no calls from the Merlin flight. He assessed the risk as medium.

THE SQUIRREL SQUADRON FSO reports that the 2 Squirrel helicopters were manoeuvring on an Aviation Recce Patrol at very low-level, 'pepperpotting' from woodline to woodline. The Merlin was first sighted by the Lead Squirrel pilot who then warned the No 2 pilot to maintain position as the Merlin was very close but hidden to the No 2 by the treeline. The first the No 2 Squirrel pilot saw of the Merlin was when it had passed by.

BM SAFETY POLICY AND ASSURANCE reports that the Airprox occurred at 120ft agl, between Whitchurch and Overton within LFA1 and just E of the A34, approximately 13nm W of Odiham (Figure 1 refers, the W edge of Odiham's MATZ stub can be seen to the right of the picture), between a Merlin in receipt of a BS from Odiham Information and a pair of Squirrels.

Figure 1: Extract from LF Chart Depicting Area of Airprox.

The Airprox was not captured by NATS Radar Heads and BM SPA contends that, given the height of the Airprox, neither the Merlin nor the Squirrels would have been detected by Odiham's Watchman PSR.

Investigation by Odiham ATC determined that the Merlin entered LFA 1, calling Odiham Information, at approximately 1147:00, having conducted a PD at Odiham, and left the Odiham frequency at approximately 1210:00, going 'en-route' to Benson. No other transmissions were received from the Merlin flight by Odiham during this period. Moreover, there was no record of the Squirrel formation being 'worked' by Odiham Information.

The Military Low Flying Handbook (MLFH) stipulates that:

'Where possible, ac within LFA 1 should monitor the UKLFS common safety frequency 278·0 MHz, which may be used for blind safety calls when lifting from fields or other landing sites. A Basic Service is available during ATC operating hours from Benson (376·65MHz), Boscombe Down (359·775MHz); Middle Wallop (280·625MHz) and Odiham (131·3MHz).'

The BINA En-Route Supplement lists Odiham Information's frequency as 372·375MHz, the frequency stated by the pilot of the Merlin as the one on which they were operating and makes no mention of LF Common. Whilst not stipulated within the MLFH, the historic boundaries of responsibility for the provision of a BS to ac within LFA 1 are the M4 and A34.

Given the height at which the Airprox occurred and that Odiham Information had no knowledge of the Squirrel formation's presence, they were unable to affect the outcome of the occurrence.

HQ JHC comments that this is a known area of increased helicopter activity for ac departing or joining SPTA and RAF Odiham and as such it is evident from the narrative that both ac were conducting meticulous lookouts. Both crews were operating iaw extant military low flying regulations. The Squirrel patrol leader gave timely information to his wingman on the overflying Merlin and the Merlin crew were ensuring separation on the first Squirrel they had visually acquired. The effectiveness of the low level frequency was probably negated due to the terrain and line of sight issues. Neither of the Squirrels had undergone the ongoing Traffic Advisory System (TAS) modification yet and a collision avoidance system is being actively pursued by this command for all JHC manned platforms, which would have been likely to provide an earlier warning. Both of the ac communities involved have discussed this Airprox occurrence and have used it to reinforce the requirement for a stringent lookout when operating, particularly at low level.

HQ AIR (TRG) comments that all crews in the LF system should monitor the LF Common Frequency whenever possible, along with Guard. Groups have been requested to remind units of this requirement. Further guidance regarding the use of LF Common is under consideration. Following a recent but unrelated change to booking procedures, LF Ops Sqn now pass details of other users of the LF System on booking in. However, rotary-wing ac are not required to book in, making it impossible to ascertain the numbers or details of other users, creating a reliance on 'see-and-avoid'. In the event, the nature of the training exercise made sighting more difficult, but the Squirrel formation leader's intervention was effective, albeit that it made sighting by the Merlin impossible.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

With the helicopter crews operating in accordance with the low-flying regulations, the primary means of discharging their responsibilities was through 'see and avoid'. This, for all intents and purposes, had worked well, given the tactical flying tasks being executed. The Squirrel formation's 'hide and seek' sortie profile had intentionally placed the helicopters where they would be difficult to see in an operational scenario. The Squirrel leader had done well to spot the approaching Merlin and had told the No2 pilot to stay put in a very low hover behind a wood to deconflict from it. Meanwhile the Merlin crew had also done well in seeing the No1 Squirrel at some range and had manoeuvred to avoid it. However, the Merlin crew was unaware of the measures that had been taken by the Squirrel formation when they overflew the No2 Squirrel, which they saw only as it passed beneath and which had caused them concern. The Board agreed that the Squirrel formation tactics and the leader's actions had been effective in preventing a conflict occurring, the helicopters passing each other, albeit at close quarters, with no risk of collision.

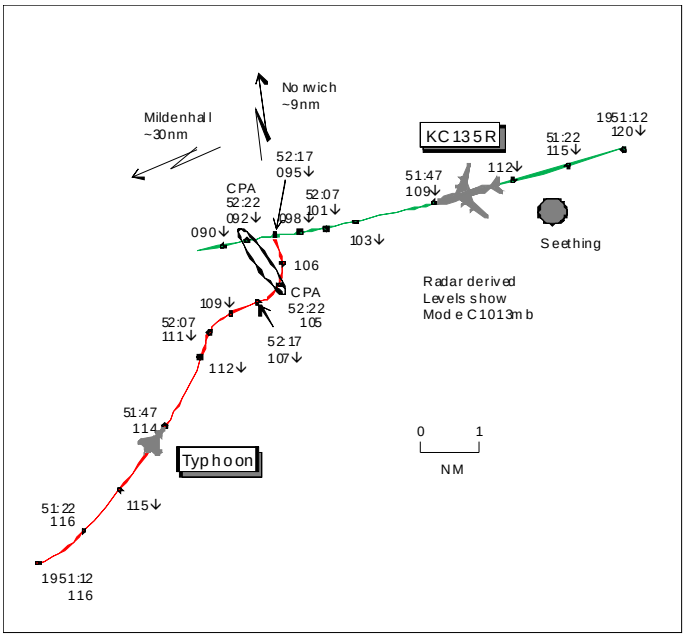
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict prevented by the Squirrel formation leader.

Degree of Risk: C.

AIRPROX REPORT NO 2012169

Date/Time:	4 Dec 2012 1952Z	(Night)
Position:	5230N 00117E (30nm ENE Mildenhall)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	KC135R	Typhoon
Operator:	Foreign Mil	HQ Air (Ops)
Alt/FL:	↓FL80	11000ft (RPS (996hPa))
Weather:	VMC CLBL	VMC CLAC
Visibility:	>10km	20km
Reported Separation:	200ft V/2nm H	Slant 4000ft
Recorded Separation:	1300ft V/0·9nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KC135R PILOT reports in an en-route descent from FL160 to FL80 returning to Mildenhall, IFR and in receipt of a DS from London Mil E on 259·6MHz, squawking an assigned code with Modes S and C; TCAS was fitted. The visibility was >10km flying 2000ft above cloud but between layers in VMC and the ac's strobes, nav and nacelle lights were all switched on. Heading 200°, he thought, at 300kt both pilots noticed on TCAS an ac 8nm away, tracking towards them in close proximity and descending towards their level. Shortly after, a TCAS TA was received on traffic in their 11 o'clock about 400ft above that was descending at a faster rate than them. The PF acquired a Typhoon visually and deviated 30° to the R while deploying speed-brakes and increasing their ROD. The PNF kept eyes on TCAS and relayed to the PF that the Typhoon was 200ft above and within 3nm. They then communicated the position of the ac and their deviation to London Mil E. They ceased their deviation and levelled-off at FL80 after the Typhoon passed. London Mil E asked if they wished to file an Airprox and they stated they would telephone after landing.

THE TYPHOON PILOT reports checking out at the end of a night CAS serial using NVGs and in receipt of TS from London Mil on a discrete frequency, squawking an assigned code with Modes S and C. The visibility was 20km flying clear above cloud in VMC and the ac's red strobes, nav and formation lights were switched on. Heading 020° at 300kt about 10nm NE of Mildenhall he was asked by London to maintain above 9000ft amsl to deconflict from traffic inbound to Mildenhall. He climbed to 11000ft and tracked N to start recovery to Coningsby. He was aware of a contact from his radar which was 10nm to his NE heading towards Mildenhall and it appeared to be at his level. He assumed from his deconfliction with London that the other ac would be in a descent so he maintained his heading and level. He went heads-in for a short period to compile an In-Flight Report and when he looked out he could see the lights of an ac in his 1 o'clock at a similar level appearing to be on a collision course. He queried the height of this ac with London but his call was stepped-on by another formation. He broke away to the R at about 1nm range to avoid colliding with this ac, estimating 4000ft separation at the CPA. Once clear of this traffic he reversed his turn and followed the ac in order to try and identify it whilst again asking London of its altitude. It was reported as a KC135 that he was supposedly de-conflicted with flying FL100. He was working RPS of 996hPa so flying at 11000ft meant a difference of approximately 300ft between them, he thought. He recovered to Coningsby without further incident, assessing the risk as high.

THE LATCC MIL E TACTICAL CONTROLLER reports as the oncoming controller with the Typhoon operating between 5000ft and 19500ft RPS 996hPa and 2 F15s operating O/H Lakenheath between FL50 and FL190 on

separate discrete frequencies, but MARSA and in contact with each other on a tactical frequency. As he took over control a KC135R was leaving the UAR in the vicinity of MOLIX at FL260 to descend into Lakenheath for a PD before recovering to Mildenhall for a full-stop. On its call of ready for descent he instructed the KC135R flight to descend to FL80 and ascertained that the crew would require a DS on leaving the upper air. After assessing the ROD he saw fit to stop the Typhoon not below 9000ft RPS, to which the pilot agreed. He then took a pre-note from ScATCC(Mil) for a GR4 transit from the N to Marham. As he ranged his radar display out to look for the GR4 he noticed a large number of ac (circa 30) in the D323 complex at various levels tracking S. Knowing that there were a number of F15s and Typhoons operating with Boulmer CRC in that airspace, he was anticipating pre-notes and checked the KC135R's range against the subject Typhoon and its ROD and was still content that his coordination would be sufficient. At this point various landlines were ringing and he believed he answered the Boulmer CRC line to take a pre-note on another formation flight. His Planner then stepped in to take the pre-note and he, TAC, answered the ScATCC(Mil) line to take the handover on the GR4. At this point the KC135R crew requested information on traffic in his 12 o'clock 3nm to which he responded, "Roger, apologies, expedite descent through FL80, traffic S 2nm Typhoon 500ft above". He believed he was distracted by the massive wave of ac heading out of D323 complex and by various pre-notes and handovers of traffic. At no point did he issue avoiding action to either ac as the developing situation had distracted him to such a degree. The KC135R crew stated that they were descending and taking a RH turn to avoid the Typhoon. The Typhoon pilot then requested information on the KC135R, believing it to be civil traffic before advising him to expect an Airprox report from the KC135R flight. On asking the KC135R crew if they would be filing a report, they requested the LATCC(Mil) telephone number which he gave. He believed the ac closed to 500ft vertically and 2nm laterally before the Typhoon passed 1200ft over the KC135R. Later he learnt the Supervisor received calls from both crews after his shift had ended.

BM SAFETY POLICY & ASSURANCE reports that this Airprox occurred at night on 4 Dec 12 between a KC135R operating IFR in receipt of a DS and a Typhoon operating VFR in receipt of a TS; both ac were receiving an ATS from LATCC(Mil) E TAC.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Both pilots reported VMC above and between cloud layers, with the Typhoon pilot operating on NVGs. E TAC reported medium to low workload with increasing task complexity and were providing ATS to a pair of F15s unrelated to the incident, in addition to the Typhoon and KC135R. All 3 of these 'speaking units' were operating on separate frequencies, with the Typhoon and F15 formation requiring 'discrete' frequencies; consequently, although frequency 'cross-coupling' was available to E TAC, it was not utilised.

The incident sequence commences at 1945:51 as the KC135R crew advised E TAC that they were, "*ready for descent*" and were instructed to descend to FL80. At this point, the KC135R is 69·8nm ENE of Mildenhall, tracking WSW'ly at FL260; the Typhoon is manoeuvring 12·7nm SW of Mildenhall indicating FL102; the unrelated F15 flight was manoeuvring between 13-20nm E of Mildenhall. The Typhoon is operating in an altitude block of 5000-19500ft on the RPS of 996hPa, thus the SSR Mode C of FL102 equates to an altitude of approximately 9690ft. Prior to the start of the incident sequence, at 1945:00, E TAC had taken a pre-note from ScATCC(Mil) on an unrelated GR4 transiting to RAF Marham. During this pre-note, E TAC increased the range on their surveillance display to 108nm and re-centred the display to enable scanning of the airspace to the NW of L975; the surveillance display was centred just N of the eventual point of confliction. E TAC had also selected 1min 'vector predict' lines, a tool which predicts the position and, if the option is selected, the level of all ac on the surveillance display. E TAC's surveillance display remained in this configuration throughout the incident sequence.

At 1949:00, the KC135R's clearance to descend was amended to FL60; at this point, the KC135R is 33·6nm ENE of the Typhoon, descending through FL184. At 1949:07, having previously ascertained the type of ATS that the KC135R crew would require on leaving the Upper Air, E TAC applied a DS which was read back by the crew. At 1949:14, E TAC initiated an exchange of RT with the Typhoon pilot requesting that for, "*coordination against traffic inbound to Lakenheath, are you happy to remain not below 9000 feet 996*?" The Typhoon pilot replied at 1949:30, "*copied, not below 9000 feet on 996*." 9000ft on the RPS of 996hPa equates to 9510ft on the SAS of 1013·2hPa. At this point, the KC135R is 30·4nm ENE of the Typhoon, descending through FL165. In their DASOR, E TAC reports that they asked the Typhoon whether they were "*happy to remain not below 9000 feet 996*" having assessed the KC135R's RoD. The LATCC(Mil) radar replay system enables an investigator to see a replica of the controller's surveillance display at the time of the incident. Analysis of the data for this Airprox demonstrated that E TAC did not utilise the 'predict vector' tool to assess the KC135R's RoD and the potential for conflict with the Typhoon.

At 1950:04, E TAC 'hooked' both the Typhoon and the KC135R and established a 'range and bearing line' between them; this line was left in place throughout the remainder of the incident sequence. Between 1950:23 and 1950:40, E TAC was involved in an exchange of RT with the unrelated F15 formation, elements of which were operating 3·4nm NW and 6·1nm W of the Typhoon respectively. The KC135R continues to track WSW'ly, descending through FL144, 22nm ENE of the Typhoon; the Typhoon has begun to track ENE'ly and is indicating FL114, approximately 10890ft on RPS 996hPa. At the start of this RT exchange, the GR4 pre-noted to E TAC by ScATCC(Mil) is approximately 125·3nm NW of the impending CPA and had begun to squawk the SSR 3A code assigned to it by E TAC during the pre-note. It is shortly after this RT exchange that the additional landline exchanges with Boulmer CRC and ScATCC(Mil) reported by E TAC occurred; however, E TAC's recollection of these calls was incorrect. At 1950:44, the ScATCC(Mil) line began to ring and, although E TAC may have initially 'clicked in' to the call, the call was answered at 1950:50 by the Planner, who accepted the handover of the GR4; the handover concluded at 1951:13. At 1950:49 the Boulmer CRC line began to ring and was answered by E TAC at 1950:55, accepting a pre-note on unrelated traffic that was part of a package of around 20 ac (reported as circa 30 by E TAC); the pre-note concluded at 1951:30. At this point, the lead elements of that package were approaching the S edge of EGD 323B, transiting S.

Analysis of the LATCC(Mil) radar replay data for this Airprox shows that at 1951.12 the KC135R is 12nm ENE of the Typhoon; the 1min 'predict vector' lines on both ac indicates that approximately 2nm lateral separation would exist at the CPA 1min later, with the KC135R passing N of the Typhoon. The KC135R's data block reads FL120 descending to FL60 and the 1min 'predict vector' reads FL94; the Typhoon's data block reads FL116, manoeuvring in the block to FL200, the 1min 'predict vector' indicates FL116. In essence, the 'predict vector' line shows that the KC135R will not reach FL80 or below, before the lateral separation breaches the deconfliction minima and thus E TAC's deconfliction plan was unachievable. At 1951:22, lateral separation between the Typhoon and KC135R closes to 10·5nm and thus represents the approximate point at which the Typhoon pilot detected the KC135R on his AI radar. The KC135R is descending through FL115, the Typhoon is continuing to track ENE'ly, indicating FL116. Up to this point, the KC135R has averaged approximately a 2600fpm ROD but the ROD then begins to reduce markedly, reaching approximately 830fpm at 1951:43.

At 1951:44, the KC135R crew advised E TAC, "*we have contact with traffic in our 12 o'clock, 500 high*." The KC135R is 6·5nm NE of the Typhoon indicating descent through FL111, the Typhoon is indicating FL114 (equating to approximately 10890ft on 996hPa), tracking NE'ly having turned at 1951:28. At 1951:47, the KC135R's ROD begins to increase, achieving approximately 3600fpm by the time of the CPA. E TAC replied, *"(KC135R c/s) apologies, affirm, that's a Typhoon 500 feet above. Expedite descent through FL80*" which was acknowledged by the KC135R's crew, who added, "*also got him showing descent. We're deviating right of course*." Up to this point, the KC135R had received no TI from E TAC with regards to the Typhoon. As the KC135R crew's call was acknowledged by E TAC at 1952:07, the radar replay shows the KC135R initiating a gentle turn to the R as it descends through FL101, 2·8nm NE of the Typhoon; the Typhoon is indicating FL111, maintaining its NE'ly track.

CAP 413 Chapter 5 Section 1.6.4 states the phraseology to be utilised 'when the controller considers that an imminent risk of collision will exist if action is not taken immediately'. In this example, instructions such as '(KC135R c/s) avoiding action, expedite descent through FL80' or 'descend immediately FL60', followed by essential TI would have been expected.

Immediately following E TAC's acknowledgement of the KC135R crew at 1952:05, the unrelated Marham GR4 called on handover, 114·7nm NW of the impending CPA. E TAC did not have an opportunity to respond to the Marham GR4 however, as the Typhoon pilot then called them, "*requesting location of the traffic*?" Up to this point, the Typhoon pilot had received no TI from E TAC with regards to the KC135R. At 1952:15, as E TAC advises the Typhoon flight, *"(Typhoon c/s) apologies, FL100 descending*", the Typhoon is observed on the radar replay commencing a tight R turn onto a NE'ly track. The KC135R is 1·2nm NNE of the Typhoon descending through FL95, the Typhoon is indicating FL107 (10190 ft on RPS 996hPa).

The CPA occurs at 1952:22 as the Typhoon passes 0·9nm SE of the KC135R which is indicating descent through FL92, the Typhoon indicating FL105 (approximately 9990ft on RPS 996hPa) and in a L turn.

With the benefit of good VMC, AI radar and TCAS, both the Typhoon pilot and the KC135R crew were able to visually acquire the other's ac and took decisive action to break the confliction; however, this was achieved in the absence of TI and, in the case of the KC135R deconfliction advice, which both crews had an expectation of receiving.

Based on the information presented by the 1min 'vector predict' function, it was clear from 1951:13 that the deconfliction plan put in place by E TAC at 1949:14 would not be effective. Moreover, whilst E TAC had expanded the range of the surveillance display to better encompass the airspace to the NW of L975, the area of the CPA remained at approximately the centre of the display and the depiction of the incident geometry was still relatively clear. Given this and the lack of TI and/or deconfliction advice from E TAC, it is clear that they were either not monitoring the progress of the Typhoon and KC135R, or were not fully assimilating the information presented to them. E TAC stated in their DASOR that they had became distracted by landline calls from Boulmer CRC and ScATCC(Mil) and the package transiting the EGD323 complex; however, it is reasonable to argue that the most significant distracting factor was the 'unfortunate' timing of the handover from ScATCC(Mil) of the transiting GR4 and the pre-note from Boulmer CRC, as this would have directed E TAC's attention some distance away from the developing situation. Consequently, although E TAC had a plan to deconflict the KC135R and the Typhoon, they did not monitor either the Typhoon's position or the KC135R's ROD, to ensure that the plan could be achieved. Once the Typhoon began to track NE'ly, closing the lateral separation between it and the KC135R, E TAC's deconfliction plan became unachievable. As the LATCC(Mil) Examining Officer has identified, an enhancement to E TAC's plan would have been to have restricted the Typhoon's movement to the E. That said, it is reasonable to suggest that even with such a restriction, a base altitude of 9000ft on RPS 996hPa left little room for error; a better option may have been to have requested a higher base altitude.

The crews of the KC135R and Typhoon were able to discharge their responsibility to "see and avoid" each other to resolve this conflict in Class G airspace; however, this was achieved in the absence of TI and deconfliction advice from E TAC.

HQ AIR (OPS) comments that it is clear that in this case TCAS aided the KC135's crew to gain visual and their 30° turn helped to increase the time available for avoiding action; a timely breakaway by the Typhoon ultimately resolved the issue but it would not have been necessary if the de-confliction plan by ATC had been better. There have been a number of cases in recent months where information provided on traffic by LATCC(Mil) controllers working traffic in that sector has not been effective, perhaps it is time to consider whether the LATCC(Mil) manning for that sector is appropriate.

HQ USAFE UK comments that, amongst others, 2 points arise from this Airprox. Firstly, that forward planning is a vital controlling skill but it should not dominate to the detriment of those ac already in receipt of a service. Secondly, there are pros and cons to controlling with predict vectors selected on permanently; on the one hand, they are an additional aid to spotting and resolving conflictions in busy circumstances but on the other, they create additional clutter on the radar display. In this case, the pros of using predict vectors were negated as the information provided was seemingly overlooked.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members agreed with the BM SPA Advisor's summing up of the incident. E TAC had formulated a plan to deconflict the subject ac by restricting the Typhoon to a level more than 1000ft above the cleared level of the descending KC135. However, with no further restrictions/limitations placed on either ac the successful outcome of the plan was predicated on E TAC monitoring the situation to ensure the ac were performing in accordance with his intentions. Although E TAC had selected prediction vectors, he did not assimilate the deteriorating situation when the Typhoon manoeuvred to the NE towards the descending KC135R. Having selected an expanded range on his radar display to search for a GR4, which would be handed-over from ScATCC(Mil), he apparently became distracted with the handover and a pre-note from Boulmer CRC on exercise traffic about to depart EGD323B. This was to the detriment of the KC135R and Typhoon, both of which were under an ATS from E TAC to enhance their SA within Class G airspace. Having agreed a service contract with both flights, both crews were poorly served by E TAC. It was clear to Members that E TAC had not fulfilled the requirements of a DS for the KC135R crew and did not provide TI to the Typhoon pilot under a TS and these were the causal factors in the Airprox.

The KC135R crew were concerned when they noted the approaching Typhoon on TCAS without receiving any deconfliction advice. They noted the height differential and, after visually acquiring the Typhoon, elected to increase their ROD and turn R 30° before informing TAC E of the Typhoon's proximity; E TAC acknowledged the

call with TI and an instruction for the crew to expedite their descent. The Typhoon pilot had seen the KC135R on his AI radar about 2min after agreeing to maintain above 9000ft and going heads-in for a short while. On looking up he was undoubtedly concerned when, in the belief he had been de-conflicted, he could see the ac closing into confliction in his 1 o'clock without any TI from E TAC. The HQ Air Member commented that the Typhoon pilot's perception of geometry and separation would have been difficult to gauge owing to the characteristics of NVGs. After a short delay, when the GR4 flight made initial contact, the Typhoon pilot called E TAC requesting the position of the traffic and was told it was FL100 descending. During this RT exchange he broke away to the R before passing behind the KC135R, estimating 4000ft slant range separation at the CPA. The radar recording had shown the ac passing 1300ft vertically and 0·9nm horizontally at the CPA. Although it was disappointing that ATC had not provided the agreed service to either flight, the KC135R crew and the Typhoon pilot had discharged their responsibilities to see and avoid which was enough for the Board to conclude that their combined actions had been effective in removing any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

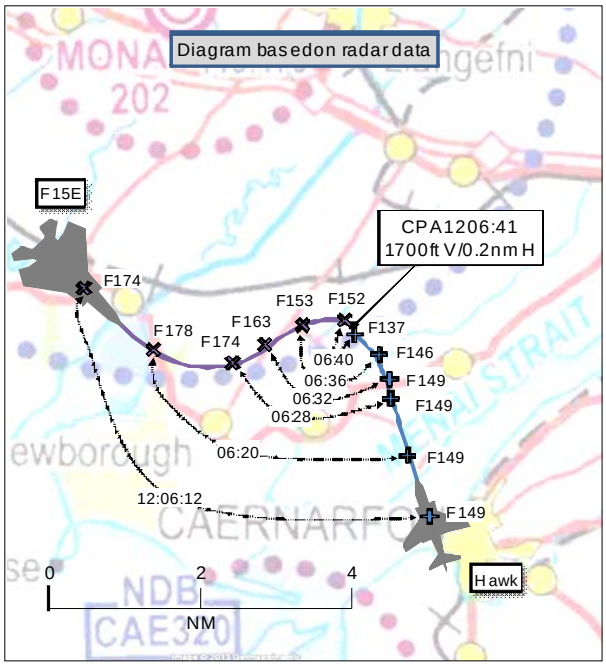
Cause: LATCC(Mil) TAC E did not fulfil the requirements of a DS for the KC135R crew and did not provide TI to the Typhoon pilot.

Degree of Risk: C.

AIRPROX REPORT No 2012170

AIRPROX REPORT NO 2012170

Date/Time:	28 Nov 2012 1207Z	
Position:	5311N 00418W (RAF Valley 120°/9nm)	
Airspace:	Valley AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk 2	F15E
Operator:	HQ Air (Trg)	Foreign Mil
Alt/FL:	15000ft	15000ft
	RPS (1015hPa)	RPS (NR)
Weather:	VMC CLAC	VMC NR
Visibility:	40km	30km
Reported Separation:	0ft V/1500ft H	0ft V/500m H
Recorded Separation:	1700ft V/0.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T MK 2 PILOT reports leading a 2 ac formation, setting up for a basic radar intercept sortie, on CAP as a singleton in the NW of the over-land part of the Welsh MTA, initially at position 53 05N 004 15W. The other formation member was simulating a hostile ac with both ac using a datum split [initial separation] of 50nm along the 150° radial from RAF Valley. He was operating under VFR in VMC without an ATS. The black ac had navigation lights, nose light and HISLs selected on. The SSR transponder was selected on with Modes A and C and the ac was fitted with an ACAS. On departure from RAF Valley, 'Valley Radar' informed him that there were multiple contacts in the operating area above 20000ft. The formation was not going to go above 20000ft before speaking to an ATC agency and both ac went en-route. In accordance with the squadron SOP, he selected the deconfliction frequency for the Valley Air Training Area (VATA) on his 'main' radio and formation operating frequency on his 'back' radio; the number 2 pilot contacted London Mil on his 'main' radio, selected the formation operating frequency on his 'back' radio, and the formation members separated to generate the required 50nm split range. The number 2 pilot agreed a TS with London Mil and obtained squawks for both ac. The formation leader commenced his CAP orbit with a London Mil squawk but without an ATS, TI being passed by the number 2 pilot. Seven F15s were conducting training in the MTA and the number 2 pilot was initially passed TI that 'all the traffic was above 20000ft'. Whilst in his CAP orbit, the formation leader received a TCAS warning of Traffic 2500ft above, descending within 5nm of his position. He became visual with an F15 at 4nm range in his L 11o'clock position, in a descending RH turn and took avoiding action by descending to the L. He estimated the separation was approximately 1500ft H. During this event, the number 2 pilot was passed TI that the [F15] contacts were all changing height down to 9000ft in his position and the formation leader's position. He terminated any further training in the Welsh MTA due to high traffic density and moved to an adjacent danger area.

He assessed the risk of collision as 'Medium'.

THE F15E PILOT reports that a flight of 4 F15Es were operating in the Welsh MTA for a Surface Attack Tactics training mission, attacking simulated targets at RAF Valley. He was operating under VFR in VMC with a TS from 'London Mil'. The dark grey ac had position lights and flashing red anti-collision beacon selected on. The SSR transponder was selected on with Modes A, C and S. The ac was not fitted with an ACAS. He was operating in the altitude block 9000-40000ft, using the lowest RPS for the NWMTA, coordinated with a flight of 3 F15Es [the non-factor formation to the S]. At approximately 1205 the F15E formation completed a simulated target attack and turned SE to prepare for another attack. The formation members were all at or above altitude 17000ft after the turn. At approximately 12:06:15, the formation simulated a surface-to-air system targeting [F15E (4)] from the SW

at a range of 10nm. At 12:06:25, [F15E (4)] pilot began a descending LH turn to the N in response to the simulated threat. At 12:06:39, the crew of [F15E (4)] saw a Hawk ac passing 500m H from, and level with them in their R 3o'clock position. He terminated the defensive manoeuvre to deconflict from the Hawk. He stated that no other formation members saw or detected the Hawk before this point. He stated that it was apparent from a subsequent review of ac recorded data that London Mil had attempted to pass TI to the formation when the Hawk was approximately 5nm away. Only one formation member had heard the TI, which was concurrent with the simulated threat call RT to [F15E (4)].

He assessed the risk of collision as 'Medium'.

He also stated that the F15E squadron members would continue to request a TS when conducting general handling and that techniques on clearing flight paths before aggressive manoeuvres, like the defensive training that led to this incident, would be emphasized. Additionally, RT contact, both within the formation and with London Mil, would be emphasized such that if one formation member heard TI, the formation would terminate manoeuvres until the TI was resolved. They would also attempt to work with RAF Valley to determine which area frequencies were used, in order to monitor or pass advisory calls to other airspace users, in a similar fashion to the Low Flying System Advisory Frequency.

He reported that the Valley ATA, Welsh MTA, and Valley AIAA areas overlap on the British Isles En Route Low Altitude Chart, UK(L)2, in such a way that is difficult to discern where one airspace ends and another starts both laterally and vertically.

[UKAB Note(1): The RAF Valley weather was reported as follows:
METAR EGOV 281150Z 36011KT 9999 FEW025 07/00 Q1019 BLU NOSIG
METAR EGOV 281250Z 01011KT 9999 FEW028 BKN035 07/00 Q1019 BLU NOSIG]

BM SAFETY POLICY AND ASSURANCE reports that this Airprox occurred in VMC on 28 Nov 12 between a Hawk (1) and an F15E (4). Hawk (1) was operating under VFR within Valley Aerial Tactics Areas (VATA) East, without an ATS, as part of a formation of 2 Hawks, with Hawk (2) in receipt of a TS. F15E (4) was operating under VFR within the North Wales Military Trg Area (NWMTA), as part of a 4-ship formation of F15Es in receipt of a TS. Both formations were receiving an ATS from LATCC(Mil) W Tac. All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Information

The Mil AIP, ENR 5-2-18 Para 9.1, states that the NWMTA has 'been established within Class C airspace to provide military ac with the operational freedom to manoeuvre, without the requirement for the provision of a RCS. Although the airspace is intended for autonomous activity, a DS, TS or BS may be requested from the military ATCC'. The vertical boundaries of the NWMTA are FL195-FL660 (see Figure 1). The RAF Valley FOB states that deconfliction between 4FTS traffic within the NWMTA but outside of the VATAs 'is to be achieved by either requesting a TS or DS or by free-calling the [4FTS] deconfliction frequency'.

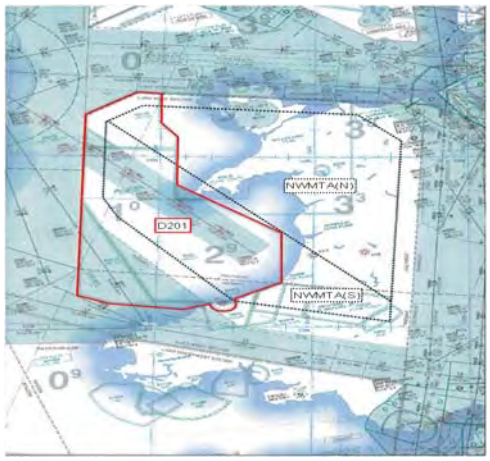


Figure 1: Depiction of NWMTA and D201

The RAF Valley FOB states:

'the northern part of the NWMTA is divided into 2 areas by the VYL 180° radial: VATA East and VATA West (see Figure 2). The VATAs provide a degree of autonomy from other 4FTS users and may be activated by formations conducting Air Defence training or other high energy manoeuvring. However, aircrew should be aware that the VATAs are a local arrangement only and sit within Class G airspace and that other, non-4FTS traffic, may be encountered within them.'

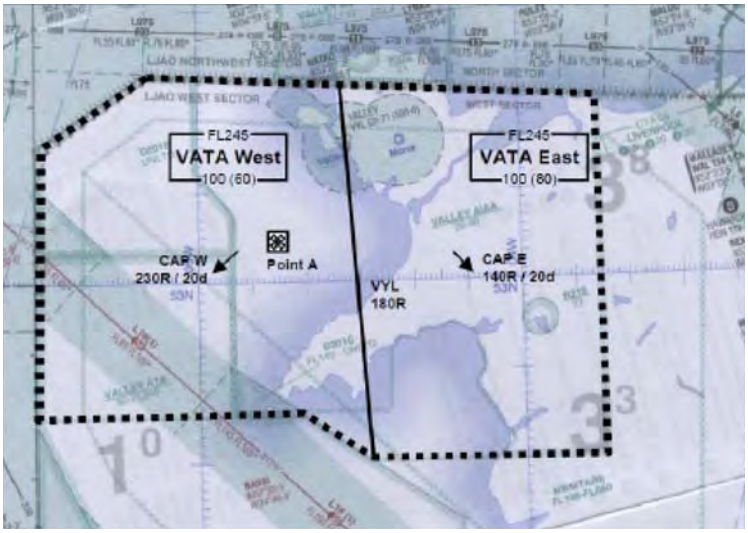


Figure 2: Depiction of VATAs

The FOB further states:

'Since the VATAs are within Class G airspace several other users may be encountered within them. Not all of these users will be receiving a service from either Valley or London Mil. Whilst deconfliction against such traffic is not possible in the MTA unless Valley aircrew are in receipt of a TS or DS, Valley ATC will nevertheless inform Active VATA users of any traffic that is known to be within the lateral and vertical limits of that VATA. Such traffic will include those in receipt of a service from Valley, have been identified by Valley SSR but not in receipt of a service, or have contacted Valley informing of their intention to operate within an active VATA ie 'known' traffic. This information will be passed by ATC on the [the 4FTS] formation frequency as soon as it is safe to do so.'

The pilot of Hawk (1) reported that 'In accordance with…Sqn SOPs…Hawk (1) [was] holding the deconfliction freq for VATA on the main radio and formation frequency on the back radio. Hawk (2) contacted London Mil on the main radio and formation freq on the back radio'. The RAF Valley FOB states that 'During routine training flights from RAF Valley, the Hawk T2 will normally use Comm 1 for ATC and deconfliction and Comm 2 for intra-formation communication'.

Throughout the incident sequence there was a confused mixture of callsigns used by the Hawk Formation and W Tac to refer to the Hawks. In terms of this report, where reference is made to Hawk (1)'s or Hawk (2)'s C/S, it refers to the individual ac's C/S; where reference is made to the Hawk formation's C/S, it refers to both ac. For example, if RIPSAW 1 was Hawk (1)'s C/S, RIPSAW 2 would be Hawk (2)'s C/S and RIPSAW would be the formation C/S. Analysis of the RT has determined that whilst the only voice on the RT from the Hawk formation was that of the pilot of Hawk (2), he used the formation C/S, Hawk (1)'s C/S and his own C/S.

The LATCC(Mil) W and SW positions were 'band-boxed' and manned by the W Tac trainee and an instructor, with an experienced controller operating as a Planner. At the time of the incident, although a 'multi-tourist', the trainee had completed around 50% of the trg toward their first Area endorsement following graduation from the Area Radar Training Course (ARTC). Whilst the W and SW Tac positions were separate, they routinely operate 'band-boxed' due to traffic levels. The W Tac instructor reported that workload was high and that the task complexity was 'very difficult'. The Planner reported that their workload was low and that the task was undemanding, relating that 'the majority of the workload was RT related'. At the start of the incident sequence, W Tac was providing ATS

to 2 formations of F15Es on a discrete UHF; the 4-ship incorporating the incident F15E was operating as 2 pairs, SE of Valley in the vicinity of Caernarfon, and a 3-ship was operating as a pair and a singleton, E of Aberporth and to the N of L9 and UL9.

Prior to the start of the incident sequence, Hawk (1) and Hawk (2) had been in communication with Valley RAD, asking, at 1158:27, whether there was, "*any further traffic to affect*?" RAD replied that there were, "*multiple London tracks, flight level 2-3-0 and above manoeuvring*" which was acknowledged by the Hawk formation, advising RAD that they would, "*be going free-call for an agency once we get to that height*." The Hawk formation left RAD frequency at 1158:42.

The incident sequence commenced at 1202:21 as Hawk (2) free-called W Tac on the W ICF using his individual C/S. At this point, Hawk (2) was 22.6nm SE of Valley, tracking SE'ly, indicating FL130. Hawk (1) was 8.6nm N of Hawk (2), tracking NW'ly, indicating FL140. The incident F15E formation were operating between 7.1nm and 9.2nm NE and ENE of Hawk (1), tracking SSW'ly, indicating between FL206 to FL212. The unrelated F15E formation was 69.3nm S of the incident F15E formation, tracking E'ly, indicating between FL259 and FL287 within the NWMTA. Figure 3 depicts the incident geometry at this point.

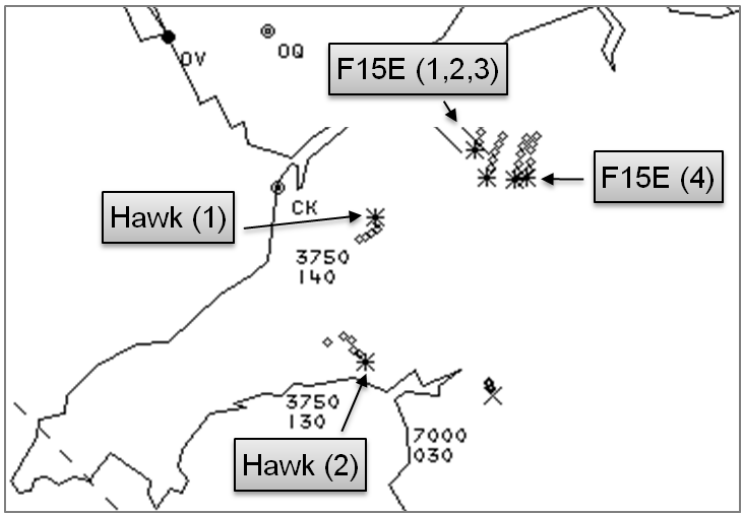


Figure 3: Incident Geometry at 1202:21.

W Tac replied to Hawk (2) requesting him to, "*pass your message*" and Hawk (2) advised, "*Now* [Hawk formation C/S], *2 Hawks operating North Wales MTA, er looking to maintain a Traffic Service with yourselves, FL100 to FL300 for 3-0 mikes."* It has not been possible to determine whether W Tac perceived the changed C/S by detecting the pause between the use of the formation C/S and the number of ac in the formation. W Tac then acknowledged Hawk (2) instructing him, "[Hawk (2) C/S] *Squawk 3-3-4-0, what type of service do you require*?" Hawk (2) pilot acknowledged the squawk and re-iterated his request for a TS, responding using the formation C/S. Shortly afterwards, at 1203:00, Hawk (2) pilot transmitted, "*Er London,* [Hawk Formation C/S], *request a squawk for* [Hawk (1) C/S] *but they won't be on frequency*." W Tac replied, "[Hawk (2) C/S] *roger, 3-3-4-1*" which was acknowledged by Hawk (2) pilot, erroneously using Hawk (1) C/S. During this exchange, at 1203:04, the SSR3A code assigned to Hawk (2) was displayed on W Tac's surveillance display changing from 3750, as depicted in Figure 3, to 3340.

Immediately after Hawk (2) pilot's acknowledgement of the squawk for Hawk (1), W Tac advised, at 1203:18, "[Hawk (1) C/S] *identified, Flight Level 1-3-0, Traffic Service*." However, whilst W Tac had utilised Hawk (1)'s C/S, he had identified Hawk (2) as it was Hawk (2) that was maintaining FL130 and Hawk (1) had not yet begun to squawk the assigned SSR3A code. Hawk (2) replied at 1203:24, "*sorry, stepped on, say again for* [Hawk formation C/S]" and again at 1203:31, "*London* [Hawk formation C/S] *say again*." W Tac replied at 1203:33, "[Hawk formation C/S] *identified Traffic Service, confirm Flight Level 1-3-0*?" Although live-mic recording was not available, given W Tac's transmissions at 1203:18 and 1203:33, it is likely that the delay in W Tac replying to Hawk (2) was that his instructor had prompted him to verify Hawk (2)'s level, rather than assume that the displayed SSR Mode C information was correct. Hawk (2) pilot confirmed that he was at FL130 and advised W Tac that the formation were, "*looking to work in the block Flight Level 100, Flight Level 300*." W Tac then replied, using Hawk (1)'s C/S, instructing the [Hawk (2)] pilot to, "*manoeuvre as required between FL100 and FL300, report 1 minute to*

completion. Be advised there's 7 F-15s operating within the North Wales M-T-A." This was acknowledged by Hawk (2) using the formation C/S. At this point Hawk (1) pilot had not commenced squawking the SSR3A code assigned to him and was 9.3nm WNW of F15E (4) and 25.7nm NNW of Hawk (2). Figure 4 depicts the incident geometry at this point.

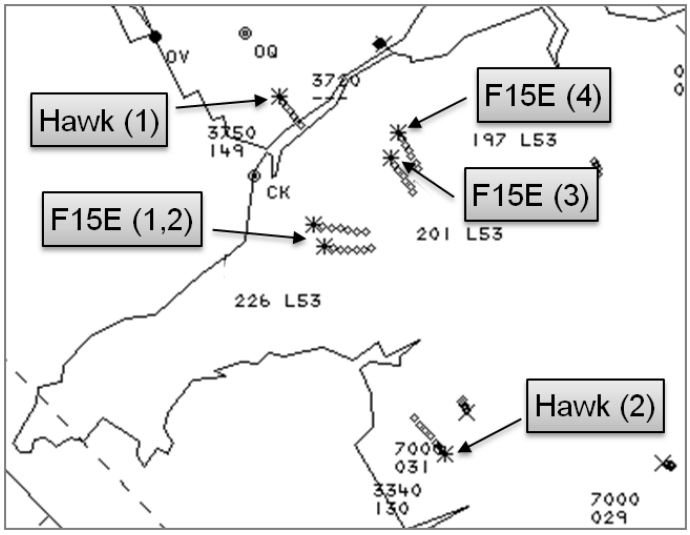


Figure 4: Incident Geometry at 1203:43.

Hawk (1) pilot began to squawk his assigned SSR3A code at 1204:36; however, an ATS was not applied by W Tac and the electronic flight strip was not amended to suggest that it had been placed under a service. At 1205:10, W Tac asked, "[Hawk Formation C/S] *would you be happy to manoeuvre within Delta 2-0-1 if I can arrange it, to remain clear of the F15s*?" The position of EGD201 is depicted in Figure 1. At this point, F15E (4) was 10.8nm N of Hawk (1), tracking W'ly, indicating FL193; Hawk (1) was tracking SSE'ly, indicating FL151. Hawk (2) replied, "*er* [Hawk formation C/S] *whereabouts are they operating*?" W Tac advised, "[Hawk formation C/S] *they'll be operating all over. They're currently split between the north and south but they will be er tracking back in*." Initially, Hawk (2) pilot acknowledged this information then added at 1205:33, "*er* [Hawk formation C/S] *I'll only be operating a further 5 miles south of here*." W Tac replied, "*roger, if you're happy you can manoeuvre there, then I'll keep you informed of traffic as it becomes relevant*" which was acknowledged by Hawk (2) pilot. This exchange of RT finished at 1205:46 and W Tac engaged in no further recorded communication until 1206:16.

At 1206:16, transmitting on both the Hawk and F15E formation's frequencies, W Tac trainee attempted to provide TI to the N'ly F15E formation on Hawk (1); however, quoting the W Planner, the trainee 'stumbled' over his phraseology, prompting the instructor to step in. The instructor stated, "[F15E formation C/S] *Hawk west…east 2 miles, manoeuvring, Flight Level 1-5-0, operating in the block Flight Level 300 Flight Level 100*", which was acknowledged using the F15E formation C/S. However, based on the F15E formation's report, it was not the formation leader who acknowledged the TI, a point that will be examined later. At the time the W Tac trainee attempted to pass TI, F15E (3) and F15E (4) were 4.5nm and 4.8nm respectively NW of Hawk (1), tracking SE'ly, indicating FL180 and FL175 respectively. As the instructor passed TI to the F15E formation, at 1206:28, F15E (4) turned left approximately 30° introducing the confliction with Hawk (1), 2.3nm ESE of him. At 1206:36, F15E (4) turned left approximately a further 45° and commenced a rapid descent, further reducing the separation on Hawk (1). This detail can be seen in Figure 5. Extrapolation of the radar data demonstrated that approximately 2.1nm lateral separation would have existed between Hawk (1) and F15E (4), prior to this manoeuvre. Immediately after the F15E formation's acknowledgement of the TI, the W Tac instructor replied to an unrelated free-calling ac on the SW ICF, instructing them to, "*standby*". The CPA between Hawk (1) and F15E (4) occurred between radar sweeps at approximately 1206:42 as F15E (4) crossed 0.2nm L to R through Hawk (1)'s 12 o'clock. Figure 5 depicts the incident geometry at 1206:39 at the radar sweep immediately prior to the CPA. In the radar sweep immediately after the CPA, at 1206:43, the F15E is shown having made a tight R turn through 45° towards Hawk (1), indicating FL153. Hawk (1) was indicating FL135, after his 'avoiding action…descending to the left'; Figure 6 shows this detail with the flight path of F15E (4) highlighted in red and that of Hawk (1) highlighted in blue.

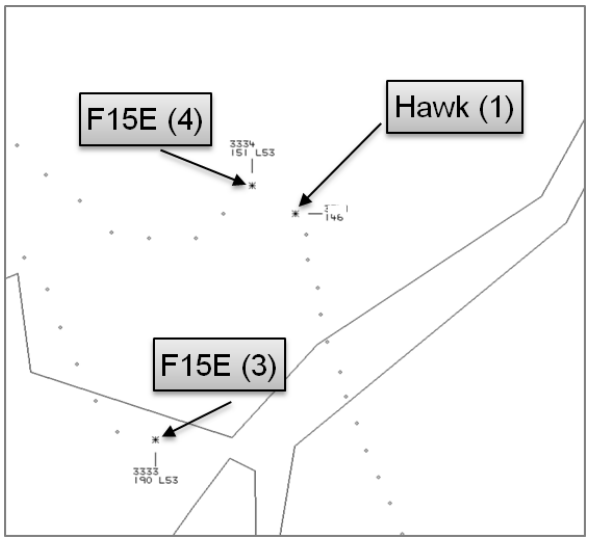


Figure 5: Incident Geometry at 1206:39 immediately prior to the CPA.

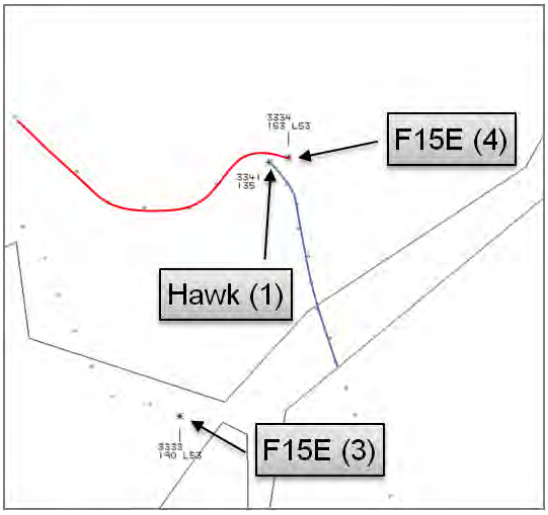
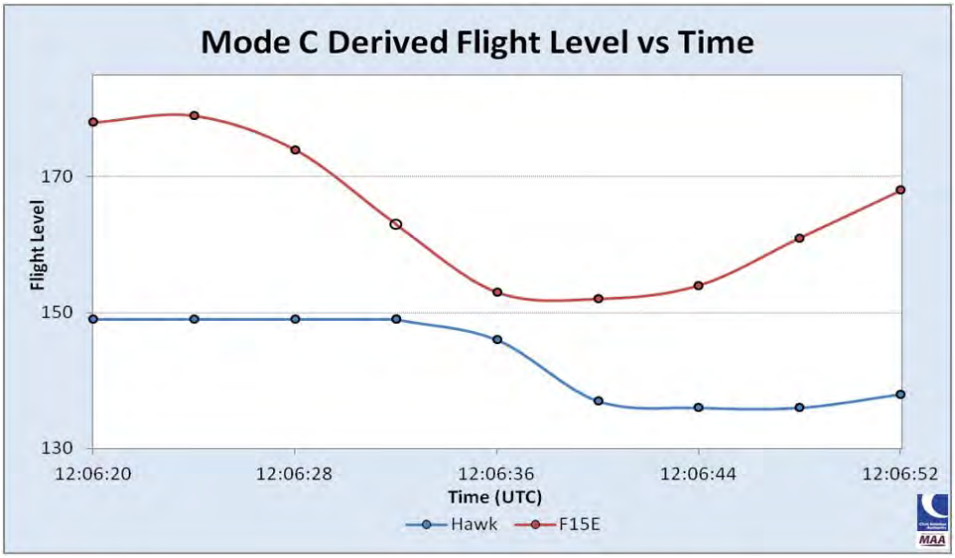


Figure 6: Incident Geometry at 1206:43 immediately after the CPA.

[UKAB Note(2): The vertical profile of the encounter, derived from Mode C data, is shown below:



Note that the F15E Flight Level is interpolated between 12:06:28 and 12:06:36 as its RoD exceeded the surveillance system parameters for processing height readout.]

The guidance material contained within CAP774 Chapter 3 Para 5 states:

'Controllers shall aim to pass information on relevant traffic before the conflicting aircraft is within 5nm, in order to give the pilot sufficient time to meet his collision avoidance responsibilities and to allow for an update in traffic information if considered necessary.'

Although the regulation states that 'high controller workload and RTF loading may reduce the ability of the controller to pass traffic information, and the timeliness of such information', no reduction in the ATS was applied by W Tac.

The F15E formation reported that 'only one ac actually heard the radio call [the TI from W Tac]. This was around the same time that F15E (1) was transmitting a simulated threat call to F15E (4). It is reasonable to argue that the timing of the 'simulated threat call' explains the manoeuvring conducted by F15E (4) between 1206:28 and 1206:36. Following this Airprox, the F15E Sqn stated that 'they will emphasise techniques on clearing flight paths before aggressive manoeuvres like the defensive manoeuvre that led to this incident'.

Immediately after instructing the unrelated ac free-calling the SW ICF to, "*standby*", at 1206:54, the W Tac instructor transmitted to the Hawk formation, "*4 F15s south west of you in your current location, in the block Flight Level 9-0 Flight Level 4-0-0, indication Flight Level 1-8-5*." At this point, F15E (4) was 2.2nm E of Hawk (1) tracking SE'ly indicating FL166; F15E (3) was 3.3nm S of Hawk (1) tracking E'ly, indicating FL193; F15E (1) and (2) were 9.3nm SSW of Hawk (1) indicating FL206 and 200. Although the TI was inaccurate, given the surveillance display range scale that W Tac would have required in order to monitor the W and SW AoRs, combined with the proximity of the F15E formation to Hawk (1), it is unlikely that W Tac would have been able to provide more accurate TI.

It has not been possible to determine the point at which W Tac detected Hawk (1)'s squawk; however, based upon the DASOR's submitted by the W Tac instructor and the Planner, it is clear that W Tac had not detected the conflict between Hawk (1) and F15E (4) prior to it being pointed out by the Planner. This might also suggest that W Tac had not detected Hawk (1)'s SSR3A code prior to this point. An argument which is lent weight by the W Tac instructor's report that he had assumed prior to the incident that Hawk (1) and Hawk (2) 'were in close formation', adding that he had become distracted by the proximity of the F15E 3-ship operating in the S of the area to L9, UL9 and EGD203 at Sennybridge. During the closing stages of the incident sequence, the F15E 3-ship operating in the S of the area was around 14nm W of EGD203 maintaining an orbit in which the S edge was around 8nm N of the lateral boundary of L9. The W Tac instructor stated that he passed TI to the F15E formation first as this 'was coherent to frequency set up at the time'. It is likely that W Tac had selected the F15E formation's discrete freq to transmit in case he was required to broadcast a warning to the S'ly formation of their proximity to L9/UL9 or EGD203.

Analysis

In terms of this incident as an Airprox, both Hawk (1) and F15E (4) pilots were operating in Class G airspace and were required to discharge their responsibilities for collision avoidance. Based on the available data, although the pilot of Hawk (1) had SA on the F15E through TCAS, he seemed to have visually acquired F15E (4) relatively late and shortly before 1206:39, given that his avoiding action is seen to take effect at this time. At this point, 0.7nm lateral separation existed, with 500ft vertical separation indicated. Based on the formation report, the pilot of F15E (4) appears to have visually acquired Hawk (1) at approximately the CPA. Moreover, the Airprox appears to have occurred following defensive manoeuvring from the F15E (4) pilot, in response to a simulated threat, which brought him into conflict with Hawk (1).

In terms of the ATM aspects of the incident, both the W Tac trainee and the instructor had become distracted such that they were unable to divide effectively their attention between all their ac; consequently, TI was provided late to the incident F15E formation and, given the intra-formation RT traffic, the TI was rendered nugatory. Although the Planner had stepped in to prompt the W Tac trainee and instructor, the intervention came too late to affect the situation given the likely lateral separation at that point, compounded by the trainee's 'stumbled' phraseology.

The question of provision of service to Hawk (1) pilot is more difficult. Given the generic nature of the warning passed by W Tac at 1205:10, BM SPA contends that, although Hawk (1)'s SSR3A code was visible from 1204:36, W Tac had not detected it by 1205:10 and was only monitoring Hawk (2) who was operating in clear airspace. Moreover, despite the trainee's erroneous transmission to Hawk (1) at 1203:18 and the whole formation at 1203:33, Hawk (1) was never formally identified and placed under an ATS. The basis of ATSOCAS is that pilots and controllers agree a 'contract' between them, based upon the Service Principles and the details of the specific ATS as laid down in CAP774. Whilst acting as a formation, the formation leader may agree a 'contract' with an ATCO on behalf of the formation; however, in this instance, the formation were split by up to 44nm and Hawk (1) pilot was not on frequency. Consequently, each element of the formation was required to have been identified separately and an ATS agreed between the pilot and W Tac. Implicit within that statement is that each ac in receipt of an ATS should be on the ATC frequency in use. That said, given W Tac's transmissions to the formation and that W Tac did not challenge Hawk (2) when he learned that Hawk (1) would not be on freq, the Hawk formation probably believed that both ac were in receipt of an ATS. Unfortunately, as previously stated, it has not proved possible to conclusively determine the point at which W Tac obtained 'track ident' on Hawk (1); subsequent to completing their DASOR, the W Tac instructor could only recall that it was spotted prior to TI being passed. As argued previously, it appears reasonable to suggest that the SSR3A code was sighted as the Planner identified the conflict to the Tac. However, what is clear is that the distraction that affected the ATS provision to the incident F15E formation would have similarly affected the monitoring of Hawk (1); thus W Tac was unable to provide an earlier, more specific warning to Hawk (1). Disappointingly, this distraction affected both the trainee and the instructor in equal measure. It is also reasonable to argue that the generic traffic warnings passed by W Tac to the Hawk formation could have included more specific detail to enhance the Hawk formation's SA; for example, expanding on the N/S split between the F15E formations to include range and bearing information.

Whilst neither causal nor contributory to the Airprox, BM SPA believes that the following observations identified in the conduct of this investigation are noteworthy.

Notwithstanding the issues over the 'ATS contract', the 'comms plan' presented to W Tac by the pilot of Hawk (2) appears convoluted. At best this arrangement could lead to a significant delay in the passage of time critical TI to the second ac; at worst, it could lead to inaccurate and potentially misleading information being passed. The RAF Valley FOB states that deconfliction between 4FTS traffic within the NWMTA but outside of the VATAs 'is to be achieved by either requesting a TS or DS or by free-calling the [4FTS] deconfliction frequency'; however, it states that within the VATAs, crews may either elect to receive a TS or DS or they will receive generic traffic warnings from Valley ATC. This latter arrangement is despite there being no agreed ATS between ATC and the 4FTS aircrews and has the potential to blur the boundary between autonomous ops and being in receipt of an ATS; an issue that was highlighted by both the SATCO and BM SPA as being unsatisfactory when it was introduced following Airprox 2011/134. These flying orders present aircrews with an 'either/or' arrangement; however, in this instance, the Hawk formation were attempting to conduct both activities in order, perhaps understandably, to achieve greater SA.

Operating in the 'band-boxed' position, given W Tac's task-load and the distribution of ac around the West AoR, BM SPA contends that W Tac was working at or very near capacity. Thus, it is unlikely that he would have had sufficient capacity to provide ATS to additional free-calling ac, in either the W or SW AoR. However, the Planner does not appear to have attempted to 'split' the control positions or to seek an additional Tac controller to increase sector capacity. Moreover, whilst the Supervisor reported being cognisant of the traffic loading on the 'band-boxed' position, he did not mention whether this was discussed with the Planner. This observation provides additional evidence to support 2 recommendations made to the RAF ATM Force Cmd. Firstly following the investigation of Airprox 2012/117, where a request was made to consider the requirement for LATCC(Mil) Planner endorsed personnel to be re-briefed on assessing task complexity, in addition to task load, when determining sector manning. Secondly, following the investigation of Airprox 2012/163, a request was made to review the practice of 'band-boxing'.

Conclusion

This incident resulted from a conflict of flight paths within Class G airspace that was resolved by the pilot of Hawk (1). Lack of TI to both the pilot of Hawk (1) and lack of timely TI to the incident F15E formation was a contributory factor in this Airprox, caused by controller distraction.

HQ AIR (TRG) comments that the conflict was due in large part to weakness in communication between the controllers and crews involved. It appears that neither party perceived the potential for a conflict, despite their efforts to maintain a TS. It should be emphasised that a TS provides no form of deconfliction as is suggested by the RAF Valley FOB extract, unless:

A controller 'goes the extra mile' to engineer it, as was attempted in this case with an offer to move to D201.

The crews perceive the potential for a conflict and arrange their own deconfliction with the other traffic directly.

Deconfliction is arranged through ATC.

By moving clear themselves.

By remaining in the airspace the crews accepted the collision avoidance responsibility but it appears in this case that they may not have perceived the full conflict potential, despite the controller's suggestion of an airspace move; they were not informed of the F15's operating block, other than Valley RAD's call that they were '230 and above', nor were they offered any direct TI for the reasons given in the report. More precise RT phraseology may well have painted the picture of the Hawk formation's disposition to the controller, enabling better TI to be passed. Equally, the controller's description of the disposition of the F15s did not convey the potential for conflict and this, coupled with the lack of a timely call of the F15s' operating block, created a false sense of security.

It has been suggested that a booking system for the NWMTA could be instigated but this presupposes that it is unacceptable to operate more than one formation in the area at any one time. In light of the relatively small number of issues in the MTA, and its potential to impact availability of the airspace to Valley traffic, this is not being pursued at present. There remain several options to get detail of other traffic in the MTA (or Overland Training Area) and the crews in this case were well aware of the other traffic, albeit once they had got airborne. A greater willingness to accept the suggested airspace change might have prevented this incident. The F15 unit have taken some useful lessons from this incident and hopefully have an increased awareness of the Hawk activity in the area.

The crews attempted to cover all bases with their communications plan but its complexity, and the imprecise use of phraseology and callsigns, rendered it ineffective. The option to use a GCI service should also be considered as a viable option to achieve a service on a single and discrete frequency. Such a service is normally preceded by a brief to the specific controller and should provide the greatest situational awareness for the formation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings and reports from the appropriate ATC and operating authorities.

Board Members considered the Hawk formation's communications plan was flawed. In trying simultaneously to comply with the Squadron SOPs and the RAF Valley FOB they achieved a radio configuration that denied them the service they were seeking. The Hawk (2) pilot's use of differing C/Ss further confused the issue, such that the LATCC(Mil) W Tac trainee Controller likely thought he was communicating with both Hawk formation members when in fact he was in RT contact with Hawk (2) pilot only. The Hawk formation leader's plan was to obtain ATSOCAS for both ac; however, they were separated by up to 44nm and he was not on frequency. Consequently there was little prospect of him obtaining timely TI, if any. ATC Members further opined that it is only feasible to provide a service to a formation member who is not on frequency if the formation ac are close together and not if formation elements have split. An attempt to do so in the latter case, by having a formation member relay TI, would only serve to increase risk. The Board concluded that the Hawk formation communication plan had been a contributory factor in the Airprox. Military pilot Members questioned why the Hawk formation were not using GCI control but also acknowledged that Air Surveillance And Control System (ASACS) provision was limited and subject to prioritisation, such that it may not be possible to provide GCI control regularly for RAF Valley sorties of this type. The USAFE Liaison Officer advised that UK-based F15 crews were also affected by the availability and prioritisation of ASACS resources. The Air Cmd Safety Policy and Assurance Advisor advised the Board that LATCC(Mil) were considering a request by RAF Valley for a dedicated service in the NWMTA; this development was welcomed by the Board.

The F15E formation was operating in the N of the NWMTA, with a separate but coordinated 3-ac F15E formation operating in the S. The N'ly formation was in receipt of a TS from the same controller with whom Hawk (2) was in RT communication. TI was passed to both formations before CPA but it did not include operating blocks and the Hawk formation had previously received information from Valley RAD that the F15Es were operating above FL230. The TI to Hawk (2) pilot crucially did not inform him of the true F15E operating block of FL90-FL400 until shortly after the CPA. The LATCC(Mil) W Tac trainee controller had earlier suggested, sensibly and proactively, to Hawk (2) pilot that the Hawk formation move W to D210 but without accurate block information the Board opined that Hawk (2) pilot did not perceive there to be a potential confliction issue and that the Hawk formation pilots were operating in the mistaken belief that the F15E formation would remain above FL230. The Hawk operating block of FL300-FL100 was passed to the F15E formation some 20sec before CPA but it transpired that this was as the formation was reacting to a simulated threat, transmitting on the discrete formation frequency, and did not increase formation SA in time to avoid the incident. The LATCC(Mil) W Tac trainee and instructor controllers did not pass specific TI to Hawk (2) pilot prior to CPA and could not pass TI to Hawk (1) pilot directly. The Board opined they probably became aware of Hawk (1) pilot's location shortly before CPA, but by then had insufficient time to pass TI to him, via Hawk (2) pilot. The Board concluded that the lack of adequate TI to both formations had been a contributory factor in the Airprox.

The LATCC(Mil) W Tac trainee controller and instructor were operating bandboxed W and SW positions with 'high' workload and 'very difficult' task complexity reported by the instructor. The experienced Planner reported the task complexity to be undemanding with the majority of the 'low' workload due to RT. ATC Board Members opined that this disparity in perceived work load was indicative of the Planner not being aware of the Tac controllers' level of concern over the proximity of the S'ly F15E formation to the airways and Danger Area and responsible for his consequent late intervention to indicate the impending Hawk and F15E confliction. The Board agreed with the military ATC analysis that the W Tac trainee and instructor controllers were distracted by the proximity of the S'ly F15E formation to the L9/UL9 airways and D203 and that this had degraded their capacity to control the situation in the N of the area.

The F15E and Hawk formation members were all operating in class G airspace with equal responsibility to 'see and avoid'. The geometry of the conflicting ac flight paths prior to CPA indicated that Hawk (1) pilot had right of way. Hawk (1) pilot was warned of the proximity of F15E (4) by his TCAS and saw it at an estimated range of 4nm, in his L 11 o'clock. He was thus well-placed to take avoiding action. F15E (4) pilot did not see Hawk (1) until it was in his R 3 o'clock position, which was too late to take avoiding action. The Board concluded that the Airprox was caused by the F15E crew's effective non-sighting but that the Hawk pilot had taken effective and timely action to prevent the ac colliding.

[Post meeting note: Director UKAB has undertaken to write to AIDU about the depiction and clarity of the airspace boundaries of the NWMTA]

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the F15E crew.

Degree of Risk: C.

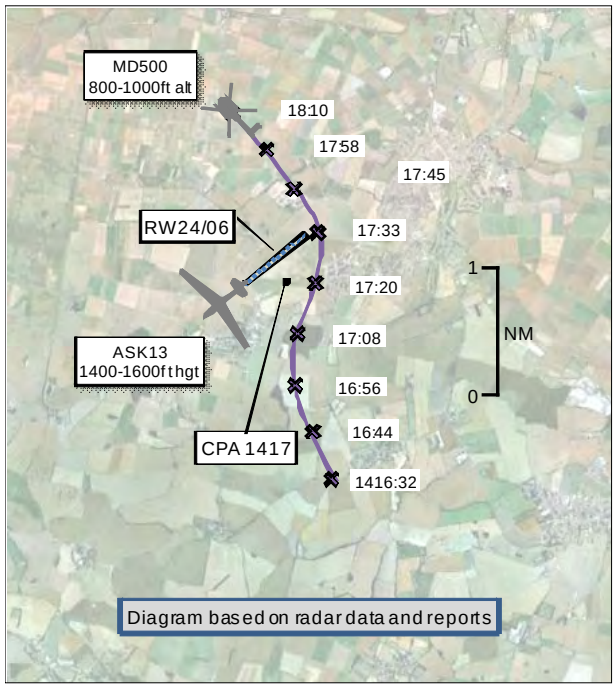
Contributory Factors: 1. Inadequate TI to both formations.

2. Hawk formation communication plan.

AIRPROX REPORT No 2012171

AIRPROX REPORT NO 2012171

Date/Time:	6 Dec 2012 1417Z	
Position:	5226N 00009W (Upwood G/S - elev 75ft)	
Airspace:	Lon FIR	(Class: G)
Reporter:	Duty Instructor	
	1st Ac	*2nd Ac*
Type:	ASK13	Hughes MD500
Operator:	Civ Club	Civ Trg
Alt/FL:	700ft↑ QFE (NR)	800-1000ft QNH (NR)
Weather:	VMC CAVOK	VMC NR
Visibility:	25km	10km
Reported Separation:	500ft V/0.5nm H	NR
Recorded Separation:	NR	



GLIDER LAUNCH PARTY REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER CLUB DUTY INSTRUCTOR reports that an Airprox occurred during an ASK13 glider winch launch. The glider pilot was operating under VFR in VMC from RW24 at Upwood. The red and silver glider was not fitted with external lights, an SSR transponder an ACAS or RT equipment. As the glider reached a height of around 700ft, a helicopter was observed at a range of 2nm, converging from the S, straight and level at about 800-1000ft and heading approximately 350°. The helicopter intruded upon the 'restricted airspace', cut across the NE and N of the Upwood A/D boundary and passed within 0.5nm of the glider, as it climbed from 1400ft to 1600ft. The glider pilot did not see the helicopter, due to the steep climbing attitude during winch launch, and was unaware of the Airprox until after he had landed.

The Duty Instructor assessed the risk of collision as 'Medium'.

THE MD500 PILOT reports transiting from a private helipad just S of RAF Wyton, returning to his operating base. He was operating under VFR in VMC with a BS from Wyton APP [134.050MHz]. The black helicopter had strobe and navigation lights selected on, as was the SSR transponder with Modes A and C. The ac was not fitted with an ACAS. In a level climb at 100kt and altitude 800-1000ft [QNH NR], he was visual with Upwood G/S and at 2nm range could see a glider which was 'ready to launch' from the W'ly RWY. Consequently, he changed track to the E to avoid the 'ATZ'. He watched the glider launch and continued his transit.

He assessed that there was no risk of collision.

ATSI reports an Airprox was filed by the gliding club Duty Instructor when, during the winch launch of a Schleicher AS-K 13 (ASK13) glider, a Hughes 369HE (MD500) helicopter was observed to converge with the ASK13 in the vicinity of Upwood.

Background

The ASK13 pilot was not in receipt of an ATS and was in the process of being launched from RW24 at Upwood. The MD500 had departed from a private site S of RAF Wyton for a VFR flight and was in receipt of a BS from Wyton APP [134.050MHz].

ATSI had access to the glider club duty instructor and helicopter pilot reports, recorded area surveillance and transcription of Wyton APP frequency. Meteorological information for Wyton was recorded as follows:

METAR EGUY 061350Z 19010KT CAVOK 01/M03 Q1012 BLU=

Glider Launching Sites are notified in the UK AIP, which states at ENR 1.1.5:

'5.1 Glider Launching Sites

5.1.1 Glider launching may take place from designated sites which are regarded as aerodromes. The sites are listed at ENR 5.5. Where launching takes place within the Aerodrome Traffic Zone of an aerodrome listed within the AD section, details are also shown at AD 2 and AD 3.

5.1.2 Gliders may be launched by towing aircraft, or by winch and cable or ground tow up to a height of 2000 ft agl. At a few sites the height of 2000 ft may be exceeded (see paragraph 5.3).

5.1.3 Sites are listed primarily to identify hazards to other airspace users and listing does not imply any right for a glider or powered aircraft to use the sites.'

Upwood, situated in Class G uncontrolled airspace 4.8nm N of Wyton (see Figure 1), is listed in ENR 5.5 as follows:

Designation Lateral Limits	Vertical Limits	Remarks Activity Times
Upwood, Cambs (AD) (W) 522612N 0000836W	2000 ft agl	**Hours:** HJ. **Site elevation:** 75 ft amsl.

[UKAB Note(1): (W) denotes Winch/Ground Tow launch.]

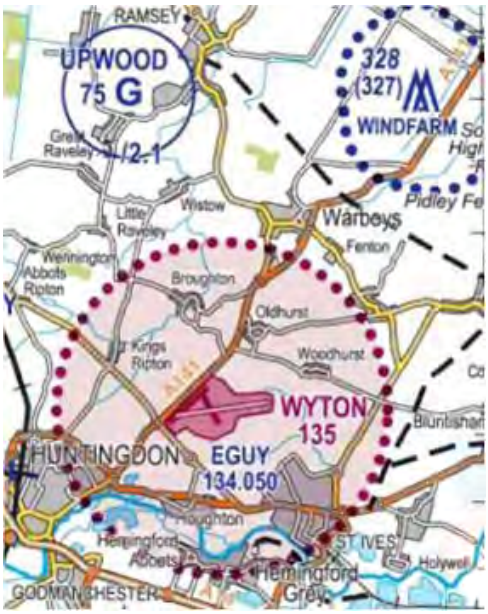


Figure 1: VFR 1:250.000 (2012)

[UKAB Note(2): The 1nm radius circle around a G/S, as shown on VFR charts, does not denote any form of controlled or regulated airspace. Upwood G/S, as shown above in Figure 1, does not have an associated ATZ; the circle is printed only to highlight the presence of the G/S to other airspace users.

UKAB Note(3): A G/S is classified as an A/D in the UK AIP and RoA Rule 12 (Flight in the vicinity of an aerodrome) therefore applies:

… a flying machine, glider or airship flying in the vicinity of what the commander of the aircraft knows, or ought reasonably to know, to be an aerodrome shall conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed; …]

Factual History

At 1413:30 the MD500 pilot called Wyton APP, stating that he had just lifted from a site about ¼nm S of Wyton RW27 threshold. Permission was given to transit along the A/D E boundary. Wyton APP informed the MD500 pilot that he would be in receipt of a BS and the Chatham RPS, 1007hPa, was passed.

Swanwick Multi Radar Tracking (MRT) first detected the MD500 at 1413:48, 1.4nm E of Wyton. The MD500 pilot flew on a NW, then NNW track; no Mode C level information was detected. At 1416:00 Wyton APP requested that the MD500 pilot report leaving the frequency. This request was made twice with no reply. Shortly after, at 1416:30, Wyton APP informed another departure that Upwood gliding site was 'now' active. At 1417:40 Wyton APP broadcast that Upwood G/S was notified as active.

Figure 2 below shows the Swanwick MRT surveillance picture at 1417:49; the large cross denotes the Upwood RW06 threshold and the horizontal line shows ½nm range. The MD500 was displaying Mode A code 7000, with no Mode C; the ASK13 was not visible on the surveillance recording. Each track history update represents 4sec in time.

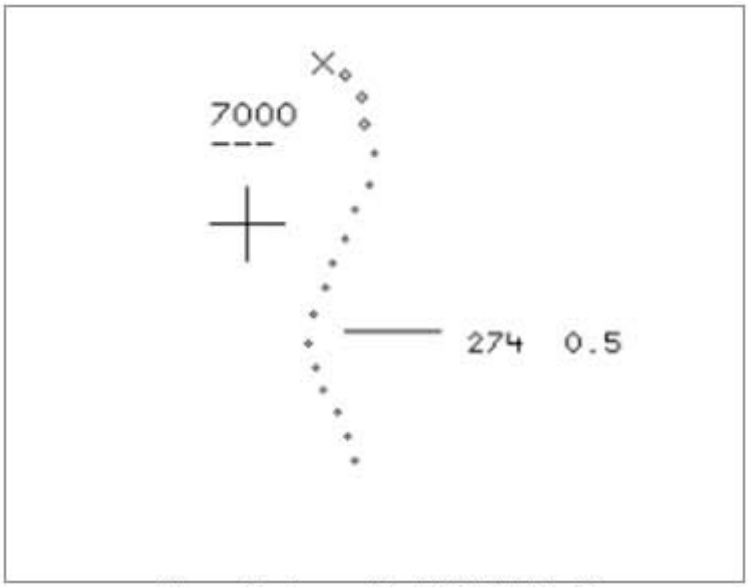


Figure 2: Swanwick MRT 1417:49

The ground reporter's estimate of the MD500's level was given as 800-1000ft above RWY height. The MD500 pilot reported his ac's altitude as 800-1000ft. The ground reporter's account describes the ASK13 as being at 700ft when the MD500 was first observed converging from the S. The MD500 pilot reported observing the ASK13 on the ground, ready for launch.

At 1418:30, Wyton APP called the MD500 pilot using callsign only; he reported 'clear' and thanked Wyton APP for the transit. The MD500 pilot was instructed to free-call en-route.

Analysis

The gliding site at Upwood is notified in the AIP in order to identify it as a hazard to other airspace users. No airspace restrictions exist in the vicinity of Upwood. The radar recording shows that the MD500 was initially on a course to cross the upwind end of RW24. Interpretation of the track history shows that at 1417:09 the MD500 pilot initiated a R turn, less than 1nm from the G/S. This was 31sec before Wyton APP made the general broadcast regarding Upwood activity but subsequent to the first mention of gliding activity on the frequency at 1416:30. The

MD500 pilot stated in his report that he was visual with the glider on the ground. This assimilation may have been supplemented by the mention of gliding activity on the frequency in use. It is not known to this investigation whether or not the MD500 pilot's pre-departure route planning had accounted for the possibility of activity at Upwood. The controller's first mention of Upwood indicates that activity had just been notified to Wyton: 'now'.

Under a BS pilots can expect to receive information and advice useful for the safe and efficient conduct of their flight. This may include information such as general airspace activity information. No form of flight path monitoring or TI should be expected under a BS and pilots remain wholly responsible for the avoidance of collision.

Conclusion

An Airprox was reported when an MD500 was observed converging with an ASK13 in the process of being winch launched from Upwood RW24. Surveillance information was insufficient to determine the exact proximity of the two ac. The MD500 pilot, previously on a track to cross the RW06 threshold, was observed to amend his course when within 1nm of the G/S. The MD500 pilot may have amended the ac's course upon hearing reference to gliding activity at Upwood on the frequency in use.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the glider club DI, the helicopter pilot, radar photographs/video recordings and reports from the appropriate ATC authority.

The Board initially considered the actions of the glider pilot and concluded that he was operating normally from a promulgated and active G/S. The glider launch party had seen the helicopter after the winch launch had commenced and had one option available to affect deconfliction, to abort the launch, but with associated high risk to the glider pilot. Turning to the MD500 pilot's actions, pilot Members were unanimous in their opinion that his transit did not appear to take sufficient account of the G/S location. The radar recording showed his intended track crossing the upwind end of RW24 but then deviating to the R when less than 1nm from the G/S, as he saw the glider 'ready to launch'. His subsequent track took him adjacent to the RW24 threshold, which, if an ATZ had existed at Upwood as he thought, would have been well inside it without establishing RT contact prior to entry. Board Members emphasised that he would have been well advised to remain clear of the G/S, and the pattern formed by ac intending to land, on the 'fail-safe' basis that this undemanding plan would have afforded a measure of deconfliction from ac he might not see. The CAA Flt Ops Advisor stated that impact with the steel cable used for winch launching would most likely cause loss of control of a helicopter.

In summary, the Board agreed that the MD500 pilot had been unwise to plan to overfly a promulgated G/S below the maximum altitude of the winch cable, relying for deconfliction on his ability to see any gliders launching or in the circuit pattern. In the event, however, there was only one glider airborne and the MD500 pilot saw it in good time to avoid it by a safe margin but not without causing the launch party concern.

PART C: ASSESSMENT OF CAUSE AND RISK

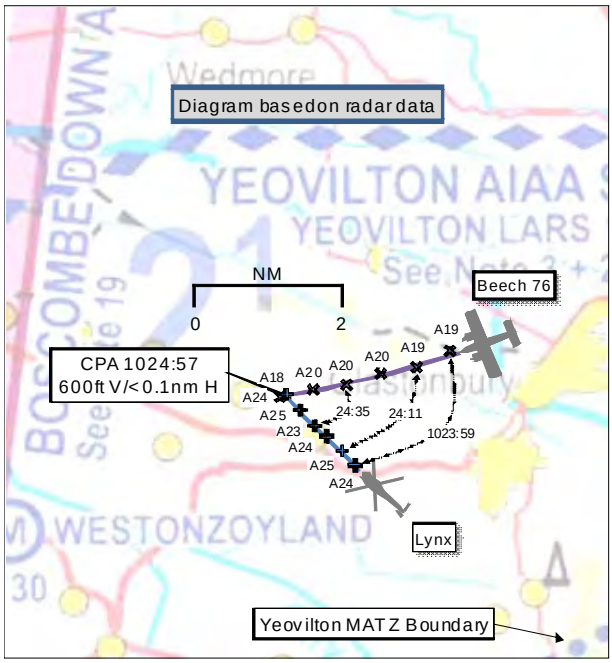
Cause: The MD500 pilot flew close enough to a promulgated and active glider site to cause the launch party concern.

Degree of Risk: C.

AIRPROX REPORT No 2012172

AIRPROX REPORT NO 2012172

Date/Time:	28 Nov 2012 1025Z	
Position:	5108N 00249W (RNAS Yeovilton 320°/10nm)	
Airspace:	Yeovilton AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Lynx Mk 8	Beech 76
Operator:	RN	Civ Trg
Alt/FL:	2100ft RPS (1008hPa)	2000ft RPS (1008hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	25km	10km
Reported Separation:	100ft V/0ft H	100m V 500-1000m H
Recorded Separation:	600ft V/<0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LYNX MK 8 PILOT reports conducting a partial Air Test following ac maintenance. He was operating under VFR in VMC, 400ft below cloud, in receipt of a BS from Yeovilton APP [234.300MHz]. The grey camouflaged ac had navigation and anti-collision lights selected on. The SSR transponder was selected on with Modes A and C. The ac was not fitted with a Mode S capable transponder or an ACAS. He stated that, immediately after 'setting up' to test one of the engines, heading 335° at 100kt and altitude 2100ft, he saw a white and red/orange coloured, low-wing, twin-engine 'civilian' ac in his R 3 o'clock position on a closing course. He immediately assessed there was no risk of actual collision so elected to remain 'straight and level'. Approximately 1-2sec later the conflicting ac, which also remained straight and level, passed directly below him with 100ft V separation.

He assessed the risk as 'High'.

He stated that cockpit workload was moderate but did require both crew to look inside to verify switch selections. He also stated that he had elected not to take a TS, based on the level of RT traffic on Yeovilton APP frequency.

THE BEECH 76 PILOT reports instructing a CPL VFR navigation exercise. He was PNF in the R seat, with PF, the student, occupying the L seat. He was operating under VFR in VMC, 500ft below cloud, the PF being in the process of establishing a BS with Yeovilton LARS. The white and red ac had navigation and strobe lights selected on, as was the SSR transponder with Modes A and S. The ac was not fitted with an ACAS. The PF had descended from altitude 2500ft to altitude 2000ft due to weather ahead when the Instructor saw a Lynx helicopter in his L 10 o'clock position at a range estimated at 10km. He considered that the student was 'late in asking for a BS from Yeovilton' but that, as an instructor, he sometimes had to 'sit and watch to see how long it takes'. He stated that 'they were always N of Yeovilton' but that they were also in the Yeovilton AIAA. He assessed the student lookout as 'poor', that it was safe to maintain track of approximately 270° at 135kt and that, being on the R, he had right of way, albeit that both parties had to be visual to 'implement this'. When he deemed it unsafe to continue he took control and descended to avoid the Lynx, which he lost sight of but judged had passed behind.

He assessed that there was no risk of collision.

UKAB Note(1): The RNAS Yeovilton weather was reported as follows:
METAR EGDY 280950Z 34011KT 9999 FEW010 SCT025 OVC030 06/01 Q1016 BLU NOSIG
METAR EGDY 281050Z 35011KT 9999 FEW010 SCT025 OVC030 06/01 Q1016 BLU NOSIG]

[**THE LYNX SQUADRON OCCURRENCE MANAGER** reports that the Airprox occurred because of a lack of SA. He stated that crews are being strongly encouraged to request an ATS commensurate with the weather conditions and task in hand.

THE YEOVILTON APPROACH CONTROLLER reports that the Lynx pilot, positioned approximately 15nm N of the A/D, was in receipt of a BS. He was in the process of handing over two separate ac, positioned approximately 15nm S of the A/D and under TSs, to a fighter control agency when the Lynx pilot transmitted that he would like to report an Airprox. He then observed a contact in the vicinity of the Lynx, at a similar level. This contact then descended and was seen to change squawk to a Yeovilton LARS squawk. Shortly after the incident the Lynx pilot upgraded his ATS to a TS.

[UKAB Note(1): The Yeovilton APP RT Transcript is reproduced below:

To	From	Speech Transcription	Time	Remarks
VL App	[Lynx C/S]	Approach, [Lynx C/S]	10:26:10	
[Lynx C/S]	VL App	[Lynx C/S], Yeovil Approach, standby	10:26:12	
Freddie	VL App	Own navigation, squawking one seven six one	10:26:14	Landline Call resumed
VL App	Freddie	Contact	10:26:17	
Freddie	VL App	Climbing flight level one six zero, traffic service	10:26:18	
VL App	Freddie	Climbing flight level one six zero, traffic service, Amber one identified, contact Freddie channel eight, back up channel nine	10:26:20	
Freddie	VL App	Channel eight, back up channel nine, roger, Approach	10:26:27	
Amber 1	VL App	Amber one, contact Freddie channel eight, two four zero decimal four	10:26:31	
VL App	Amber 1	Amber one, channel eight	10:26:40	
Amber 1	VL App	Amber one, back up channel nine	10:26:42	
VL App	Amber 1	Copied	10:26:44	
[Lynx C/S]	VL App	[Lynx C/S], Yeovil Approach, pass your message	10:27:26	
VL App	[Lynx C/S]	[Lynx C/S], I'd like to report an Airprox, I've got a position, height and details for you	10:27:27	
[Lynx C/S]	VL App	[Lynx C/S], roger, standby	10:27:38	
[Lynx C/S]	VL App	[Lynx C/S], Yeovil Approach, go ahead	10:27:48	
VL App	[Lynx C/S]	Yeah, err, we were at two thousand one hundred feet, one double oh eight set, in position north five one zero eight decimal six, west zero zero two four nine decimal two at ten twenty five exactly local, a, err, twin engine, white aircraft, flew directly underneath us, about a hundred foot separation. Our track three three zero, he was tracking south westerly	10:27:51	
[Lynx C/S]	VL App	[Lynx C/S], roger, many thanks, I have the details.	10:28:25	
VL App	[Lynx C/S]	Roger, we'll give you a ring when we get back	10:28:28	
[Lynx C/S]	VL App	[Lynx C/S], roger.	10:28:30	

]

THE YEOVILTON LARS CONTROLLER reports that [the subject Beech 76] free-called Yeovilton LARS [127.350MHz] and requested a service. He agreed a BS and issued a squawk. He was then asked by someone else in [the subject Beech 76] to 'standby' because they were avoiding a conflicting ac. He looked at the radar display and noticed a 7000 conspicuity code in the vicinity of a recognised Yeovilton APP squawk. Once [the subject Beech 76] was established in a 'safe area', he was then asked to repeat his last message.

[UKAB Note(2): The Yeovilton LARS RT transcript is reproduced below:

To	From	Speech Transcription	Time	Remarks
VL Lars	[Be76 C/S]	Yeovilton Radar, [Be76 C/S fragment], err, [Be76 C/S fragment], err, request MATZ penetration.	10:23:52	
[Be76 C/S]	VL Lars	[Be76 C/S], Yeovil Radar, pass your message.	10:24:00	
VL Lars	[Be76 C/S]	[Be76 C/S], err, Beach Seventy Six, from Bournemouth to Bournemouth we are, err, north of Bridgewater to err west of Bridport, err, currently, err, south of err Wells, err, one, err, two thousand err feet, QNH one zero zero eight, request MATZ penetration.	10:24:04	
[Be76 C/S]	VL Lars	[Be76 C/S], roger, squawk zero two four four, basic service, Portland regional is one zero zero eight.	10:24:37	
VL Lars	[Be76 C/S]	Say again, sorry, [Be76 C/S], just descending for the Lynx.	10:24:46	
[Be76 C/S]	VL Lars	Roger	10:24:50	
VL Lars	[Be76 C/S]	Clear of the Lynx, say again please, [Be76 C/S].	10:24:53	
[Be76 C/S]	VL Lars	[Be76 C/S], roger, squawk zero two four four, Portland regional one zero zero eight.	10:25:56	
VL Lars	[Be76 C/S]	Zero two four four, [Be76 C/S]	10:25:02	

]

HQ NAVY COMMAND comments that this Airprox occurred between two ac operating VFR in receipt of a BS from Yeovilton ATC, albeit two different controllers. The Beech 76 had not yet been identified as they had only just called the LARS controller and the Approach controller had prioritized his attention to the TS ac under his control. This meant that no warning of proximity was passed to either ac, however both saw each other in time and avoided a collision. Both crews report 'mission focus' by being either 'eyes in' the cockpit or allowing the student pilot to have rein, and the Lynx Squadron Occurrence Manager states that crews are encouraged to request the most appropriate ATS. Collision was averted by the sighting of both ac, albeit somewhat late by the Lynx crew.

[UKAB Note(3): RoA, Rule 8 (Avoiding Collisions) states:

(1) Notwithstanding that a flight is being made with air traffic control clearance it shall remain the duty of the commander of an aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft.

(2) An aircraft shall not be flown in such proximity to other aircraft as to create a danger of collision.

…

(4) An aircraft which is obliged by this Section to give way to another aircraft shall avoid passing over or under the other aircraft, or crossing ahead of it, unless passing well clear of it.

(5) …, an aircraft which has the right-of-way under this rule shall maintain its course and speed.

…

RoA Rule 9 (Converging) states:

…

(3) …, when two aircraft are converging in the air at approximately the same altitude, the aircraft which has the other on its right shall give way.

RoA Rule 11 (Overtaking) states:

(1) …, an aircraft which is being overtaken in the air shall have the right-of-way and the overtaking aircraft, whether climbing, descending or in horizontal flight, shall keep out of the way of the other aircraft by altering course to the right.

(2) An aircraft which is overtaking another aircraft shall keep out of the way of the other aircraft until that other aircraft has been passed and is clear, notwithstanding any change in the relative positions of the two aircraft.

…]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings and a report from the helicopter operating authority.

The Board first considered the actions of the two pilots. The JHC Member opined that the Lynx pilot knew the air-test would involve more than normal in-cockpit activity and consequently that his lookout would be degraded, exacerbated by the Lynx Mk 8 only having flying controls for the single pilot. He would therefore have been better served by using a TS or DS. Planning for this level of service would have been a useful part of his pre-flight preparation, especially with regard to risk mitigation, and may even have led him to make the decision that provision of such a service was an essential requirement to undertake the air-test. Turning to the Beech 76, a civilian Pilot Member commented that an instructor did have to give his student time to complete procedures that were necessarily limited in tempo by the student's inexperience, but the dividing line between achieving a valuable learning exercise and continuing to the detriment of safety could be a fine one. Some pilot Members opined that the Beech 76 instructor had taken control too late to avoid the Lynx by a margin sufficient to avoid causing the Lynx pilot concern. Both pilots were operating in class G airspace and had equal responsibility to 'see and avoid'. The Beech 76 instructor correctly assessed that he had right of way, but the Board emphasised that both pilots were responsible for collision avoidance. In this case the Beech 76 pilot had achieved collision avoidance but it was felt that he would have been better served by not passing almost directly beneath the Lynx.

It was apparent from the radar recording that the 2 ac were separated by some 600ft at the CPA. Nevertheless, the Lynx pilot was sufficiently concerned to file an Airprox. The Board opined that the Lynx pilot's concern was due to his late sighting and consequent surprise at the proximity of the Beech 76 and that the Beech 76 instructor had taken effective and timely action to avoid a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the Lynx pilot.

Degree of Risk: C.

AIRPROX REPORT No 2012173

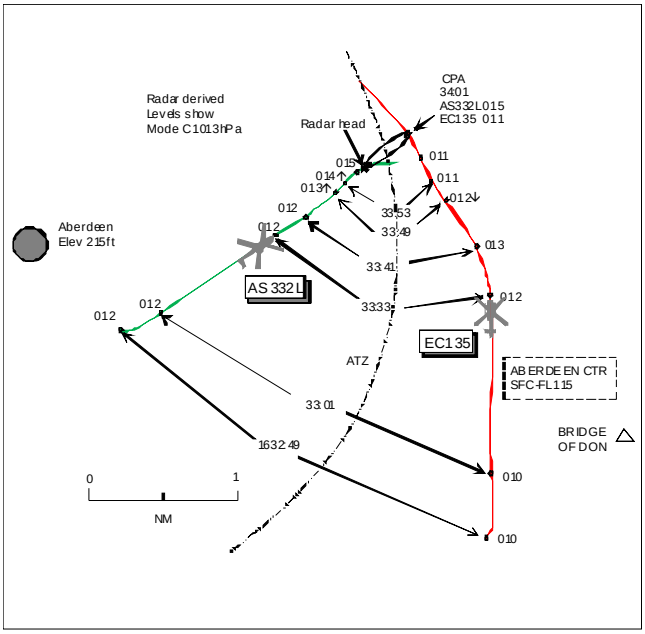
AIRPROX REPORT NO 2012173

Date/Time: 20 Dec 2012 1634Z (Night)

Position: 5713N 00207W
(2·5nm ENE Aberdeen - elev 215ft)

Airspace: ATZ/CTR (Class: D)

	Reporting Ac	*Reported Ac*
Type:	AS332L	EC135
Operator:	CAT	Civ Comm
Alt/FL:	1000ft	1000ft
	QNH (1009hPa)	QNH (1009hPa)
Weather:	VMC CLBC	VMC CLBC
Visibility:	10km	>10km
Reported Separation:	Nil V/1000m H	100ft V/400m H
Recorded Separation:	100ft V/0·8nm H OR 400ft V/0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS332L PILOT reports outbound to an off-shore rig from Aberdeen, VFR and in receipt of an ATS from Aberdeen Tower on 118·1MHz squawking 3671 with Modes S and C; TCAS was not fitted. The visibility was 10km flying 1500ft below cloud in VMC. They departed RW16 on a SHRUB VFR departure. At the same time another flight, the EC135, called departing the Aberdeen Royal Infirmary (ARI) on a VFR departure towards the Bridge of Don for Aberdeen. After take-off they turned L passing 500ft towards SHRUB and climbing through 700ft called 'visual' with the EC135, whose pilot was told to route to the Bridge of Don and join via the radar head. The EC135 pilot was asked if he could see their helicopter and he responded 'yes'. On reaching Bridge of Don the EC135 continued N towards Balmedie and its pilot was asked by ATC again if he could see their helicopter and the pilot replied 'yes'. Heading 090° at 120kt and 1000ft QNH 1009hPa the NHP requested a R turn to slot in behind the EC135 as closure seemed inevitable. The EC135 flight was instructed by ATC to take avoiding action and make a L turn. They did not hear the EC135 pilot respond and the helicopter continued on a N'ly heading. Shortly after this the EC135 flight made a L turn which placed it on a direct collision course. The HP initiated an expeditious climb to 1500ft to avoid, estimating the EC135 passed 1000m ahead with a high risk of collision.

THE EC135 PILOT reports inbound to Aberdeen, VFR having lifted from Aberdeen Hospital and in communication with Aberdeen Tower on 118·1MHz squawking a discrete code with Modes S and C; TCAS was not fitted. The visibility was >10km flying clear below cloud in VMC and the ac's red strobes, position and landing lights were all switched on. He was told of traffic departing RW16 and proceeding NE'bound and was told to remain to the E and head towards the radar head on downwind L for RW16. He levelled at 1000ft QNH and when approaching the radar head heading 350° at 100kt the paramedic in the LH seat reported visual with an ac in his 8 o'clock at approximately 1nm. It moved closer at the same height appearing to be heading straight for their ac before moving to their 9 o'clock and finally passing close behind, about 400m away and 100ft below, he thought. There was a 220/40kt wind blowing, he thought, which may have meant the closing speed between ac may have been misjudged. Although he had not seen the other helicopter he was not concerned by its proximity as he was sure the other ac's crew had their helicopter visual and that it was bound to pass behind, which it eventually did. He took no evasive action but after the event the Tower controller was concerned by how close the ac had passed each other and reminded both crews that under the new night VFR rules pilots were responsible for their own collision avoidance.

THE OUTGOING ADC reports the AS332L departed RW16 on a SHRUB VFR and the EC135 flight called lifting ARI, as briefed, not above 500ft. The EC135 flight was instructed to track E with the AS332L departing. The AS332L flight was given TI on the EC135 and both crews reported each other in sight. The EC135 pilot was given

joining instructions for RW16. Whilst this was taking place his relief ADC was plugging-in waiting for a handover and once he was satisfied with the situation he commenced the handover. Subsequently the relief controller checked with the AS332L pilot that he was still visual with the EC135 but the AS332L pilot was not. The relief controller issued instructions to the EC135 flight and the AS332L pilot reported he would be filing an Airprox.

THE INCOMING ADC reports he had just plugged-in to the ADC position and was receiving a handover from the out-going ADC. During the handover the AS332L was departing VFR to the E at night in poor Wx conditions but still in VMC. As the AS332L departed an EC135 flight at the ARI reported lifting to return to Aberdeen. TI was passed to, and acknowledged by, both helicopter crews and the EC135 pilot was instructed to initially route towards the Bridge of Don. The EC135 pilot then reported visual with the AS332L and was cleared to route to L base RW16. He accepted the position and the outgoing ADC unplugged. As the EC135 joined downwind the AS332L turned L to the E at about the midpoint of RW16. The AS332L crew then requested to deconflict from the EC135 by "slotting behind". Both ac were continuously visible to him at this point but due to the Wx and light conditions he was unsure of their relative heights. As a precaution he gave avoiding action to the EC135 flight to turn L away from the AS332L, the L turn to allow the pilots to keep the other traffic visual. This was not acknowledged by the EC135 crew who continued downwind. The AS332L was then observed to climb over the EC135 and the AS332L crew reported that they, "would be filing on that one", which he acknowledged.

ATSI reports that the Airprox was reported by the pilot of an AS332L when it came into proximity with a EC135 on the boundary of Aberdeen ATZ within the Class D CTR, airspace extending from the surface to FL115, at 1634:02 UTC (night).

The AS332L was operating VFR departing Aberdeen for an offshore oil rig and was in receipt of an ACS from Aberdeen Tower on frequency 118·1MHz.

The EC135 was operating VFR on a flight from Aberdeen Royal Infirmary to Aberdeen Airport and was in receipt of an ACS from Aberdeen Tower on frequency 118·1MHz.

CAA ATSI had access to written reports from the pilot of the AS332L and the Aberdeen AIR controller, area and local radar recordings together with RT recordings of Aberdeen Tower.

The Aberdeen METARs are provided for 1620 and 1650 UTC:

EGPD 201620Z 12022G34KT 8000 –RA FEW018 SCT022 BKN026 06/03 Q1007 NOSIG= and EGPD 201650Z 13024G37KT 6000 RA FEW018 BKN021 06/03 Q1007 NOSIG=

At 1630:30 the AS332L flight was given take-off clearance with a L turn out from RW16 by the Aberdeen AIR controller.

At 1631:20 the EC135 pilot contacted the Aberdeen AIR controller, lifting out of Aberdeen Royal Infirmary (situated approximately 3·5nm SE of Aberdeen Airport) requesting joining instructions for Aberdeen Airport. The Aberdeen AIR controller advised, *"(EC135 c/s) roger I've just got a helicopter joining er just lifting will be going left er V F R not above a thousand feet sort of tracking northeast so if you can just track towards Bridge of Don for the moment"*; the EC135 pilot replied, *"(EC135 c/s) wilco"*. The ATSU advised that the routeing to the Bridge of Don for the EC135 was to give both pilots time to be given TI and to visually acquire each other.

At 1631:50 the Aberdeen AIR controller passed TI to the AS332L flight, *"(AS332L c/s) EC135 c/s just lifting A R I just tracking east at the moment V F R not above a thousand feet"*; the pilot replied, *"yeah copied that traffic (AS332L c/s)"*.

At 1632:30 the AS332L crew reported turning E and at 1632:35 the pilot of the EC135 advised, *"and (EC135 c/s) that's us Bridge of Don are we happy you happy for us to come inbound now"*. The AIR controller replied, *"(EC135 c/s) yeah that traffic's just airborne tracking northeast now so if you track east of the radar head and then left base for runway one six V F R not above a thousand feet Q N H one zero zero seven"*.

At 1632:50 the pilot of the EC135 replied, *"one zero zero seven set visual with that traffic and er we'll continue er north around the head er for er one six (EC135 c/s)"*. The ac were 2·6nm apart.

AIRPROX REPORT No 2012173

At 1633:00 the Aberdeen AIR controller updated the TI to the AS332L flight, *"(AS332L c/s) er the EC135 c/s er just I believe west of Bridge of Don this time tracking north he's visual with you"*. The crew replied, *"we're visual with him as well (AS332L c/s)"*.

The written report from the Aberdeen AIR controller stated that both ac had reported having each other in sight and a handover of controllers took place.

At 1633:30 the pilot of the AS332L transmitted, *"yeah (AS332L c/s) so we slot in behind that er (EC135)"*. The incoming Aberdeen AIR controller asked of the AS332L, *"(AS332L c/s) do you have him visual he's not above a thousand at the moment".* At 1633:33 the EC135 was tracking N with the AS332L 1·5nm W, tracking NE, converging. The crew of the AS332L stated, *"er he's er he might not be above a thousand feet but we're gonna nail him so we're gonna turn right now"*.

At 1633:41 the 2 ac were 1·2nm apart, converging, the EC135 having turned L about 30°. The Aberdeen AIR controller gave avoiding action to the EC135 flight (1633:45), *"???? ???? (unintelligible words) (EC135 c/s) avoiding action please turn left immediately left immediately"*; this was not acknowledged by the pilot of the EC135.

The ATSU advised that the incoming Aberdeen AIR controller was watching both ac out of the window prior to the Airprox. He became concerned at the relative positions of the 2 ac and believed that neither pilot was taking sufficient action to avoid the other. Based on the AIR controller's visual sighting of the 2 ac, he gave avoiding action to the EC135 to turn to the L. The GMC controller, who was watching the situation at the time, confirmed that turning the EC135 L appeared to be the most appropriate course of action to resolve the situation.

[UKAB Note (1): The 2 ac close and at 1633:49, separation is 0·8nm with the AS332L having commenced a climb, passing FL013, and the EC135 having commenced a descent, indicating FL012. Four seconds later at 1633:53 the AS332L is climbing through FL014, 0·6nm to the W of the EC135 which is level at FL011. The CPA occurs at 1634:01 as AS332L continued to climb to FL015 and turned R with the EC135 passing to its NE tracking NW'ly at a range of 0·3nm maintaining FL011.]

The pilot of the AS332L reported on frequency that he would be filing an Airprox.

CAP493, the Manual of Air Traffic Services Part 1, Section 3, Chapter 4, Paragraph 3.1 states:

'Separation standards are not prescribed for application by ATC between VFR flights or between VFR and IFR flights in Class D airspace. However, ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to 'see and avoid' each other....'

Having passed TI and received reports from both pilots that they had each other in sight when they were 2·6nm apart, the outgoing Aberdeen AIR controller had a reasonable expectation that the pilots would discharge their responsibility for collision avoidance appropriately.

When the pilot of the AS332L reported that they were in conflict with the EC135 and needed to take action to avoid, the incoming Aberdeen AIR controller became concerned that the confliction between the 2 ac was not being resolved and issued avoiding action to the pilot of the EC135. As the instruction was not acknowledged by the pilot of the EC135 and no discernible track difference can be observed on radar it is not possible to tell if the pilot of the EC135 responded to the instruction.

The Airprox occurred in Class D airspace when an EC135 and an AS332L flew into conflict with each other while both flights were operating VFR not above 1000ft. Both flights were passed appropriate TI and reported each other in sight prior to the Airprox. When the pilot of the AS332L advised that they needed to turn R to avoid the EC135 and it appeared that the confliction had not been resolved the incoming Aberdeen AIR controller gave avoiding action in an attempt to resolve the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

There appeared to be different viewpoints of this incident by all parties. ATC had assimilated the potential for conflict when the EC135 pilot reported lifting from the ARI and the flight was issued routeing instructions towards the Bridge of Don, away from the AS332L's intended track on the SHRUB departure. This action gave the ADC time to discharge his responsibilities by passing TI to both VFR flights on each other and, after ensuring both crews were visual with each other, he issued the EC135 pilot inbound routeing instructions towards the downwind leg for RW16; this had placed the ac on converging tracks. Although this incident occurred within Class D CAS both crews were VFR and were responsible for maintaining their own separation from each other. Members noted that prior to the change in night VFR rules, both of these helicopter flights would have been SVFR at night in the CTR and would have been afforded separation from each other by ATC. The incoming controller was concerned as he could see the potential for confliction with the helicopters continuing towards each other but without any resolution visible. The AS332L crew asked if they had to "slot-in" behind the EC135 (turn R and give-way), apparently expecting confirmation that they could turn off their assigned routeing. Members agreed that at this stage the crew should have executed the turn to resolve the conflict and informed ATC of their actions. The ADC had asked the crew if they were visual with the EC135 and reiterated that the helicopter was not above 1000ft to which the crew replied that they were going to turn R. The ADC did not acknowledge the AS332L crew's intended turn but instead gave the EC135 pilot a L turn towards the AS332L as, from his position in the VCR, this was the best way to resolve the situation. However, the EC135 had picked up a strong tailwind when routeing N'ly which had led to the geometry changing whereby the EC135 was going to cross ahead of the AS332L and this was not apparent to the ADC. Similarly, the AS332L crew would have had to execute a large heading change into the strong SE'ly wind to effect a significant change of flight path. The EC135 pilot did not acknowledge the instruction to turn L but it almost certainly placed doubt in the AS332L crews mind as to his intentions. In the end, at a late stage, the AS332L crew executed a climb to resolve the confliction, the R turn only becoming apparent on the radar recording at the CPA. This led the Board to agree that the AS332L crew did not take timely action to give-way to the EC135, as required by the RoA, which had caused the Airprox.

Looking at the risk element, although the EC135 had right of way it appeared its pilot was content to follow the ATC routeing instruction towards the downwind leg, perhaps in the mistaken belief that positive control from ATC would resolve any traffic confliction. The pilot reported being sure the AS332L was going to avoid his helicopter, without visually acquiring it himself, content with the information from the paramedic in the LH seat. It is unknown why the EC135 pilot did not acknowledge the avoiding action L turn issued as they approached the CPA. That said, the Board acknowledged that the AS332L crew had good SA, were fully aware of the deteriorating situation and had eventually taken positive action which ensured that any risk of collision was effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

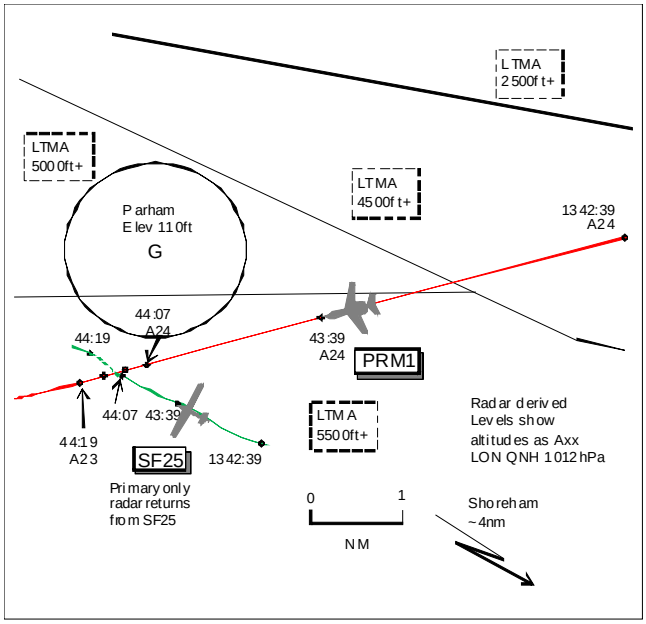
Cause: The AS332L crew did not take timely action to give way to the EC135.

Degree of Risk: C.

AIRPROX REPORT No 2012174

AIRPROX REPORT NO 2012174

Date/Time:	29 Nov 2012 1344Z	
Position:	5054N 00029W (1·4nm SSW Parham G/S)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Scheibe SF25C	RA390
	Falke M/Glider	Premier 1
Operator:	Civ Club	Civ Pvt
Alt/FL:	2500ft (QNH)	NR
Weather:	VMC CLNC	NR
Visibility:	30km	NR
Reported Separation:	Very close	NR
Recorded Separation:	~0·1nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCHEIBE SF25C FALKE MOTOR GLIDER PILOT reports, 7 weeks post incident, en-route from Shoreham to Lasham, VFR and not in communication with any ATSU; no transponder was fitted. The visibility was 30km in VMC and the ac was coloured canary yellow with strobe lights switched on. About 1nm W of Parham, heading NW'ly at 2500ft QNH and 80kt, a business jet was first sighted abeam his R wing tip at very close range. It passed them from behind rolling R and climbing before it rolled L, presumably back onto its course. He believed that the jet would have collided had it not taken avoiding action. He assessed the risk as high.

The pax pilot provided a brief description, 12 weeks post incident. He believed the incident occurred about 3nm SW of Parham; they had been looking at the Gliding Site just before the encounter so were within a short distance of the spot. Their altitude was around 2500ft and after the incident they descended 200-250ft to about 2300ft amsl so that they would not be cruising at a round number of feet. The twin-engine (rear-mounted) business jet approached from the ENE and departed WSW. He had seen it over his R shoulder a split second before it passed, their heading was NW'ly, and he thought it was marginally above their level. After passing it turned a bit to the L; he believed it was resuming its original heading having jinked a bit to its R to avoid their ac before it disappeared in the direction of the I-O-W.

UKAB Note (1): The identity of the business jet was delayed owing to an incorrect time provided by the reporting pilot. Initially, following confirmation of the erroneous time by the SF25 pilot, it was thought the reported ac may have been a DA42 TwinStar, which was seen on the recorded radar about 15min prior to the stated time. However, no radar contact could be seen which correlated to the SF25's departure from Shoreham on a NW'ly track. The SF25 pilot agreed that from his viewpoint of the other ac it could have been a DA42. The DA42 pilot kindly provided a report which included the sighting of, and subsequent avoiding action taken on, a glider close to Parham. However the geometry of the encounter described by the SF25 pilot could not be correlated to the track observed to be flown by the DA42. After a further request to the SF25 pilot to confirm the date/time of the incident, he was able to confirm (10 weeks post incident), after consultation with his pilot pax who had returned from extended absence abroad, that the incident time was over 50min prior to the previous time given. RAC Mil carried out further tracing action and found the radar recording for the revised time does capture the Airprox. The reported ac was identified as a RA390 Premier 1 business jet. Unfortunately the operator ceased trading 2 weeks post incident and it has not been possible to obtain a report from the crew.

UKAB Note (2): Shoreham METAR shows: - EGKA 291350Z 36012KT 9999 FEW020 06/02 Q1011=

ATSI reports an Airprox occurred 1·4nm SSW of Parham gliding site and was reported by the pilot of a Scheibe Falke motor glider (SF25).

The SF25 was on a VFR flight from Shoreham to Lasham and was not in contact with an ATSU.

The reported ac was a Raytheon RA390 Premier 1 (PRM1), which had departed from Manston and was in contact with Farnborough LARS. The fps from Farnborough seems to indicate that the PRM1 was in receipt of a TS but due to the time elapsed between the incident and the confirmation of the Airprox time and date (78 days) it was not possible to obtain RT recordings.

CAA ATSI had access to written reports from the pilot of the SF25 and area radar recordings.

There is no report available from the pilot of the PRM1. As there are no recordings available from Farnborough it cannot be established if TI was passed to the PRM1 flight on the SF25.

[UKAB Note (1): The area radar recording at 1342:39 shows a primary return 2·5nm SSE of Parham tracking NW, which is believed to be the SF25. The PRM1 is seen 5nm E of Parham tracking WSW squawking 5020 (Farnborough LARS) at altitude 2400ft (QNH 1012hPa). The ac close on a line of constant bearing and by 1343:39 the SF25 is in the PRM1's 1130 position range 1·6nm. The SF25 exhibits track jitter as the ac close, and by 1344:07 the SF25 is just L of the PRM1's 12 o'clock range 0·3nm. The CPA occurs between the next 2 radar sweeps at 1344:11 and 1344:15, the SF25 crosses ahead of the PRM1 from L to R but its primary returns are unreliable owing to jitter. It is seen to steady in the PRM1's 4 o'clock on the radar sweep at 1344:19 at range 0·3nm; taking the SF25's speed prior to and post jitter it is estimated the separation is about 0·1nm at the CPA. Subsequently the ac diverge, the PRM1's Mode C shows a descent of 100ft at 1344:19 to altitude 2300ft, which is maintained for 8sec before readjusting to 2400ft.]

The Airprox occurred in Class G airspace where the principles of see and avoid apply. It is unclear if the PRM1 flight received TI on the primary return believed to be the SF25 but ultimately the pilots of both ac were responsible for their own collision avoidance.

An Airprox was reported by the pilot of the SF25 when it came into proximity with a PRM1.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the SF25C pilot, radar video recordings and reports from the appropriate ATC authorities.

Without the benefit of a report from the Premier 1 crew or a full ATC investigation, Members had only limited information on which to assess the incident. As this had occurred in Class G airspace both crews were responsible for maintaining their separation from other traffic through see and avoid. The Premier 1 had approached the SF25 from its R rear quarter and was only spotted by both pilots on board the SF25 in their R 3-4 o'clock position shortly before it passed very close behind. The SF25 was there to be seen for some time as it was crossing through the PRM 1's projected flightpath but without knowing whether the PRM 1 crew had seen the SF25, Members could only categorise this incident as a conflict.

Looking at the risk element, the Board was unsure whether there was enough information to make an assessment. From the SF25 cockpit's viewpoint, it appeared that the PRM 1 crew may have taken late avoiding action on their ac as it was perceived to have manoeuvred as it passed. The radar recording does not show any discernible track deviation but any small/momentary deviation would be unlikely to show. This perceived avoiding action manoeuvre flown by the PRM 1 may have been purely fortuitous. If the SF25 had passed unsighted to the PRM 1 crew, then a definite risk of collision existed, risk A. Alternatively, if the PRM 1 did manoeuvre as late avoiding action, given the radar recording shows the ac passing about 0·1nm apart, the action taken had been just enough to remove the actual collision risk but safety was not assured, risk B. On balance it was judged that this had been a risk bearing Airprox with at least a B rating for the risk.

A Board Advisor commented that he was airborne from Parham that afternoon and there were several gliders operating on the S Downs where the Airprox occurred as the Wx conditions were favourable for ridge soaring. A gliding pilot Member also commented that it was fortunate that the PRM 1 was cruising at 2400ft crossing the S

AIRPROX REPORT No 2012174

Downs as the strength of the N'ly wind over the local terrain on that particular day made it conducive for flying on the N side of the ridge at around 1500ft. for best lift.

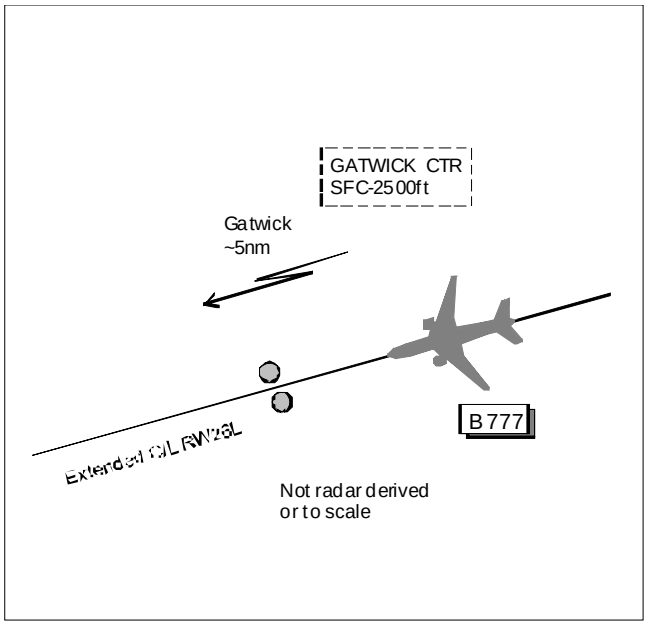
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace.

Degree of Risk: B.

AIRPROX REPORT NO 2012175

Date/Time:	30 Dec 2012 0853Z (Sunday)	
Position:	5110N 00003W (5nm FIN APP RW26L Gatwick - elev 203ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B777-200	2 x Untraced objects
Operator:	CAT	NK
Alt/FL:	1500ft↓ (QNH)	(NK)
Weather:	VMC NR	NK
Visibility:	>10km	
Reported Separation:	100-200ft V	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B777 PILOT reports inbound to Gatwick, IFR and in communication with Gatwick Tower, squawking an assigned code with Modes S and C. About 4-5nm from touchdown RW26L heading 260° at 140kt and descending through 1500ft QNH, P2 spotted, and then drew his attention to, 2 flat silver discs ahead, 1 either side of the C/L and below their flightpath; these objects appeared to be very slow moving or stationary. All 3 pilots on the flightdeck saw the objects, which passed 100-200ft below; the crews in 2 subsequent ac also saw the objects. They informed ATC of incident and he assessed the risk as low.

RAC MIL reports tracing action did not reveal the identity of the reported objects. Looking at possible sources, there are no registered radio-controlled model flying clubs listed in the area. Maps show many open fields under the RW26 approach where persons could operate remote control ac. There are saucer-shaped or blimp-shaped model ac, up to 4ft in diameter, on sale to the public.

THE GATWICK WATCH MANAGER reports the B777 crew reported seeing 2 man-made objects, possibly toys, passing under their ac approximately 5-6nm on final. Further details from the crew, and from the crew of a following B767, added the objects were 2 white or silver discs at approximately 1000-1500ft. Details of the incident were passed to the local Police Authority and to LTCC Group Supervisor.

ATSI reports that the Airprox was reported by the pilot of a B777 inbound to Gatwick when 2 objects were observed to pass beneath the ac. The report below contains only a factual history of all available information as the identity and origin of the observed objects could not be determined.

The B777 was an IFR flight squawking Mode A 4456 and in receipt of an ACS from Gatwick Tower on 124·255MHz. The Gatwick Tower frequency was reviewed between 0850 and 0904 UTC. RT loading was reasonably constant during this period.

The Gatwick METAR was EGKK 300850Z 23009KT 9999 FEW040 06/02 Q1011=

The B777 flight called Tower at 0850:35 passing 3200ft at 11·5nm from touchdown and was instructed to continue approach.

Figure 1 is taken from the Gatwick 10cm radar replay at 0852:16 when a primary position indication symbol appeared on the outskirts of East Grinstead in the B777's 11 o'clock range 3·4nm. The return disappeared on the next update of the replay.

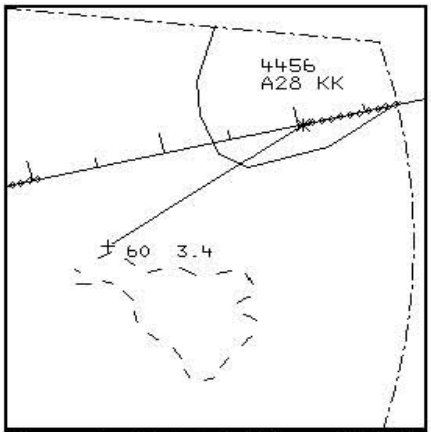


Figure 1: Gatwick 10cm: 0852:16 UTC

At 0853:02 the Gatwick 10cm replay showed the B777 at 6·4nm from touchdown, passing 2200ft and at this time another primary position indication symbol appears 0·1nm behind the B772 (Figure 2). The unknown target disappeared on the next update of the replay.

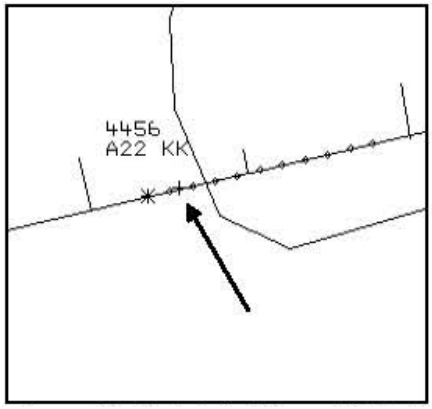


Figure 2: Gatwick 10cm: 0853:03 UTC

The B777 passed 6nm from touchdown at 0853:12 as it descended through 2100ft. The B777 passed 5nm from touchdown at 0853:43 as it descended through 1800ft.

The next ac inbound to RW26L, a B767 flight (Mode A 3243) called Tower at 0854:32 passing 2900ft at 10·5nm from touchdown and was instructed to continue approach.

At 0855:11 a primary position indication symbol appeared at 5·3nm on the approach and offset to the north by 0·1nm. The B767 was at 9·1nm passing 2900ft. The target disappeared on the next update of the replay.

The surface wind (230/08KT) was passed to the B777 flight and it was cleared to land at 0856:16. After the read back the pilot stated that, at between 5–6nm from touchdown, a couple of man-made objects had passed underneath the ac. These were described as 'some sort of toy'. The report was acknowledged by the controller. At this time the B767 was at 6·3nm from touchdown passing through 2300ft.

As the B767 approached 6nm from touchdown (passing 2200ft) the Gatwick 10cm replay showed a sequence of 6 primary position indication symbols moving E'bound approximately 1nm N of the FAT (Figure 3).

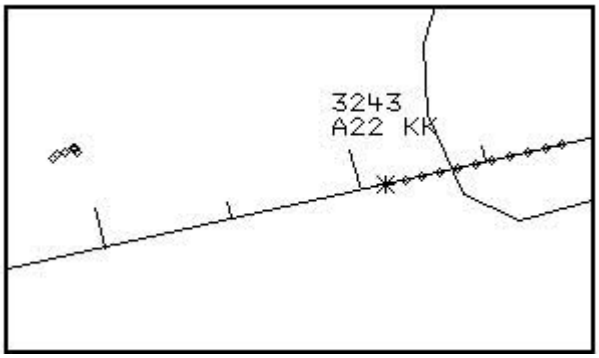


Figure 3: Gatwick 10cm: 0856:37 UTC

At 0857:17 the next inbound ac, an A319 called Tower, with 11nm to run and passing through 3000ft.

The B767 and A319 landed. There was no further mention, by pilots or controller, on the Tower frequency of the previously reported objects.

The controller and pilot reports subsequently indicated that the unknown objects were '2 white or silver discs at 1000–1500ft, which appeared to be very slow moving or stationary'. ATSI did not record the ground frequencies in use, where any further discussion of the objects may have taken place between ATC and the pilots of the 3 landing ac.

The incident was reported to the Police and London Terminal Control; however the nature of the objects has not been resolved.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the B777 crew, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic Supervisor and reports from the appropriate ATC authorities.

The CAA FOI Advisor informed Members that the CAA is regularly approached with enquiries regarding various devices, including balloons/kites, to be used as camera platforms. Regulations require operators of model ac/ UAVs with a mass greater than 7kg to seek approval for flight in an ATZ or CAS or above 400ft (ANO Article 166) and other limitations apply to surveillance ac (ANO Article167). For platforms less than 7kg, the operator has to be satisfied that the flight is safe without endangering an ac, person or property (ANO Articles 137 and 138). Model flying clubs are well regulated but other flying can take place anywhere else. There was no doubt that the B777 crew, and 2 subsequent flights, had seen a couple of objects, reported by the B777 crew as man-made and toy-like. However, with the dearth of other information available to the Board and with the objects sighted remaining untraced, the Board elected to classify this incident as a sighting report on final approach; the risk was deemed unassessable.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report on final approach.

Degree of Risk: D.

2012067	21/05/12	Chinook v EC155	ivo 02 Arena	B	297
2012068	23/05/12	KC135R v Tucano	11nm NE Linton-on-Ouse	C	308
2012069	25/05/12	Pegasus v R44	O/H Strathaven M/Light Site	C	311
2012070	25/05/12	Grob Tutor TMk1 v BE200 King Air	10nm W Cranwell A/D	C	315
2012071	28/05/12	Sea King Mk4 v EC145	2nm S Tavistock	C	320
2012072	27/05/12	CFM Shadow D v EC145	Near Redruth	C	323
2012073	31/05/12	Apache v Merlin	10nm SW Salisbury	A	327
2012075	02/06/12	B777 v A320	OCK HOLD	C	329
2012076	09/06/12	PA44 v SR22	(CIT NDB(L) Hold)	C	332
2012077	12/06/12	PA31-350 v Hawk T Mk2	1.5nm W Liverpool Airport	A	336
2012078	13/06/12	DHC8 v PA28	10nm WNW East Midlands	C	343
2012079	14/06/12	Beech Shadow v Grob Tutor	3.6nm W Cranwell	C	348
2012080	14/06/12	Squirrel v Untraced ac	3nm W RAF Shawbury	C	354
2012081	14/06/12	Typhoon T Mk1A v Typhoon FGR4	3nm SW Spurn Pt Lt – 3nm NW b'dry D307 - Donna Nook	C	358
2012082	27/05/12	C560XLS v Untraced Glider	O/H OX NDB	A	363
2012083	20/06/12	Cessna C172 v VS Spitfire TR9	1nm final RW14R Chichester/Goodwood A/D	C	367
2012084	19/06/12	PA28 v C177	RW14 LHC Chichester/Goodwood	A	372
2012085	20/06/12	PA25+Grob Astir v EC135	2nm SE Nympsfield G/S	B	376
2012086	28/05/12	KC-135R v F-15C	18nm E Norwich	C	380
2012088	28/06/12	C172 v PA32	2.1nm N Chichester/Goodwood	C	385
2012089	30/06/12	Puchacz Glider v Piper Arrow	O/H Gransden Lodge Airfield	C	390
2012090	27/06/12	PA28 v DR400	DW RW18 RHC Wellesbourne Mountford	B	392
2012091	30/06/12	TB10 v PA28	4.5nm SE DET	C	396
2012092	02/07/12	B737-800 v ATR72	O/H RW26L Gatwick	C	400
2012093	26/06/12	Merlin v A109SP	3nm SE Penrith VRP	C	404
2012094	03/07/12	Saab 2000 v A319	12nm E Glasgow	C	408
2012095	05/07/12	PA25 v PA28	2nm S Charing Village	A	413
2012096	07/07/12	EC135 T2+ v YAK50 x 6	3½nm SE Silverstone Heliport	A	417
2012098	12/07/12	Hawk T1 v Nimbus 3T	9nm W Leeming	B	423
2012099	08/07/12	A319 v A321	19nm E Gatwick	C	426
2012100	12/07/12	Tutor T Mk1 v AS355	17nm WSW Leuchars	C	433
2012101	12/07/12	Tutor T Mk1 x3 v Untraced Glider	2nm W Sawtry	A	436
2012102	18/07/12	C172 v R44 +2xR22s	1.5nm S Duxford	C	440
2012103	09/07/12	Gazelle v Titan Mustang	3nm S Hereford	E	448
2012104	19/07/12	JS41 v F-15E x2	26nm N Humberside Airport	C	452
2012105	22/07/12	PA23 v PA28	3nm SE Stapleford	C	458
2012106	24/07/12	PA34 v Jabiru	12nm NE Southend	C	462
2012107	25/07/12	BE200 v BE200	O/H Cranwell	C	466
2012108	24/07/12	Tucano v Spitfire Mk26	4nm NNE Grimsby	B	471
2012109	21/07/12	C150 v Pilatus PC6	2nm E Fleetwood VRP	C	476
2012110	24/07/12	Tucano T Mk1 v Grob Tutor T Mk1	Church Fenton RW24RH cct	B	480
2012111	17/07/12	Lynx v C130 Hercules	8nm E Yeovilton	C	485
2012112	27/07/12	B737-800 v C172	5nm SW Londonderry	E	489
2012114	25/07/12	A320 v Untraced Glider	Luton radar pattern DW RW08	D	494
2012115	04/08/12	B737-400 v A320(A)	Threshold RW26L Gatwick	C	497
2012116	07/08/12	Tornado v Hawk TMk1	8nm SE Kendal	B	500
2012117	09/08/12	Grob Tutor TMk1 v Typhoon T Mk3	17nm WSW Marham	B	503
2012118	09/08/12	B737-800 v Untraced Balloon	6nm NE DET	D	511
2012119	09/08/12	Hawk T Mk1 v Untraced Paraglider	Ivo Ripon	B	513
2012121	09/08/12	Quik GT450 v Grob Tutor TMk1	Thornhill Microlight Site	C	516
2012122	14/08/12	Merlin v DO228	7nm NW Culdrose	E	520
2012123	10/08/12	Duo Discus Turbo v Untraced Light Ac	7km NW Banbury	D	525
2012124	14/08/12	Grob 109B v PA34	10nm WNW Wellesbourne Mountford – O/H Alcester	C	526
2012125	16/08/12	EMB175 v EC145	2.25nm WSW Exeter	E	531
2012126	17/08/12	BE200 v PA28R	2nm SW Islay A/D	C	535
2012127	22/08/12	SZD51 Junior v C182	1.1nm NE Husbands Bosworth	B	539
2012128	18/08/12	DR400 v PA28	Chichester/Goodwood A/D	C	541
2012129	23/08/12	Diamond DA42 v SkyRanger ML	3.6nm S Sywell	C	546
2012130	14/08/12	Tutor T Mk1 v BE35	0.5nm FIN APP RW21 Gamston	C	549
2012131	23/08/12	Cessna F406 v Cessna 172	Shoreham NDB Hold	B	554
2012132	28/08/12	Chinook v Grob 103 Glider	4nm WNW Odiham	C	558
2012133	01/09/12	B737-800 v Cessna C208B	6nm N Birmingham	E	561
2012134	03/09/12	DA42 v Model Glider	3½nm E Coventry A/D	C	570

2012135	31/08/12	Griffin v RC114	8nm E Odiham	B	573
2012136	04/09/12	Hawk TMk1 v ASW22 Glider	8nm S RAF Leeming	C	579
2012137	05/09/12	Typhoon FGR4x2 v Untraced Glider	4nm E Conningsby	C	582
2012138	29/08/12	Tornado GR4 v BAE Hawk T1	19nm ENE Leeming	C	585
2012139	07/09/12	Gulfstream Galaxy v Hawk T Mk1	4.5nm W Cambridge	C	592
2012140	31/08/12	EuroFox ML v PA28	1.7nm final RW27 Gloucestershire A/D	B	598
2012141	01/09/12	Flash 2A ML v Untraced LA	Finmere Microlight Site RW28 LHC	C	603
2012142	09/09/12	AS355 v Gulfstream GV-SP	3.5nm NNW OX NDB	C	605
2012143	13/09/12	Slingsby T67M v C152	1nm FIN APP RW23 Sleap	A	611
2012145	09/09/12	PA28 + RC114 v PA28	1nm FIN APP RW18 Wellesbourne Mounford	C B	615
2012146	13/09/12	A319 v EC135	6nm FIN APP RW23 Glasgow	E	620
2012147	14/09/12	Hawk T Mk2 v Cirrus SR22	11nm SW Valley	C	626
2012149	22/09/12	ASK-8 Glider v EC135	O/H Bicester A/D	C	631
2012150	24/09/12	SK76 v AS365	4.5nm SW Wycombe Air Park	C	633
2012152	07/09/12	Hawk T Mk1 v Saab 2000	Ivo EGD323A	C	637
2012153	26/09/12	Sea King Mk4 v PA28	O/H RW09 Yeovilton	C	641
2012154	03/10/12	DHC8 v A319	3.5nm W Gatwick	C	646
2012155	04/10/12	BE35 v SR22	2.3nm NW GST NDB	B	650
2012156	06/10/12	ATR 42 v A109	8nm SW Southend	A	657
2012157	10/10/12	Tornado GR4 v Tornado IDS	EG D613A	C	666
2012158	10/10/12	Grob 115 v Yak 50	North Weald Base Leg RW02 LH	C	670
2012159	20/10/12	Scheibe SF25C Falke M/G v C172	3.5nm E Bicester G/S	B	676
2012160	01/11/12	C152 v SkyRanger M/L	RW27 Perth/Scone	A	679
2012161	09/11/12	R44 v Bo105	Gloucestershire A/D	B	682
2012163	13/11/12	Squirrel (A) + Squirrel (B) v R44	1.2nm NE Ternhill	B	687
2012164	15/11/12	AW139 v C150	8nm NNE North Denes	C	697
2012165	15/11/12	Squirrel HT1 v GA-8 Airvan	7nm N RAF Shawbury	C	702
2012166	02/12/12	A320 V Unknown	GOW 090 11nm	D	709
2012167	04/12/12	JS41 v Tucano T Mk1	12.5nm NNE Newcastle A/D	C	712
2012168	30/11/12	Merlin v AS350 Squirrel	13nm W Odiham	C	719
2012169	04/12/12	KC135R v Typhoon	30nm ENE Mildenhall	C	722
2012170	28/11/12	Hawk T Mk2 v F15E	RAF Valley 120º/9nm	C	727
2012171	06/12/12	ASK13 v Hughes MD500	Upwood G/S	C	737
2012172	28/11/12	Lynx Mk 8 v Beech 76	RNAS Yeovilton 320º/10nm	C	741
2012173	20/12/12	AS332L v EC135	2.5nm ENE Aberdeen	C	745
2012174	29/11/12	Scheibe SF25C Falke M/Glider v RA390 Premier 1	1.4nm SSW Parham G/S	B	749
2012175	30/12/12	B777-200 v 2 x Untraced objects	5nm FIN APP RW26L Gatwick	D	752