



UK AIRPROX BOARD

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Analysis of Airprox in UK Airspace

Report Number 12
January 2004 - June 2004

Twelfth Report by the UK Airprox Board:

‘Analysis of Airprox in UK Airspace’

(January 2004 to June 2004)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

If you are a new reader of these books – *welcome!* If you are a regular reader – *welcome back!* I hope that you will find this publication of value as part of your overall flight safety awareness.

Although the twelfth in the series, the purpose of this book remains unchanged – to promote air safety awareness and understanding of Airprox by sharing widely the unfortunate experiences of the few for the benefit of the many. For that benefit to be realised, it is essential that this book be made freely available, in particular to pilots and air traffic controllers. Please would you help the process along by ensuring that *your* crew room, club house or work place has available a copy of this book for people to read.

“Book 12” covers the first six months of 2004 and contains findings on the 109 Airprox which occurred within UK airspace in that period. The count of 109 incidents during the six-month period exceeds the totals recorded in each of the same periods in the previous four years. Note however that the increase is virtually all in Airprox assessed as Risk Categories C - ‘no collision risk’ - and D - ‘insufficient information available’ - respectively.

A summary of ‘risk’ results for the first six months of 2004 is shown in the following table, set against comparable results from year 2000 onwards.

January to June						
Risk Category	2000	2001	2002	2003	2004	
A	14	16	7	6	8	<i>Collision Risk</i>
B	20	23	27	29	30	<i>Safety not assured</i>
C	61	57	56	49	66	<i>No collision risk</i>
D	0	5	2	1	5	<i>Insufficient information available</i>
Totals:	95	101	92	85	109	
Risk Bearing%	36	39	37	41	35	<i>Average 37%</i>

As can be seen from data in the table, in respect of *risk-bearing* results (Risk A + Risk B) the outturn for the first six months of 2004 was below average: 35% vs 37%. The significant drop in Risk Category A Airprox after 2000-2001 is being maintained and once again there were no Risk A Airprox involving any Commercial Air Transport aircraft. The reader is invited to note from the ‘causal factors’ tables the drop in the number of Airprox with ‘inadvertent penetration of controlled airspace’ as a cause. This development is to be welcomed reflecting, it is hoped, the value of the ‘On Track’ initiative.

There are many valuable lessons to be learned by reading about the unhappy situations in which others have found themselves, starting on page 19. Tribute is paid to those who reported their experiences honestly and openly so that colleagues might benefit.

Peter Hunt

Director, UKAB

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INTRODUCTION

UK AIRPROX BOARD (UKAB) COMPOSITION

The UKAB is an independent organisation sponsored jointly by the CAA and the MOD to deal with all Airprox reported within UK airspace. There are 8 civilian and 6 military Members on the Board which is chaired by the Director UKAB who reports directly to the Chairman CAA and Chief of the Air Staff, Royal Air Force. Board Members together form a team of hands-on practitioners with first-hand civil and military 'know how' on:

- Air Traffic Terminal Control, Area Control and Airfield Control, military and civil;
- Commercial Air Transport (CAT) flying;
- General Aviation (GA) flying, both fixed and rotary wing; and
- Military flying, both fixed and rotary wing, by the RN, Army and the RAF.

UKAB's ROLE

The UKAB undertakes the following tasks in promoting improved safety standards in the air:

- Act as the start point for an investigation process into each incident, generally carried out by the Safety Regulation Group (SRG) of the CAA and/or Military HQs;
- Determine what happened plus analyses of the main causal factors;
- Assess the risk levels involved;
- Make Safety Recommendations where appropriate to reduce the risk of incident recurrence; and
- Publish and distribute full reports so that lessons can be learned.

STATUS OF UKAB REPORTS

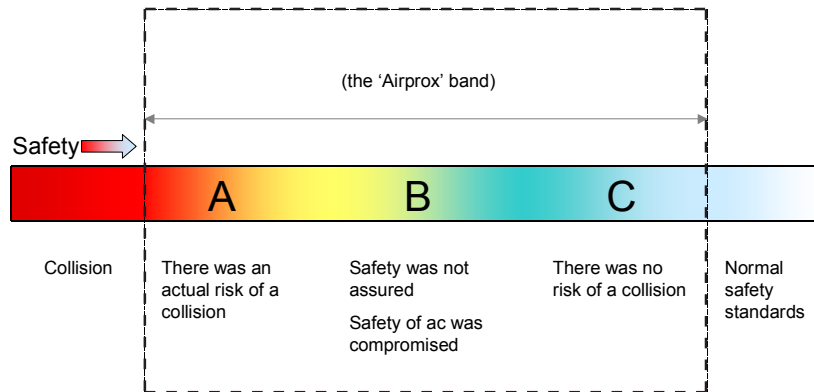
The sole objective of the UK Airprox Board is to assess reported Airprox in the interests of enhancing flight safety. It is not the purpose of the Board to apportion blame or liability. To encourage an open and honest reporting environment, names of companies and individuals are not published in UKAB's reports.

RISK CATEGORIES

Risk level assessments are made on the basis of what actually took place and not on what may or may not have happened. There are four agreed categories as follows:

A Risk of collision	An actual risk of collision existed
B Safety not assured	The safety of the aircraft was compromised
C No risk of collision	No risk of collision existed
D Risk not determined	Insufficient information was available to determine the risk involved, or inconclusive or conflicting evidence precluded such determination

A pictorial representation of the main Airprox risk bands is shown below:



An AIRPROX is described as: "A situation in which, in the opinion of a pilot or a controller, the distance between ac as well as their relative positions and speed was such that the safety of the ac involved was or may have been compromised"

THE UKAB DATA SET

The UKAB Airprox database comprises a set of records which relate to a specific Airprox. As an investigation proceeds, from first report until the conclusion of the Board's deliberations, fields within the appropriate record are completed by the UKAB Secretariat. Analysis of a set of records is then possible to produce information.

On pages 7 to 12, this report follows established practice, giving a broad overview on general trends and then examining in more detail some specific results for each of the three principal airspace user groups Commercial Air Transport (CAT); General Aviation (GA) and Military.

To begin this review, a map (overleaf) of the UK showing the location of those Airprox that were reported in the period January–June 2004 and which were subsequently opened for full investigation is included. (Please note that some events reported as Airprox are subsequently withdrawn and are thus not subject to full investigation. *Note also that only the reporter can withdraw an Airprox*).

Map 1: location of Airprox reported in the period January–June 2004 which were subsequently opened for full investigation.

Airprox location ○



AIRPROX NUMBERS INVOLVING CIVIL AND MILITARY AIRCRAFT

HALF-YEAR COMPARISONS 2003 AND 2004

A total of 109 Airprox were reported and opened for full investigation in the period 01 January to 30 June 2004. As shown in Figures 1 and 2, the proportion of Civ~Mil encounters has remained constant whilst the balances of Civ~Civ and of Mil~Mil have moved by 4-5%. The figures underpinning the two pie-charts are given in Tables 1 and 2 below.

Civil/Military Mix: January – June 2003

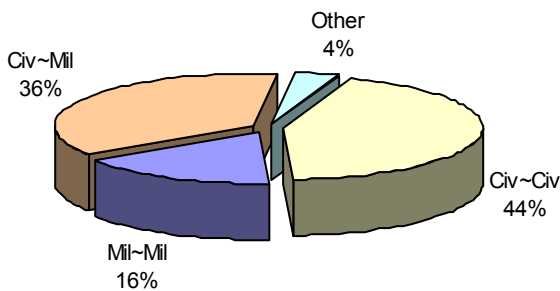


Figure 1

Civil/Military Mix: January – June 2004

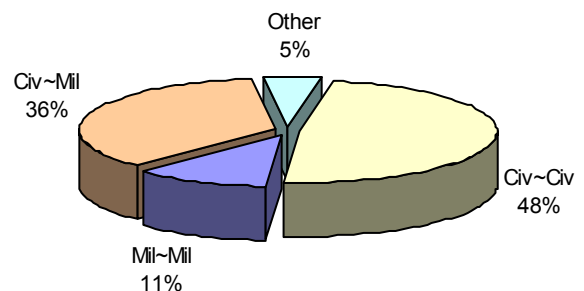


Figure 2

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	2	1	1	1	4	5	14
Civ~Mil	2	2	7	4	7	9	31
Civ~Civ	3	6	2	6	6	14	37
Other		1	1	1			3
Totals	7	10	11	12	17	28	85

Table 1

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	2	1	2	2	3	2	12
Civ~Mil	3	5	12	5	9	5	39
Civ~Civ	2	3	8	14	16	10	53
Other				1	3	1	5
Totals	7	9	22	22	31	18	109

Table 2

Exploring the changes in more detail, the data in Tables 1 and 2 can be expressed as in Tables 3 and 4 below.

Mix details for 2003 (Jan - Jun):	
CAT~CAT	6
CAT~GA	13
GA~GA	18
CAT~Mil	12
GA~Mil	19
Mil~Mil	14
CAT~unknown	1
GA~unknown	1
Mil~unknown	1
Totals	85

Table 3

Mix details for 2004 (Jan - Jun):	
CAT~CAT	10
CAT~GA	16
GA~GA	27
CAT~Mil	16
GA~Mil	23
Mil~Mil	12
CAT~unknown	1
GA~unknown	1
Mil~unknown	3
Totals	109

Table 4

As can be seen, the increase of 24 Airprox in the period is, with two exceptions, spread evenly across the categories. The exceptions are for Mil~Mil (decrease of two) and GA~GA, an increase of nine (which will be referred to later).

WHO MET WITH WHOM?

Jan to Jun 2004	CAT Helicopter	CAT Passenger	GA (Hire & Reward)	GA Company Ac	GA Glider	GA Helicopter	GA Private or Club	GA Training	Untraced GA Ac	Military Fixed Wing	Model aircraft	Military Glider	Weather Balloon	Unknown	Other Civil Ac	Untraced aircraft	Totals
CAT Cargo								1									1
CAT Passenger		10	2	1			6	3	1	12				1			36
GA (Hire & Reward)			1					1		4							6
GA Company Ac								1		1							2
GA Glider			1				2										3
GA Helicopter							3			1	1						5
GA Private or Club		2		1	1		9	1		6							20
GA Training							3	1	1								6
Military Fixed Wing	1	2			1		4	1		10	1			1	1	1	23
Military Glider						1											1
Military helicopter		1		1			2			2							6
Totals	1	15	4	3	2	1	29	9	2	36	2	0	0	2	1	2	109

Table 5 (above) provides a breakdown showing 'who met with whom?' in Airprox in the first six months of 2004. As last year, the highest number of encounters (49) were experienced by pilots of military fixed wing aircraft, CAT (with 43) being next in the list and GA pilots flying Private or Club aircraft coming third with 40 incidents.

AIRSPACE IN WHICH CONFLICTS TOOK PLACE – JANUARY TO JUNE 2004

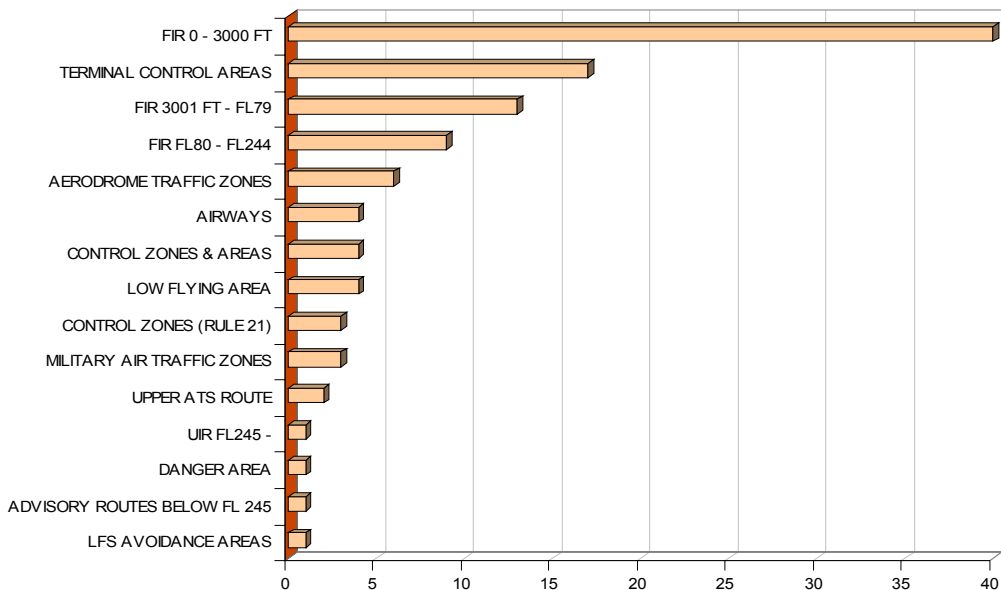


Figure 3

Figure 3 (above) shows the various classes of airspace in which Airprox events occurred in the first six months of 2004. The most notable feature is the increase, comparing Jan-Jun 2004 with the same period in 2003, of incidents in Class G airspace, the 'Open FIR', in the altitude band from ground level to 3,000ft. The increase is from 25 to 40 Airprox, equating to an increase in percentage terms from 29 to 37% of all Airprox in the period.

This increase reflects through into the result for Airprox in the first six months of 2004 occurring in Class G airspace: almost 75% compared with 60% for the same period in 2003.

Increases are also noted for Airprox inside Terminal Control Areas – from 10 to 17 – and the number of Airprox occurring in Airways is down by almost 50%, from seven events to four (note that 'Airways' and 'Terminal Control Areas' are both Class A airspace). It is pleasing to note that the number of events occurring in Low Flying Areas is also down, from nine to four. The number of Airprox in the 'Open FIR' in the altitude/level band from 3,001ft to FL79 is up from three to 13.

CAT Involvement in Airprox: January - June in 2003 and 2004

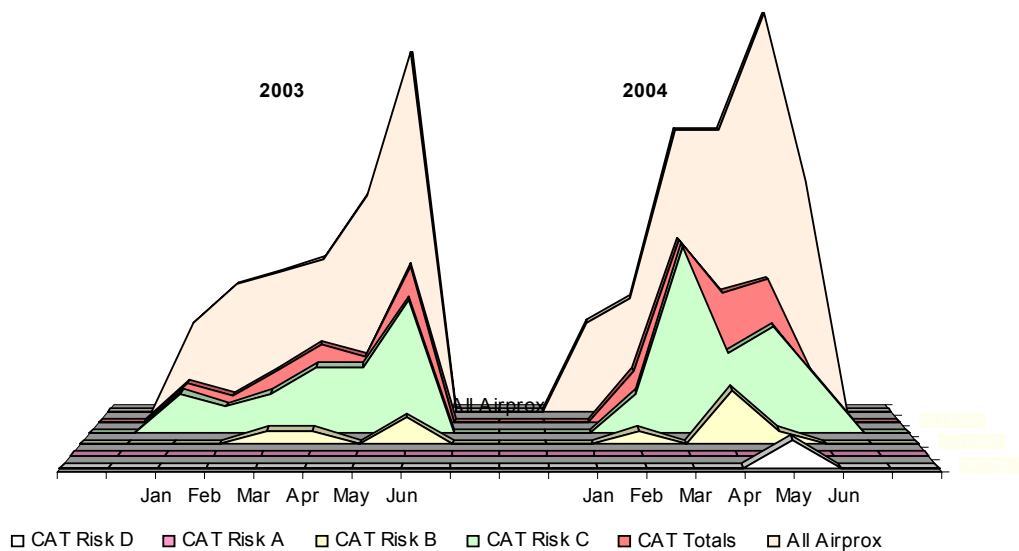


Figure 4

Figure 5

Risk results for CAT aircraft are plotted in Figures 4 and 5 above using data from the two tables below.

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	0	0	1	1	0	2	4
Risk C	3	2	3	5	5	10	28
Risk D	0	0	0	0	0	0	0
Totals	3	2	4	6	5	12	32

Table 6

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	0	1	0	4	1	0	6
Risk C	0	3	14	6	8	4	35
Risk D	0	0	0	0	2	0	2
Totals	0	4	14	10	11	4	43

Table 7

As the tables show, there were again no Risk Category A incidents. The number of Risk Category B incidents increased by two and the combined number of Risk levels C and D increased by nine.

In terms of Causal Factors for CAT Airprox, Table 8 below shows the different reasons behind the 43 encounters involving CAT aircraft in the first six months of 2004. To be strictly accurate, the Table shows all bar the 'one off' examples of cause such as 'Misunderstood RT/Apparent Language Difficulty'.

Ser.	Cause	Totals	Attributed to
1	DID NOT SEPARATE/POOR JUDGEMENT	18	CONTROLLER
2	CONFUSION/ POOR COORDINATION	5	CONTROLLER
3	DID NOT SEE CONFLICTING TRAFFIC	4	PILOT
4	FIR CONFLICT	4	OTHER
5	'BANDBOXING'/HIGH WORKLOAD	4	CONTROLLER
6	UNDETECTED READBACK ERROR	4	CONTROLLER
7	PENETRATION OF CAS/ATZ WITHOUT CLEARANCE	3	PILOT
8	SIGHTING REPORT	3	OTHER
9	LATE SIGHTING OF CONFLICTING TRAFFIC	3	PILOT
10	DID NOT ADHERE TO PRESCRIBED PROCEDURES	3	PILOT
11	DISTRACTION / FAILURE TO MONITOR	3	CONTROLLER
12	INADEQUATE AVOIDING ACTION/LACK OF POSITIVE CONTROL	2	CONTROLLER
13	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	2	PILOT
14	DID NOT ADHERE TO PRESC'D PROCED'S/OPERAT INSTR'S	2	CONTROLLER
15	NOT OBEYING INSTRUCTIONS/ FOLLOWING ADVICE FROM ATC	2	PILOT

Table 8

There were 76 different causes assigned to the 43 Airprox involving CAT aircraft. Because one Airprox can have more than one causal factor so there is no 'one to one' relationship between number of Airprox and causal factors.

In the period January-June 2003, 'Did Not Separate/Poor Judgement' was also at the top of the list. All of the 2003 incidents where this was causal factor were assessed as Risk Category C: in the same period in 2004 all bar one were assessed as Risk Category C, the exception being one assessed as Risk Category B.

Again comparing the same two periods, it is noteworthy that 'Penetration of CAS/ATZ Without Clearance', second on the list of causes in 2003 with nine events, has now dropped to seventh on the list with three such incidents.

As has been mentioned, any analysis of the data must be undertaken with care because in general the numbers are small.

GENERAL AVIATION (GA) SECTION

GA: Risk Results

Figures 6 and 7 (overleaf) plot the data in Tables 9 and 10 (also overleaf) to show the GA Risk results from the two January – June periods in 2003 and 2004. When figures are expressed in percentage terms, the proportion of Risk A events is slightly higher; that for Risk B slightly lower and the proportion of Risk Bearing (Risk A+B) Airprox is unchanged at 43% of the total.

GA Involvement in Airprox: January - June in 2003 and 2004

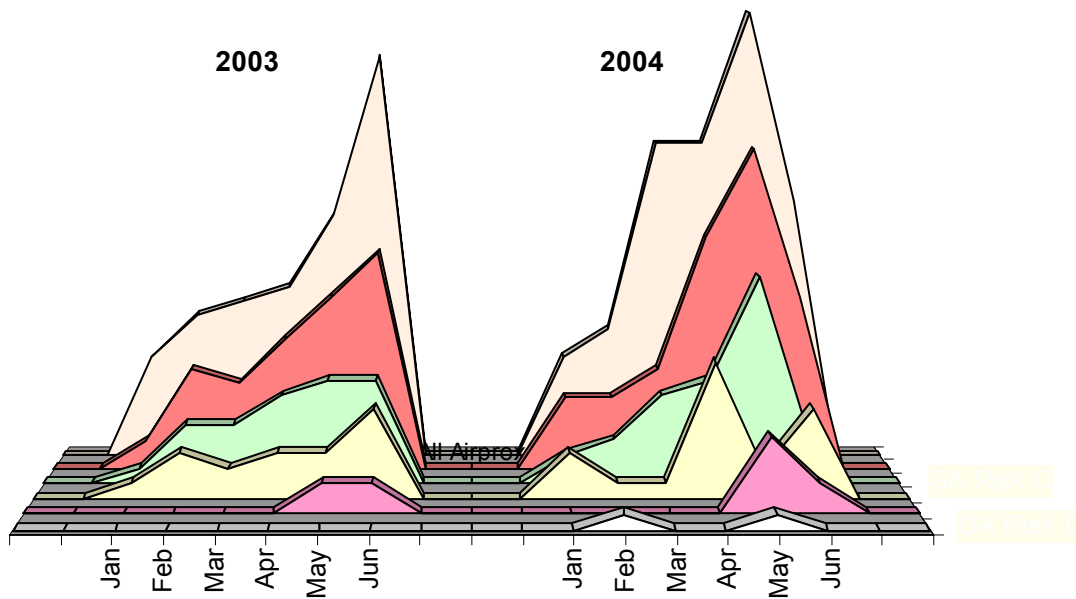


Figure 6
 Figure 7

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	2	2	4
Risk B	1	3	2	3	3	6	18
Risk C	1	4	4	6	7	7	29
Risk D	0	0	0	0	0	0	0
Totals	2	7	6	9	12	15	51

Table 9

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	5	2	7
Risk B	3	1	1	9	2	6	22
Risk C	2	3	6	7	14	4	36
Risk D	0	1	0	0	1	0	2
Totals	5	5	7	16	22	12	67

Table 10

GA: Causal Factors

Table 11 shows the principal causal factors assigned to the 67 GA Airprox which occurred in January – June 2004. As in the same period in the previous year, 'see and avoid' underpins the first two entries in the Table. It is pleasing to note that the number of penetrations of CAS/ATZ without clearance has dropped from 10 to six.

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	19
2	LATE SIGHTING OF CONFLICTING TRAFFIC	14
3	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	6
4	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	3
5	FAILURE TO ADHERE TO PRESCRIBED PROCEDURES	3
6	FLYING CLOSE TO/OVER GLIDER OR PARADROP SITE	3
7	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	3

Table 11

MILITARY SECTION

Military: Risk Results

Military Involvement in Airprox: January - June in 2003 and 2004

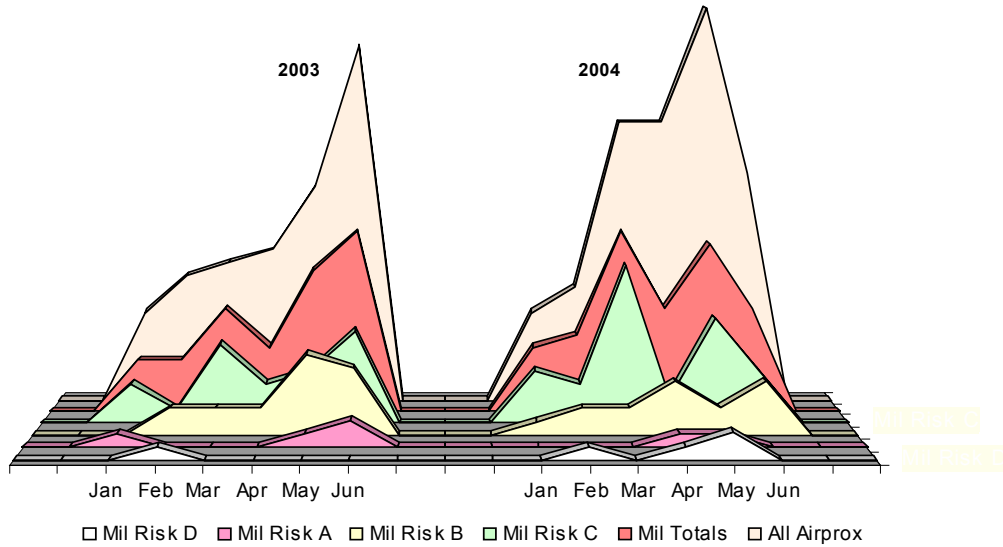


Figure 8

Figure 9

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	1	0	0	0	1	2	4
Risk B	0	2	2	2	6	5	17
Risk C	3	1	6	3	4	7	24
Risk D	0	1	0	0	0	0	1
Totals	4	4	8	5	11	14	46

Table 12

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	1	1	0	2
Risk B	1	2	2	4	2	4	15
Risk C	4	3	12	2	8	4	33
Risk D	0	1	0	1	2	0	4
Totals	5	6	14	8	13	8	54

Table 13

Figures 8 and 9 plot the data in Tables 12 and 13 to show the distribution by month of Airprox with a military aircraft involvement. Table 14 lists the principal causal factors and it is pleasing to note that notwithstanding an increase in the number of incidents, the figure for penetrations of CAS/ATZ without clearance has dropped from five to two. As in the past, it is the 'see and be seen' issue that predominates in the list, with actual numbers much as in 2003.

Ser.	Cause	Totals:
1	LATE SIGHTING OF CONFLICTING TRAFFIC	10
2	DID NOT SEE CONFLICTING TRAFFIC	10
3	DID NOT ADHERE TO PRESCRIBED PROCEDURES	6
4	DID NOT PASS OR LATE PASSING OF TRAFFIC INFO	5
5	CONFUSION OR POOR COORDINATION INCLUDING AT HANDOVER	4
6	LACK OF CO-ORDINATION BETWEEN CONTROLLERS	4
7	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	2

Table 14

UKAB SAFETY RECOMMENDATIONS

UKAB Safety Recommendations are made when, following its consideration of any given Airprox, the Board believes that action needs to be taken to address a particular safety matter. It is for the organisation(s) concerned to decide how to respond to a UKAB Safety Recommendation. The information below updates actions being taken in response to those Safety Recommendations published in Report Number 11. Also listed are Safety Recommendations made more recently together with Responses where available. Updates will continue to be published until action is complete, indicated by 'CLOSED' in the 'STATUS' sections below.

Airprox 47/02: 22 Apr 02: involving a DHC8 and a SHAR Risk C

RECOMMENDATIONS: The MOD considers a review of the rules for Visual identification by military air defence ac in UK airspace.

ACTION: The MOD accepts this Recommendation. HQ 1Gp issued written guidance on 15 May 03 to all Air Defence aircraft crews on Targets of Opportunity (TOO) that states 'if the target cannot be identified by 5nms, crews are to ensure that a minimum of 3000ft vertical separation is maintained. Wherever possible, crews conducting TOO intercepts are to be in receipt of a radar service and are to avoid traffic that is not in Class G airspace'.

An updated version of Training Instruction 4 of 1984 (TI4/84) will be released during 2005, containing the guidance.

STATUS - ACCEPTED - OPEN

Airprox 225/02: 28 Oct 02: involving an SF34, a Ka13 Glider and a ASW19 Glider Risk C

RECOMMENDATION: That the City of Derry and the Ulster Flying Club review jointly their operating procedures.

ACTION: Agreement regarding the co-ordination of instrument approach traffic and gliding traffic in the vicinity of the ILS approach area has been reached with the Ulster Gliding Club. A Letter of Agreement detailing this co-ordination has been signed by City of Derry Airport/ Ulster Gliding Club.

STATUS – ACCEPTED - CLOSED

Airprox 74/03: 9 Jun 03: involving a B757 and a Learjet 35 Risk C

RECOMMENDATIONS: That the CAA considers:

1. Providing an update on the review into terminology used by civil controllers when effecting avoiding action.
2. Advising if there are other factors, which may inhibit civil controllers from using the terminology 'avoiding action'.

CAA ACTION:

1. The CAA accepts this Recommendation. A hazard analysis has been completed by an expert working group conducting an in-depth review on the effectiveness of three avoiding action phraseologies. The working group used a systematic safety assessment methodology to analyse the current UK avoiding action phraseology, introduced in 2001, and two options for change; the previous UK phraseology and that published by ICAO. Due to the complexity of the assessment, the final report of the hazard analysis was presented to the ATS Standards Department of the CAA Safety Regulation Group in June 2004.

Of the three examples, the report concludes that the avoiding action phraseology, used in the UK prior to 2001, is the most effective and recommends that it be reintroduced. Air Traffic Services Information Notice (ATSON) No. 49, issued on 11 August 2004, instructs ATS Units to implement the revised avoiding action phraseology on receipt of the ATSON and the necessary amendments to the Manual of Air Traffic Services Part 1 will be incorporated in Amendment 63 in October 2004.

2. The CAA accepts this Recommendation. The CAA understands that there are many factors that may inhibit certain controllers from using the terminology 'avoiding action'. The CAA has, for a number of years, actively campaigned to overcome any reluctance and, from the evidence available, this has been successful. However, the phrase 'avoiding action' does continue to be omitted on occasions. Often, this is simply a case of forgetting in the heat of the moment but there are numerous other reasons. The use of the words 'avoiding action' does not dictate whether, or not, an MOR must be filed. This depends on the circumstances surrounding an incident and the cases when an MOR must be filed are described in CAP382. 'The Mandatory Occurrence Reporting Scheme', which also emphasises that the overall objective of occurrence reporting "...is to use the reported information to improve the level of flight safety and not to attribute blame".

STATUS – 1. ACCEPTED – CLOSED

STATUS – 2 ACCEPTED - CLOSED

Airprox 156/03: 29 Aug 03 involving an A320 and a SHAR Risk B

RECOMMENDATION: That the CAA and the MOD reviews jointly the safety issues associated with ac that climb or descend in controlled airspace at such high rates that their Mode C indication cannot be interpreted by TCAS or ground based ATC equipment, thereby inhibiting any warning to pilots and/or controllers.

ACTION: The CAA and the MOD accept this Recommendation. A review team, comprising members from DAP and SRG, has examined the relevant issues concerning this incident and initiated a study into the effect of high rates of climb/descent on surveillance infrastructure and safety nets, such as TCAS and STCA. This work, conducted in cooperation with the MOD, will aim to quantify the problem and allow policy guidance to be issued to adequately manage the issue. This work is expected to be completed by Summer 2005.

STATUS – ACCEPTED – OPEN

Airprox 191/03: 26 Nov 03 involving an ATR 42 300 and a SHAR Risk C

RECOMMENDATION: MOD reviews regulations with a view to ensuring that all parties concerned acknowledge safety instructions. The MOD accepts this Recommendation. The Defence Aviation Safety

Centre (DASC) has reviewed the regulations and states that the extant policy for the acknowledgement of safety instructions is satisfactory. The DASC *Feedback* bulletin issue 14-04 dated 02 September 2004 contained a summary of the subject Airprox, highlighting the importance of acknowledging instructions.

STATUS – ACCEPTED – CLOSED

Airprox 04/04: 21 Jan 04 involving a PA31 and a PA28 Risk C

RECOMMENDATION: That the MOD, MOD (DPA), and CAA should jointly review the applicable Boscombe Down, Thruxton and Middle Wallop aerodrome/approach procedures to ensure that these conform to the requirements of Rule 39 of the Rules of the Air so as to ensure the safe integration of air traffic at these closely located aerodromes.

ACTION: The CAA accepts this Recommendation. The CAA is currently setting up a joint review of the Boscombe Down, Thruxton and Middle Wallop ADC/APC procedures with respect to compliance with Rule 39 of the Rules of the Air. The review will involve CAA (SRG, DAP), MOD and MOD (DPA) and will be completed by end of March 2005.

STATUS – ACCEPTED – OPEN

Airprox 18/04: 4 Mar 04 involving a Gulfstream 41 and an F16 Risk C

RECOMMENDATION: The MOD should review the safety arrangements in respect of major air exercises with a view to establishing an Air Safety Cell for each such exercise in order to minimise the risk of participating aircraft infringing Controlled Airspace.

ACTION: The Defence Aviation Safety Centre (DASC) is to conduct a Safety Review on the potential requirement for air safety cells for major exercises. It is presently believed that there have been nine Airprox and 18 Mandatory Occurrence Reports in the five-year period 2000-2005 that either have or may have involved exercise aircraft. These figures are to be checked as part of the work of the Review.

STATUS – ACCEPTED - OPEN

Airprox 39/04: 22 Mar 04 involving a B747 and a Hawk Risk C

RECOMMENDATION: The MOD review the applicable instructions and procedures for military ATC and ASACS controllers, when effecting co-ordination, to establish whether a requirement to give/obtain a 'read back' is warranted at the conclusion of such agreements with the aim of ensuring compatibility with promulgated civilian procedures and a unified joint procedure for use by all controllers who interact with one another in UK airspace.

ACTION: The MOD accepts this Recommendation. Having consulted with the other military air traffic service providers - namely, the Royal Navy and the Defence Procurement Agency - Headquarters No 3 Group, Strike Command is providing a consolidated response to this Recommendation. Extant military ATC coordination procedures are considered to be extremely robust and are very strictly adhered to by

all controllers. A set format is used that identifies traffic involved and coordination is only complete when a course of action has been agreed. Such a requirement is clearly indicated with the words “request coordination”. Coordination is often lengthy and complex and when carried out correctly, the course of action is clear and unambiguous. Any additional requirement to readback agreements would put an unacceptable burden on busy controllers. A change of military ATC procedures to incorporate a readback is not therefore warranted. However, the MOD has agreed to work with SRG with the intention of improving the comprehension associated with an act of coordination.

STATUS – ACCEPTED – CLOSED

Airprox 59/04: 28 Apr 04 involving an Embraer 145 and a Tornado F3 Risk B

RECOMMENDATION: The MOD and CAA should jointly the terminology used by Air Defence and Air Traffic controllers when effecting co-ordination with other military and/or civilian ATSUs, the aim being usage of a standardised form of phraseology which minimises the potential for any misunderstanding.

ACTION: The MOD accepts this Recommendation. As a result, an agreement has been reached that the CAA and MOD will form a Working Group to jointly review the coordination process and terminology used by military Air Traffic or Air Defence controllers and civilian controllers when providing traffic information or effecting coordination with other military and/or civilian ATSUs. Where considered appropriate, terminology will then be amended accordingly.

STATUS – ACCEPTED – OPEN

Airprox 97/04: 25 May 04 involving an MD80 and a CRJ Risk C

RECOMMENDATION: The CAA revise the UK AIP clearly to promulgate the requirement for flight crews to report inter alia their cleared level and, if appropriate, passing level, on initial contact with a controller subsequent to an RT frequency change.

STATUS – OPEN

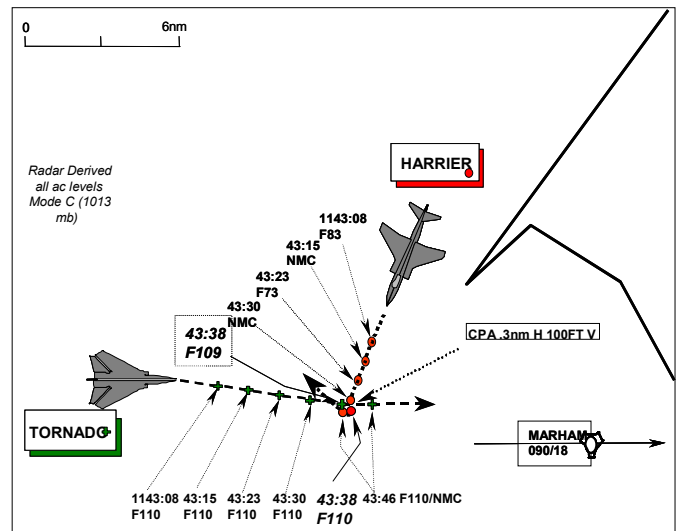
GLOSSARY OF ABBREVIATIONS

AAI	Angle of Approach Indicator	CWS	Collision Warning System
aal	Above aerodrome level	DA	Decision Altitude
ac	Aircraft	DAAvn	Director Army Aviation
ACAS	Airborne Collision Avoidance System	D & D	Distress & Diversion Cell
ACC	Area Control Centre	DF	Direction Finding (Finder)
ACN	Airspace Co-ordination Notice	DFTI	Distance from Touchdown Indicator
ACR	Aerodrome Control Radar	DH	Decision Height
A/D	Aerodrome	DME	Distance Measuring Equipment
ADC	Aerodrome Control(ler)	DUA	Dedicated User Area
ADF	Automatic Direction Finding Equipment	E	East
ADR	Advisory Route	EAT	Expected Approach Time
AEF	Air Experience Flight	ERS	En Route Supplement
AEW	Airborne Early Warning	est	estimated
AFIS(O)	Aerodrome Flight Information Service (Officer)	FAT	Final Approach Track
agl	Above Ground Level	FIC	Flight Information Centre
AIAA	Area of Intense Aerial Activity	FIR	Flight Information Region
AIC	Aeronautical Information Circular	FIS	Flight Information Service
AIP	Aeronautical Information Publication	FISO	Flight Information Service Officer
AIS	Aeronautical Information Services	FMS	Flight Management System
ALT	Altitude	FO	First Officer
amsl	Above mean sea level	fpm	Feet Per Minute
AOB	Angle of Bank	FPS	Flight Progress Strip
A/P	Autopilot	GAT	General Air Traffic
APP	Approach Control(ler)	GCA	Ground Controlled Approach
APR	Approach Radar Control(ler)	GCI	Ground Controlled Interception
ARP	Aerodrome Reference Point	GMC	Ground Movement Controller
ASACS SSU	Air Surveillance and Control System Standards and Safety Unit	GP	Glide Path
ASR	Airfield Surveillance Radar	H	Horizontal
ATC	Air Traffic Control	HISL	High Intensity Strobe Light
ATCC	Air Traffic Control Centre	HLS	Helicopter Landing Site
ATCO	Air Traffic Control Officer	HMR	Helicopter Main Route
ATCRU	Air Traffic Control Radar Unit	HPZ	Helicopter Protected Zone
ATIS	Automatic Terminal Information Service	HTZ	Helicopter Traffic Zone
ATM	Aerodrome Traffic Monitor	HUD	Head Up Display
ATS (U)	Air Traffic Service (Unit)	iaw	In accordance with
ATSA	Air Traffic Service Assistant	ICF	Initial Contact Frequency
ATSOCAS	ATSS Outside Controlled Airspace	IFF	Identification Friend or Foe
ATSI	Air Traffic Services Investigations	IFR	Instrument Flight Rules
ATZ	Aerodrome Traffic Zone	ILS	Instrument Landing System
AWACS	Airborne Warning and Control System	IMC	Instrument Meteorological Conditions
AWR	Air Weapons Range	JOI	Joint Operating Instruction
AWY	Airway	JSP	Joint Services Publication
BGA	British Gliding Association	KHz	Kilohertz
BHAB	British Helicopter Advisory Board	kt	Knots
BHPA	British Hang Gliding and Paragliding Association	km	Kilometres
BINA ERS	British Isles/N Atlantic En Route Supplement	L	Left
BMAA	British Microlight Aircraft Association	LACC	London Area Control Centre (Swanwick)
c	circa	LARS	Lower Airspace Radar Service
CAA	Civil Aviation Authority	LATCC(Mil)	London Air Traffic Control Centre (Military) (West Drayton)
CALF	Chart Amendment - Low Flying	LFA	Low Flying Area
CANP	Civil Air Notification Procedure	LFC	Low Flying Chart
CAS	Controlled Airspace	LLZ	Localizer
CAT	Clear Air Turbulence	LJAO	London Joint Area Organisation (Swanwick (Mil))
CAVOK	Visibility, cloud and present weather better than prescribed values or conditions	LOA	Letter of Agreement
CFI	Chief Flying Instructor	LTMA	London TMA
CinC Fleet	Commander in Chief Fleet, Royal Navy	MACC	Manchester Area Control Centre
CLAC	Clear Above Cloud	MATS	Manual of Air Traffic Services
CLAH	Clear Above Haze	MATZ	Military Aerodrome Traffic Zone
CLBC	Clear Below Cloud	mb	Millibars
CLBL	Clear Between Layers	MHz	Megahertz
CLOC	Clear of Cloud	MOD	Ministry of Defence
CMATZ	Combined MATZ	MRSA	Mandatory Radar Service Area
CPA	Closest Point of Approach	MSD	Minimum Separation Distance
C/S	Callsign	MTRA	Military Temporary Reserved Airspace
CTA	Control Area	N	North
CTR/CTZ	Control Zone	NNATS	National Air Traffic Services
		NDB	Non-Directional Beacon
		nm	Nautical Miles
		NK	Not Known

NOTAM	Notice to Airmen	USAF(E)	United States Air Force (Europe)
NR	Not Recorded	UT	Under Training
NVG	Night Vision Goggles	UTA	Upper Control Area
OAC	Oceanic Area Control	UTC	Co-ordinated Universal Time
OACC	Oceanic Area Control Centre	V	Vertical
OAT	Operational Air Traffic	VCR	Visual Control Room
OJTI	On-the-Job Training Instructor	VDF	Very High Frequency Direction Finder
OLDI	On-Line Data Interchange	VFR	Visual Flight Rules
PAR	Precision Approach Radar	VHF	Very High Frequency
PFL	Practice Forced Landing	VMC	Visual Meteorological Conditions
PF	Pilot Flying	VOR	Very High Frequency Omni Range
PI	Practice Interception	VRP	Visual Reporting Point
PINS	Pipeline Inspection Notification System	W	West
PNF	Pilot Non-flying		
PTC	Personnel & Training Command		
QDM	Magnetic heading (zero wind)		
QFE	Atmospheric pressure at aerodrome airport elevation (or at runway threshold)		
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)		
RAS	Radar Advisory Service		
RCO	Range Control Officer		
RIS	Radar Information Service		
ROC	Rate of Climb		
ROD	Rate of Descent		
RPS	Regional Pressure Setting		
RT	Radio Telephony		
RTB	Return to base		
RVSM	Reduced Vertical Separation Minimum		
R/W	Runway		
RVR	Runway Visual Range		
S	South		
SAP	Simulated Attack Profile		
SAS	Standard Altimeter Setting		
SC	Sector Controller		
ScATCC(Mil)	Scottish Air Traffic Control Centre (Military) (Prestwick)		
ScOACC	Scottish and Oceanic Area Control Centre		
SID	Standard Instrument Departure		
SMF	Separation Monitoring Function		
SOP	Standard Operating Procedures		
SRA	Surveillance Radar Approach		
SRA	Special Rules Area		
SRE	Surveillance Radar Element of precision approach radar system		
SSR	Secondary Surveillance Radar		
STAR	Standard Instrument Arrival Route		
STC	Strike Command		
STCA	Short Term Conflict Alert		
SVFR	Special VFR		
TA	Traffic Advisory (TCAS)		
TBC	Tactical Booking Cell		
TC	Terminal Control		
TCAS	Traffic Alert & Collision Avoidance System		
TDA/TRA	Temporary Danger or Restricted Area		
TFR	Terrain Following Radar		
TI	Traffic Information		
TMA	Terminal Control Area		
TRUCE	Training in Unusual Circumstances and Emergencies		
UAR	Upper Air Route		
UDF	Ultra High Frequency Direction Finder		
UHF	Ultra High Frequency		
UIR	Upper Flight Information Region		
UKDLFS	United Kingdom Day Low Flying System		
UKNLFS	United Kingdom Night Low Flying System		
UNL	Unlimited		

AIRPROX REPORT NO 001/04

Date/Time: 7 Jan 1143
Position: 5250N 00004W
 (27nm WNW Marham)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: Tornado GR4 Harrier GR7
Operator: HQ STC HQ STC
Alt/FL: FL110 11300ft
 (QNH 1013 mb)
Weather VMC CLAC VMC CLAC
Visibility: >10km >10km
Reported Separation:
 0.3nm H low 200yd H 200ft V
Reported Separation:
 0.3nm H 100ft V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE TORNADO PILOT reports flying a Grey GR4 ac on a singleton sortie from Marham with HISLs selected on. While heading 103° at 512kt having transited eastbound through the Lichfield radar corridor at FL110 under RC from London Military, the service was downgraded to a RIS and they were given TI on traffic left 11 o'clock, 8nm at FL80 manoeuvring but at this stage the traffic was not sighted. At 11.43:10 they were given a squawk change while they updated the ac navigation computer (11.43:30). Six seconds later they were passed further TI on manoeuvring traffic in their 12 o'clock at 1nm and the pilot became visual with the traffic ½nm away and took evasive action. The pilot assessed the range between the ac was within 0.3nm but that a collision was unlikely.

THE HARRIER PILOT reports flying a singleton GR7 in Arctic Camouflage with HISLs selected on carrying out GH and aerobatics to the E of Cottesmore. He was squawking with mode C and in receipt of a RIS from Cottesmore. He was heading 240° at 165kt and pulled up to carry out a half Cuban manoeuvre and at 70° nose-up he rolled inverted and saw a Tornado co-altitude at approximately 0.5nm, on a reciprocal heading. He delayed the pull down and rolled and pulled away from Tornado and at the same time it broke away. No information on the Tornado was passed to him. He reported the incident to Cottesmore ATC.

THE TORNADO STATION COMMENTS The FSO discussed the incident with the crew, viewed the HUD video and listened to the voice recording, a copy of which was provided. On departing the Lichfield corridor for recovery to Marham, the sequence of events was as stated in the pilot's report. The Harrier appears in the HUD below and in the 12 o'clock of the Tornado. The Tornado pilot rightly took avoiding action to ensure a safer separation; the Harrier appeared inverted in a high nose up attitude. Of note, the Harrier was in Arctic camouflage and although both ac were operating in VMC, there was a cloud layer below, which made visual conspicuity of the Harrier poor. The incident occurred in Class G airspace while both ac were operating under a RIS from different agencies; the see and avoid principle worked in this case, however the lack of TI to the Harrier is of some concern. Both pilots agree that there was little risk of collision.

THE HARRIER STATION COMMENTS that even under a limited RIS, the Harrier pilot could reasonably have expected a conflicting traffic call. However, the controller was very busy and did not make the call that would in all probability have prevented this incident. The pilot was in Class G airspace and did not

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need to be under any form of ATC service but sensibly elected for the RIS. In the aerobatic manoeuvre he saw and avoided the other ac that he noted was also taking evasive action. This incident shows that although aviators rely on a ground service they still need to maintain a constant look out – as would appear was the case in this incident from both cockpits

MIL ATC OPS reports that a Tornado GR4 departed the Lichfield Radar Video Corridor (RVC) at FL110 and was handed over to LATCC(Mil) Controller 3 (CON 3) at 1141:45 and CON 3 identified the ac and cleared the pilot on own navigation. CON 3 then called 2 separate conflicting contacts and at 1142:57 he called *“C/S, further traffic, left, eleven o’clock, range eight miles, manoeuvring indicating flight level eight zero”*, which the pilot acknowledged. CON 3 then instructed the pilot to change squawk from 6031 to 3656 for Marham and passed updated TI: *“C/S, manoeuvring traffic, now twelve o’clock, one mile, turn(ing) south, indicating seven five”* to which pilot responded *“now visual with that traffic, it was a close call”*. CON 3 questioned the pilot on the proximity of the conflicting traffic, the response was *“C/S, it was a late spot, we saw it coming from below, we’ll think about it”*.

At 1136:20, a Harrier called RAF Cottesmore Approach (APP) (band-boxed as APP/DIR) *“...fifteen miles to the east (of Cottesmore) at flight level one hundred...requesting a RIS for general handling for approximately ten minutes”*. APP instructed the Harrier to squawk 4610 and transmitted *“C/S traffic believed to be you has traffic, north west, five miles, crossing left right, indicating four hundred feet above”*. He then identified the Harrier under a RIS, called more traffic and established that the Harrier pilot wanted to manoeuvre between FL80 and FL240 and a minute later transmitted *“All stations, limited traffic information from all around due to poor radar performance”*. At 1139:30 the radar recovery ac requested an upgrade to a RAS whilst APP was also distracted on a landline conversation; APP provided the RAS ac with avoiding action and simultaneously received an unprenoted handover on a RIS formation from LATCC(Mil) for a radar recovery. APP handed over one ac to Talkdown at 1142:06 and proceeded to sequence the formation for recovery, continuously transmitting on RT with both administrative and control instructions to the formation. At 1143:59, the Harrier interrupted *“APP, C/S 2”*, and APP asked the Harrier to pass the message. The Harrier pilot advised *“just passed, errh, very close to a Tornado just over Spalding at eleven forty four, just wondered if you can see anything on radar, he’s gone out to the east, towards Marham?”* APP answered *“C/S, affirm, we have his squawk now indicating slightly below”*. The Harrier pilot inquired if that meant that the conflicting Tornado (GR4) was instrument traffic or just VFR? APP stated *“believe he’s working Marham now”* and the Harrier pilot reiterated *“just doing general handling and he just passed extremely close to me...if you’ll be able to speak to Marham and get his details, I’ll call him when I’m on the ground”*.

Analysis of the Claxby Radar video recording at 1142:47 shows the GR4 transiting 12nm NE of Cottesmore, tracking E at FL110 on a 6031 squawk. At the same time the Harrier is 23nm NE of Cottesmore, indicating FL88 on a 4610 squawk. As the GR4 maintains track and FL110, the Harrier turns onto a Westerly track then converges on a Southerly track as the Mode C disappears. The GR4 changes squawk at 1143:26 to a 3656 squawk and the Harrier is 3nm to the E indicating FL73. Again the Mode C of the Harrier disappears although it flashes with FL110 just as it comes into contact with the 3656 contact, also at FL110. At 1143:41, the 2 contacts merge, 20nm ENE of Cottesmore. The GR4 continues to head E and is observed at FL116; as the tracks diverge, the Harrier continues a right hand turn and indicates FL117.

The GR4 routed from the Lichfield RVC under control of CON 3 in receipt of a RIS. Pertinent TI was passed to the pilot and CON 3 acted in accordance with the rules of a RIS and additionally he updated the details of the conflicting traffic as it continued to constitute a hazard. Further CON 3 did not release the GR4 on a silent handover to Marham iaw the LoA until it was clear of the conflicting traffic. After the traffic had been recalled (at that specific point there was more than 3000ft between the 2 ac), the GR4 reported visual with the Harrier although he stated that the separation was very close. Under the rules of a RIS, CON 3 provided a timely and accurate service. Moreover, his diligence and foresight in anticipating the Harrier to manoeuvre rapidly in the vertical plane led him to call the traffic, this update could have enable the GR4 to gain visual acuity and hence prevented the situation from being worse.

The Harrier was also under a RIS, manoeuvring between FL80 and FL240 in between Cottesmore and the Wash Danger Areas under control of APP. At the time the Harrier first called for a service at 1136:20, APP's workload was not particularly high despite being band-boxed with DIR and operating 2 frequencies in poor weather conditions. Within the following 5min the scene changed markedly and APP became extremely busy very quickly. Simultaneously he dealt with a freecall for a random radar recovery, a protracted landline discussion, and an unprenoted handover all interspersed with standard DIR administration and controlling instructions. Although the unit's workload had been low, the controller's workload was high; additionally in response to a request he upgraded a RIS ac to a RAS when he could have continued to provide a RIS, in accordance with the rules of a RIS "*subject to the controller's workload*". As APP upgraded the service to a RAS, his priorities were appropriately displaced from the manoeuvring Harrier on the RIS to the RAS ac, now in the DIR pattern. Meanwhile the GR4 was on a steady converging heading at FL110 but at no time was it called to the Harrier, despite the 2 contacts merging with only a few hundred feet vertical separation. In this regard APP did not satisfy all the requirements of a RIS despite the adage "*the pilot is wholly responsible for maintaining separation from other ac whether or not the controller has passed traffic information*". It is understood from the Unit report that APP did request help from the Supervisor but both controllers were concentrating on the higher priority RAS traffic in the DIR radar pattern and neither spotted the conflicting GR4. When he started to get busy, APP could have offered the Harrier to LATCC(Mil) for his manoeuvring (in exchange for the unprenoted formation inbound) or limit the RIS ac until capacity allowed or until a DIR was manned. Supervisors are often faced with making the decisions to allow appropriate levels of rest amongst controllers. The Supervisor stated that he was constrained by manning options, which left him no choice but to bandbox the APP and DIR tasks on one controller and it is accepted that this was a contributory factor to the incident.

HQ STC comments that this Airprox illustrates once again the need to communicate one's intentions. While there was no formal requirement to do so, the APP/DIR controller could have transmitted to the Harrier that his service would be de-graded which, in turn, may have made the pilot re-prioritise his lookout scan.

Fortunately, see and avoid prevailed, albeit very late. The Arctic camouflage of the Harrier was a contributory factor to the Airprox, and all aircrew should be aware of their ac's conspicuity (or lack of it) in differing environmental 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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members considered in turn the parts played by the 4 parties involved in this incident.

LATCC (Mil) Controller 3 provided accurate and timely information to the Tornado crew under the RIS enabling them to acquire the rapidly manoeuvring Harrier at ½nm and to take avoiding action, albeit later than they would have liked. The late sighting was most probably because of the lack of conspicuity of the Harrier's Arctic camouflage scheme against the background of cloud and its approach from well below. The Harrier however, also under a RIS but from Cottesmore, was not afforded the same high-calibre information; on the contrary he was given almost none and Members believed this had contributed to the eventual outcome. While accepting that the RIS was degraded by the poor radar performance due to the weather clutter, specialist ATC members considered that the controller should have seen the Tornado approaching on an undeviating flight path and warned the Harrier pilot about it. Had he done so it was thought likely that the Harrier would have noted the risk and modified his GH profile accordingly, thus preventing the incident.

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Undermanning in ATC agencies is always of concern to the Board, particularly if it leads to degradation in service. In this case the Supervisor would appear to have had no option but to bandbox the APP and DIR functions and accept that this necessarily meant a lower standard of service to customer ac. Allowing that this was the case, that no reinforcements were available and that the very high workload situation developed quickly, specialist Members thought that a prudent course of action would have been to load-shed lower priority ac by requesting London Mil to accept the Harrier concerned or, in the unlikely event of that not being possible, terminate service and allow staff to concentrate on the higher priority RAS ac approaching the airfield in poor weather from the radar pattern. Although not contributing directly to the incident Members considered that the controller should have amplified the limitation on the RIS since the term 'Limited RIS' in isolation is not very helpful to aircrew.

Notwithstanding these factors, the pilots both saw the opposing ac in this conflict and in sufficient time to change their flightpaths enough to prevent there being any risk of the ac colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the FIR resolved by both pilots.

Degree of Risk: C.

Contributory Factors: The lack of TI from Cottesmore APR/DIR to the Harrier pilot.

AIRPROX REPORT No 002/04

THE ESSEX RADAR CONTROLLER an OJTI, reports that he was mentor to a trainee whilst working the Essex RADAR position at LTCC. The Jetstream 31 crew was under a limited RIS - due to controller workload. Traffic information on the unknown ac squawking 4656 – the PA44 - was given when at 11 o'clock - 4nm as the PA44's Mode C showed 2100ft ALT. Further traffic information was given when the ac had closed to 1nm still showing 2100ft. After the aircrafts' tracks had crossed the PA44's Mode C was indicating 2400ft. Subsequently, a telephone call was received from the JS31 pilot thanking them for the timely traffic information provided.

LTCC ATCI reports that the Jetstream 31 was inbound to Northolt and established contact with Essex RADAR at 1713:00. The crew reported they were maintaining 3000ft QNH and was instructed by Essex to *"...route towards BARKWAY...descend to 2400ft...Stansted QNH 1015mb limited radar information service BARKWAY CHARLIE arrival for Northolt"*. Although the JS31 crew read back the altitude and routeing the pilot did not read back the type of ATS. The Essex controller subsequently recognised that a slow moving unknown ac with a Mode C indicating 1500ft, was in potential conflict with the JS31 and at 1714:10, passed traffic information on this to the crew. At this point the unknown traffic – the PA44 - squawking A4656 - an unvalidated and unverified SSR code allocated to Cambridge APPROACH for conspicuity purposes - was in the JS31's 12 o'clock - 7.6nm and tracking in a generally southwesterly direction. Shortly afterwards at 1714:30, the JS31 crew was instructed to route direct towards the BPK. However, the unknown PA44 had climbed slowly through 2000ft Mode C, had continued on its southwesterly course and so traffic information on this ac was updated to the JS31 crew at 1715:20, *"..that traffic 11 o'clock 4 miles"*. By 1716:18, the Essex RADAR controller had recognised that the unknown traffic had turned onto a westerly track and appeared to be in potential conflict with the JS31 and advised the crew, *"...that traffic now turning cross you left to right...11 o'clock 1 mile 2100 feet unverified."* Whereupon the Jetstream crew immediately reported visual contact. No further transmissions were made between Essex and the JS31 crew relating to the occurrence, but the radar recording shows that as the tracks of the two ac crossed, the unknown PA44 was in a climb. At 1716:35, separation reduced to 0.2nm at the same altitude as the JS31 crossed ahead of the PA44.

ATSI reports that the PA44 was in receipt of a FIS from Cambridge and squawking an unverified conspicuity SSR code. The PA44 completed some instrument training at Cambridge and, at 1709:40, reported going around to depart IFR back to Cranfield. The crew's intention was to route back to Cranfield remaining outside CAS. The PA44 climbed initially to 2000ft before turning R, on course to the 'CIT', then climbing further toward 4500ft. At 1715:10, the PA44 pilot reported passing 2000ft and was instructed by Cambridge to squawk A7010 (a Cranfield IFR Conspicuity code) and to contact Cranfield APPROACH. The JS31 was inbound to Northolt from Leeming and contacted Essex RADAR at 1713. The pilot reported he was flying at 3100ft and was cleared to route BARKWAY descending to 2400ft as well as being placed under a Limited RIS. At 1714:10, the Essex RADAR controller passed traffic information to the JS31 crew regarding unknown traffic - the PA44. At that point, the PA44 was 12 o'clock – 7nm crossing from L - R. Shortly afterwards, the JS31 was cleared to route direct to BROOKMANS PARK. Traffic information on the PA44 was updated at 1715:20 and again at 1716:20, whereupon the JS31 crew reported visual with the PA44. The PA44 established contact with Cranfield APPROACH, (who are not equipped with radar), shortly after 1717:30 – after the Airprox had occurred. The pilot made no comment about the JS31, which by now, had passed.

Minimum separation occurred at about 1716:40, at a position about 8nm NW of BKY when the PA44 climbed through the level of the JS31 with a lateral separation of only 0.2nm. This took place after the PA44 crew had been instructed to change frequency by Cambridge, but before they called on the Cranfield APPROACH frequency. There are no apparent civil ATC contributory factors.

THE JETSTREAM31 PILOT'S STATION comments that this appears to be a conflict in Class G airspace where, following traffic information from the Essex RADAR Controller, the Jetstream crew visually sighted the conflicting traffic, and were able to take late avoiding action. Flying in intermittent IMC, the Jetstream crew were rightly concerned and felt the safety of their ac had been compromised (especially given the perceived miss distance), despite the best efforts of the controller who nonetheless

passed essential traffic information. It is considered that if the Jetstream had been fitted with TCAS, the crew would have been able to improve their situational awareness regarding the conflicting traffic and may have been able to take earlier avoiding action.

CinC FLEET comments that this Airprox appears to have been a conflict in Class G airspace between two ac, that it was resolved was largely due to the timely action of a very busy controller who was not obliged under the limited service being provided to call the conflicting traffic to the Jetstream but whom, by doing so, afforded the crew to focus their attention on the required area. Nevertheless this was obviously an uncomfortably close call for both crews. Notwithstanding the constant and correct exhortations for crews to maintain a good lookout there are occasions when lookout alone may not be enough; had TCAS been fitted to the Jetstream it would have allowed a much earlier identification and resolution of this conflict.

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 evident from the respective reports that the Jetstream crew was not in receipt of a RAS as the reporting pilot thought. The tape transcript clearly revealed that ESSEX had placed the flight under a limited RIS at the outset, but the controller had not stated the nature of the limitation to the service, which in this instance was workload. Pilots should always acknowledge the type of ATS and if appropriate should request an upgrade. In this instance some controller members wondered if the JS31 pilot had filed because he was expecting avoiding action and to be separated from other observed traffic in the vicinity, whereas he was correctly given only traffic information under the limited RIS with no avoiding action proffered. Descending IMC in this area at night, without a RAS was considered by some unwise especially without the benefit of TCAS. This was apparently in the mind of the JS31 pilot when he filed the Airprox, but he would have been better advised to lobby the operating authority rather than misuse the Airprox system to highlight deficiencies in the operator's equipment funding arrangements. In the Board's view, the worth of TCAS has undoubtedly been proven, but the CinC Fleet members explained that unfortunately, it was not intended to fit such equipment to the Jetstream fleet.

On another tack, the JS31 pilot's chosen routeing was considered by some members to be less than ideal; an IMC transit at night in the busy and confined Class G airspace beneath the LTMA courted risk as demonstrated. Although less direct and without the benefit of CAS for a portion of the route emanating from Leeming, the HQ STC member thought it far better to route via the airways structure into Northolt, which would have afforded a greater degree of 'protection' to the flight. Nonetheless, the JS31 pilot had seen the confliction with the PA44 – albeit at a late stage – and managed to turn R to avoid it, achieving he thought ½nm and 100ft separation. Neither Cambridge nor Cranfield could provide a warning about the presence of the JS31 to the PA44 crew as neither ATSU can provide a radar service to traffic in transit and it was most unlikely that the JS31 crew would have called either for a service whilst inbound to Northolt. As a result, the PA44 instructor would never have gained any 'early warning' of the flight, but he did see the JS31 first at a range of 1nm and was already in the process of taking avoiding action by turning R behind the twin turboprop (by what he thought was 0.2nm at the closest point) when the Jetstream pilot acquired his smaller ac. As it turned out this was exactly right according to the radar recording and the Board thought the PA44 instructor could not have done more to avert the conflict other than obtain a radar service from ESSEX RADAR. The Board concluded, therefore, that this Airprox had resulted from a conflict in Class G airspace resolved by the PA44 pilot, and that no actual risk of a collision had existed in the circumstances reported.

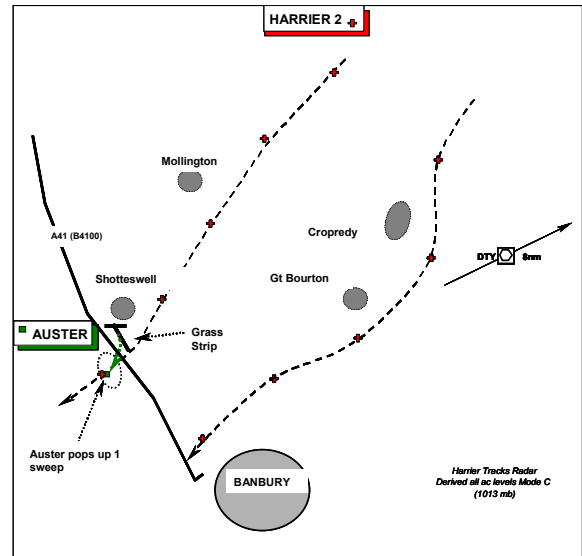
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict resolved by the PA44 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 003/04

Date/Time: 16 Jan 1635
Position: 5206 N 00123 W
 (Shotteswell Airfield)
Airspace: UKDLFS LFA4 (Class: G)
Reporting Ac Reported Ac
Type: Auster J5F Harrier GR7
Operator: Civ Pte HQ STC
Alt/FL: 750ft 400ft
 (QNH 1024mb) (Rad Alt)
Weather VMC CLBC VMC CAVOK
Visibility: 10km 20km
Reported Separation:
 30ft V 30ft H below V 0 H
Recorded Separation:
 About ¼ nm H NR V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE AUSTER J5F PILOT reports flying a red and white ac with no lights in receipt of an FIS from Oxford (he thought). While heading 230° at 70kt and 750ft QNH (220ft agl) after take off from, Shotteswell, an active private airfield in Oxfordshire, he was overtaken from his 0730 position by a Tornado (subsequently traced to be a Harrier) slightly above his height in a left turn. He first saw the ac after it had passed him 30ft away and he therefore took no avoiding action but experienced severe turbulence and assessed the risk of collision as being high. The airfield suffers from, continued overflying of military jets, particularly on Wednesdays, so the residents avoid local flying on that day. This incident however occurred on a Friday afternoon so no military activity was expected. Since the airfield at Shotteswell is marked on the CAA VFR maps no traffic below 500ft should be expected except for the purpose of take-off and landing.

[UKAB Note (1): Considerable difficulty was encountered in establishing the time of this incident since at the reported time the ac was recorded as being on the ground at Oxford between 2 flights. Further, at that time there was no military traffic in the UK LFS. The pilot was contacted and was certain that the timing was correct. In an attempt to resolve the anomaly however the radar recordings for 1 hour earlier were examined. At that time the Auster was recorded as being airborne on an Airtest from Oxford and traffic, later traced as a formation of Harriers, was observed in the Shotteswell area].

THE HARRIER GR7 PILOT reports that the incident occurred on a transit from Wittering to a tactical formation sortie in Wales. The pilot was the wingman of a 2 ac formation about 2nm abeam his leader to the right squawking with mode C with no CWS fitted. While heading 250° at 420kt and 400ft he briefly noted a white object low in his 10 o'clock which passed rapidly beneath his ac then re-sighted moving a way in the 4 o'clock position. Owing to the short time between his sighting the ac and its passing underneath, he was unable to estimate vertical separation, initiate avoiding action or assess risk of collision.

The precise location, altitude and heading of his ac at the time of the incident were unknown, as his cockpit video did not run. Post incident, owing to the proximity of Banbury airstrip and the low altitude of civilian traffic, he concluded that the ac was operating from there and attempted to contact the operators of Banbury airstrip (Shotteswell), however no reply was received.

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THE HARRIER STATION comments that this appears to be a classic case of see and be seen that fortunately ended in a safe outcome. It was noted that both Harrier pilots saw the ac too late to take avoiding action and the light ac flew under the formation who were operating slightly above their normal low level height.

[UKAB Note (2): Examination of the radar recording showed the pair of Harriers flying in Battle formation just under 2nm apart heading to the SW just to the N of Banbury. Both ac could be seen weaving slightly, presumably to avoid overflying the numerous small villages in the area. The Northerly ac, the wingman and the ac involved in the Airprox, overflew the airfield at 1528:45 on a heading of about 230° and overtook the Auster from its 7 o'clock departing in its 1 o'clock. The Auster pops up on radar for one sweep only and displayed no Mode C so the relative heights of the ac could not be determined positively. The elevation of the airfield is 530ft and the Harrier reported flying at 400ft Rad Alt which equates to 930ft amsl, but he was unable to assess the vertical separation as the Auster passed below him. The Auster pilot reported flying at a height of 220ft agl equating to an alt of 750ft amsl and he received severe turbulence, therefore it is reasonable to assume that the alts reported by both pilots are reasonably accurate; this gives a vertical separation of 180ft between the ac. The horizontal distance between the ac measured on the sweep immediately (2-3sec) before the CPA is of the order of ¼ nm and does not reduce substantially. Since the Harrier departed rapidly (6nm/min overtake) in the Auster's 1 o'clock, slightly above it, it may have appeared to the pilot to have been about the same height and similarly, since the CPA was abeam him, it would have been very difficult to estimate the lateral separation with any degree of accuracy.

The best estimate therefore, of the miss-distance is ¼ nm and about 180ft].

HQ STC comments that Shotteswell airfield was obliterated by data printed on the Harrier Mission Planning Aid (HAMPA) generated pilot's map. Thus the Harrier pilot was potentially unaware of the airstrip until after the event. All crews should note that the use of computer-generated maps can cause this problem and route markings should be studied carefully during pre-flight preparation for such occurrences and, if necessary, the symbols should be moved.

Since the incident occurred in Class G airspace and neither pilot was in a position to be aided by a radar service total reliance was placed on 'see and avoid' which, in this instance, failed due to a number of factors: a low contrast coloured ac, that has recently taken off and was therefore below the horizon, the lack of high intensity lights on the reporting ac, poor planning by the reported ac, the lack of any warning from electronic sensors of the presence of another ac. Without all of these being addressed it is quite possible that such an occurrence could happen again. Had both ac been CWS equipped it is probable that this incident would not have occurred, however, in this instance the Auster was not transponder or CWS equipped and the integration of TCAS/CWS is difficult, expensive and still a way off for Harrier. We understand however that lightweight, inexpensive Traffic Proximity Alert Systems (TPAS) are now becoming available and these will detect transponding ac out to range of 5-10nm and will alert the user that a transponding ac is present (all military fast jets are required to squawk 7001/C whilst in the UKLFS). Such a system would have warned the Auster of the Harrier's presence.

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.

Shotteswell is clearly annotated on both civil and military charts and listed in respective AIPs as an airfield. The Harrier pilot should therefore have been aware of its presence and avoided it by a safe margin. The point is well made by HQ STC that regardless of its obscuration on the map generated by the mission-planning computer, pilots have an obligation to check against a fully updated map for such

inadequacies and, if necessary, move data blocks to reveal the symbology below. Not being aware of the airfield, the pilot would not have increased his lookout for other ac in its vicinity.

Old ac, such as the Auster involved, do not have the benefit of modern technology, lighting or the generator performance to power it and can be very difficult to see, particularly almost into a setting sun. TPAS as mentioned in the STC comment is however, relatively inexpensive, internally powered, hand held and will disclose the presence of all military ac in the vicinity which are required to squawk when flying VFR.

Members questioned the wisdom of flying in a wide Battle formation through very congested airspace, particularly when not necessary for tactical reasons. More compact manoeuvrable formations can afford leaders much more flexibility and reduce the time wingmen spend station keeping thereby allowing them to allocate more time to routine lookout.

The estimated lateral miss-distance was questioned by members, who thought that it must have been closer than $\frac{1}{4}$ nm for the Auster to experience severe turbulence from the Harrier after it overtook him from behind. Further, the Harrier pilot, probably concentrating on maintaining formation on his leader, reported first seeing the Auster low in his 10 o'clock (between him and the leader) very late, affording him no time to take avoiding action. It follows therefore, that although the ac were not on a collision course they were uncomfortably close and that their safety was not assured since neither pilot saw the other ac in sufficient time to avoid it.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: An effective non-sighting by the Harrier pilot.

Degree of Risk: B.

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Date/Time: 21 Jan 1628

Position: 5113N 0138W (5nm finals RW23
Boscombe Down elev: 407ft)

Airspace: CMATZ/ATZ (Class: G)

Reporting Ac Reported Ac

Type: PA31 PA28

Operator: DPA Civ Pte

Alt/FL: 1600ft 1500ft
(QFE 1006 mb) (QNH 1020 mb)

Weather VMC CLBC VMC CLBC

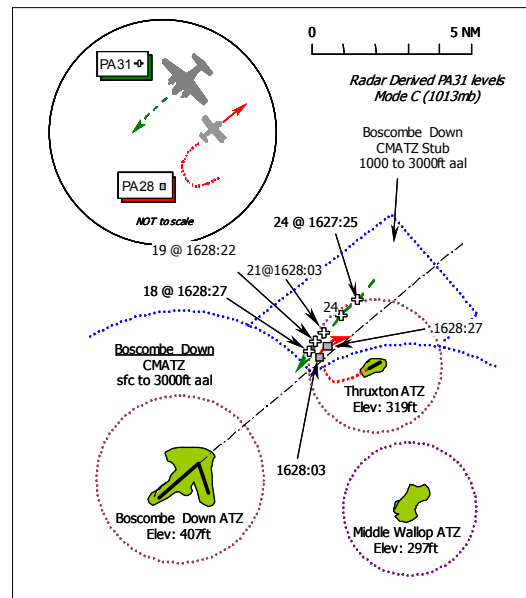
Visibility: 20km 25nm

Reported Separation:

H-"Not sure"/50ft V700-1000yd H

Recorded Separation:

NR - about 0-33nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA31 PILOT, a QFI, reports his ac has a red white & blue colour-scheme and the HISL was on. He was conducting a day/night check from the right hand seat of the Chieftain monitoring the LHS PF, whilst descending on an SRA to RW23 at Boscombe Down in receipt of a talkdown from Boscombe Down TALKDOWN (T/D) on 336.15MHz. A squawk of A2603 was selected with Mode C; TCAS is not fitted.

Approaching 5nm from touchdown, heading 225° at 130kt the controller warned them of another ac in their 11 o'clock - possibly Thrupton aerodrome Cct traffic - but not displaying any Mode C height information. Nothing was seen at that point but as the controller called "5 miles - height should be 1500ft" [QFE (1006mb)], he spotted a light ac less than 500yd away - white in colour - that flew "very close" down their port side on a reciprocal heading at almost the same height. The incident was over very quickly, which made it difficult to accurately assess separation but he believed the LA passed about 50ft below his PA31 with a "high" risk of a collision. He added that although the visibility was good the white ac was approaching them head-on against a white background of thin white cloud and considered they were "lucky to be closing from the right of the centre line and 100ft" above the nominal glide path.

THE PA28 PILOT reports his ac is white and the HISL was on whilst departing from Thrupton at 80kt outbound for Fairoaks VFR. He was in communication with Thrupton RADIO A/G Station on 130.45MHz and squawking A7000; Mode C is not fitted. After take-off from RW25 he turned R crosswind onto a heading of 340° to depart the aerodrome when he noticed another ac approaching from NE about 1 nm away and about 1000ft higher than his ac. He thought initially it might have been an inbound ac going around, but then realised that it was transit traffic - he thought it was a Jetstream - which would not conflict as he turned downwind onto 070° to depart the ATZ to the NE. His maximum altitude was 1500ft Thrupton QNH (1020mb) during the encounter [Thrupton elevation 319ft amsl]. No avoiding action was taken as the other ac passed 700-1000yd away "slightly higher" as it descended on a steady course through his level to the W. He assessed the risk as "none" and opined that neither he nor the other pilot had to take evasive action. Furthermore, his GPS trace showed that he was in the Thrupton ATZ at the time - horizontally and vertically - but he did not hear the PA31 crew contact Thrupton RADIO at all.

[UKAB Note (1): In a later telephone conversation with UKAB staff the PA28 pilot stressed that although he did not consider the encounter warranted an Airprox report, the other ac had flown through the Thruyton Cct area without calling Thruyton RADIO. He added that the UK AIP Thruyton entry "*recommends*" that departing ac should free call Boscombe Down and it is not obligatory.]

[UKAB Note (2): In view of the PA28 pilot's remarks advice was sought from the Aerodrome operator, who reaffirmed that all pilots visiting Thruyton should comply with the established and promulgated procedures for everyone's benefit.]

[UKAB Note (3): Sunset was at about 1639 UTC, 10 mins after the Airprox had occurred.]

[UKAB Note (4): The UK AIP at AD2-EGHO-1-2 notifies the Thruyton ATZ as a radius of 2nm centred on RW07/25, extending from the surface to 2000ft above the aerodrome elevation of 319ft amsl.]

[UKAB Note (5): The Pease Pottage Radar recording shows the PA31 Chieftain established inbound for Boscombe RW23 at 1626:45, squawking A2603, indicating 2400ft Mode C (1013mb) – equating to about 2190ft Boscombe Down QFE (1006mb) – 210ft difference. At 1627:49, the PA31's Mode C indicated the start of the ac's descent and at 1628:03, indicated 2100ft Mode C - 1890ft QFE. At this point the PA28 is displayed for one sweep, 1.66nm W of Thruyton, inside the Thruyton ATZ and Boscombe Down Combined MATZ stub, squawking A7000 – no Mode C fitted. At the PA28 pilots reported maximum altitude of 1500ft Thruyton QNH 1020mb (a height of about 1181ft above Thruyton's elevation of 319ft amsl and about 1093ft above Boscombe Down's elevation of 407ft amsl), his ac would be above the base of the Boscombe down CMATZ stub, which is 1407ft amsl. The PA28's contact fades immediately and does not then reappear for another 3 sweeps until 1628:27, after passing 'port – port' abeam the PA31's at a track displacement of about 0.33nm as the latter indicated 1900ft Mode C (1013mb) – a height of 1690ft Boscombe QFE and in general accord with the PA31 pilot's report. However, the minimum horizontal separation cannot be determined with certainty, as both ac returns are not shown at the same time. Thereafter the tracks of both ac continue to diverge on reciprocal headings and at 1628:53 the Chieftain indicates 1700ft Mode C - 1490ft QFE before its return fades.]

MIL ATC OPS reports that the PA31 (Chieftain), was carrying out an SRA approach to Boscombe Down RW23 under a RIS from Boscombe Down TALKDOWN controller (T/D). At 1627:41, T/D transmitted "*Turn left 5 degrees heading 230, well right of centreline. Begin descent now for a 3 degree glidepath. 6 ½ miles.*" T/D then observed an ac return 2nm WSW of Thruyton and at 1628:01, called the traffic to the PA31, "*6 miles 1800 feet pop-up traffic 12o'clock, 2miles, manoeuvring, no height, believed to be in the Thruyton circuit*", which the PA31 crew acknowledged. T/D reported that the conflicting radar return was then observed to diverge from the PA31's track and at 1628:38 T/D advised "*5miles, 1500feet.*" At 1628:55, the PA31 reported "*...we just got visual with that traffic that went down our left hand side...about 1/3 mile co-altitude, he would have been right down the extended centre-line of the runway.*" Following further routine transmissions between T/D and the PA31, T/D responded "*...height of that would have been 1550feet.*"

A Letter of Agreement (LOA) exists between MOD Boscombe Down and the Thruyton Aerodrome Operator. The PA28 was making a north-easterly departure from Thruyton Aerodrome and should have departed in accordance with this LOA and the *Thruyton Aerodrome Local Traffic Regulations – Warnings* which state at Appendix A:-

"Leave the ATZ at an altitude of 1220ft, or 900ft AAL (Thruyton QFE). If this is not possible due to weather conditions, leave the ATZ and at an altitude not exceeding 1220ft/900ft AAL, remaining in VMC. Contact Boscombe Down on 126.700MHz, or continue to climb when clear of CMATZ lateral limits."

However, the UK AIP Thruyton entry at AD 2-EGHO-1-3 Para 2.22 (b) states:-

"Outbound departing aircraft should free call Boscombe Down before climbing through

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800ft Thruxton QFE or 1100ft ALT, or climb when clear from the CMATZ.”

The PA28 was not in contact with Boscombe ZONE and, since no approval had been issued by Boscombe ZONE for further climb, in accordance with the LOA the PA28 pilot should not have flown above 1220ft Thruxton QNH (1020mb) - 800ft Boscombe QFE (1006mb). When T/D observed the PA28's return, the controller correctly called the traffic to the PA31 crew in accordance with the rules for a RIS at JSP 552 235.115 but, since the return appeared late and appeared to be diverging from the PA31's return, she might not have been able to provide effective avoiding action even if the pilot of the Chieftain had requested it. T/D had not received any information about any Thruxton outbounds that were not flying in compliance with the LOA. Consequently, the controller could not have done any more.

ATSI reports that the Thruxton RADIO A/G Station frequency of 130.45MHz is not recorded. Where the Thruxton flight procedures quote in the UK AIP at AD 2-EGHO-1-3 that “*..outbound departing aircraft should free call Boscombe Down...*” no interpretation of the word “*should*” can be found in the AIP. ICAO describe their specifications using the words “*shall/should*” as:

“Standards employ the operative verb “shall”, while Recommended Practices employ the operative verb “should”. Interpretation of “should” is also made in the MATS Part 1, at Page xxiv: “Should means that it is strongly recommended that an action is carried out...”.

On this occasion, the pilot of the PA28 complied with Rule 39, for flight within the ATZ. But as civil recognition of a MATZ is not obligatory (UK AIP ENR 2-2-3-1), he did not contravene any rules when entering the Boscombe Down CMATZ, albeit it would have been sensible to comply with the 'recommended' local procedures. The A/G operator on duty at the time commented that he did not observe the incident as he was engaged in a telephone call with Boscombe about another inbound ac.

MOD (DPA) comments that this Airprox highlights, yet again, the risks associated with operations in the intermediate and final stages of flight for ac operating outside CAS. It is particularly disappointing, that such an Airprox should occur when there are very robust procedures to de-conflict exactly this type of activity.

Of note is the observation, made by the PA28 pilot, that the conflicting ac was a Jetstream (considerably larger than a Piper Chieftain) thus, perhaps, giving the mistaken impression that the ac was further away than it actually was. His GPS trace may well indicate that the PA28 was within the Thruxton ATZ from a 'plan perspective' but does not address the issue of being 'not above 800ft' until two-way communication is established with Boscombe Down.

Heretofore the very successful working relationship between Thruxton and Boscombe, conducted in an entirely co-operative manner has undoubtedly resulted in a very low incidence of such occurrences in this area. Clearly, such procedures can only be effective when pilots/controllers comply with them. In this case, the pilot of the PA28 does not appear to have complied with the extant LOA and published procedures.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was acutely aware that this Airprox had been filed by a PA31 Chieftain commander, a QFI, flying into his home base of Boscombe Down on an IFR procedure flown in conformity with the requirements of military flying regulations whilst sighting a PA28 flown by a pilot departing Thruxton, operating his ac under VFR and the provisions of the ANO. The integration of IFR and VFR traffic

always poses difficulties outwith CAS: this has been highlighted by DPA. However, these closely located aerodromes had over many years evolved mutually agreed procedures to ensure the satisfactory integration of departing and landing traffic, not forgetting also the compounding factor of the traffic procedures at Middle Wallop, which formed - with Boscombe - part of the CMATZ. The Board recognised that these aerodromes handled widely differing traffic scenarios: airships, light ac, helicopters, fast jets and heavy transport types, indeed every form of *aircraft* could potentially be encountered in the traffic patterns of these three aerodromes. This, coupled with the overarching complication of military and civilian procedures all combined to produce a complexity of traffic scenarios which was difficult to duplicate at any other location. Nonetheless, procedures had been agreed between Boscombe Down and Thruxton within a formal LOA, promulgated to military crews within the Unit Flying Order Book (FOB) and to civilian pilots within the AIP, which had clearly worked satisfactorily for many years.

Noting that the PA31 crew was conducting an IFR approach but in receipt of a RIS from TALKDOWN, some members thought that this ran counter with best practice. A RIS is in essence a VFR service whereby traffic information is provided to enable one crew to sight another ac and thereby effect their own visual separation from it, this being at odds with an SRA in instrument conditions. However, this was a practise IFR approach conducted here in VMC and with a safety pilot looking out. The PA31 crew was evidently familiar with local procedures in the FOB and had every expectation that the agreements between Boscombe Down and Thruxton within the LOA would be complied with thereby allowing the PA31 to complete this approach through the Thruxton ATZ, this posing a conundrum in itself. However, from the traffic information provided by the controller, the QFI safety pilot had spotted the PA28 about 500yd away and in the Board's view would have been able to initiate avoiding action if need be, as the PA28 passed down the port side, from the PA31 pilot's perspective some 50ft below his ac and as he reported on RT "...about 1/3 mile" away.

For his part the PA28 pilot had seen the PA31 about 1nm away whilst flying between the crosswind and downwind legs, opining that he had not needed to take any avoiding action as he continued outbound passing he thought about 700 - 1000yd away from the Chieftain and slightly below it as the latter descended. From his perspective there was no Airprox and no risk of a collision. In this instance the PA28 pilot reported that he had not climbed above 1500ft ALT, but he had neither switched to Boscombe ZONE and communicated nor waited until clear of the CMATZ before he had climbed through 1100ft ALT - as *recommended* in the AIP. It was not feasible to determine the vertical separation that existed accurately as the PA28 was not fitted with Mode C. Nevertheless, both pilots' estimates were broadly in accord. In the Board's view the PA28 pilot's climb above the altitude recommended in the AIP had, in the absence of an R/T call to Boscombe, potentially brought his ac into conflict with the PA31 on finals to RW23 at Boscombe. However, the radar did reveal that the horizontal separation was about 0.33nm supporting both estimates. Moreover, the Board agreed that the promulgated procedures were not mandatory and relied on willing compliance to ensure the safe integration of ac departing from Thruxton and instrument traffic inbound to Boscombe. A civilian pilot member postulated that as the UK AIP was for the purposes of the ANO the notifying document, the PA28 pilot appeared to been flying contrary to ANO Article 43 insofar as, he did not apparently "...take into account the latest information available as to the aerodrome to be used". But it was not clear where the responsibility lay to ensure that visiting pilots complied with the promulgated procedures and members urged that the issue of the wording "*should*" be resolved. Nevertheless, good airmanship dictated compliance with the recommended procedures, for if the PA28 pilot had done so it could have averted this Airprox. The Board concluded unanimously that this encounter within the Thruxton ATZ/Boscombe Down CMATZ had resulted because the PA28 pilot did not follow the advice contained in the UK AIP and climbed into conflict with the PA31. Given the horizontal separation that pertained with each aware of each other's ac, no risk of a collision had existed in the circumstances reported.

The assessment of this Airprox had revealed to the members an anomaly. In conformity with the ANO and Rule 39 of the 'Rules of the Air', the PA28 pilot was required to maintain a continuous listening watch with Thruxton RADIO whilst within the Thruxton ATZ and communicate his position and height on

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leaving it: this was not possible if he had free-called Boscombe ZONE in accordance with the LOA, although he could have flown at 1110ft ALT or below and still complied with the AIP *advice*. Whilst it was clearly a very technical argument, there was an overwhelming view amongst the civilian members that the procedures in place here to allow ac on the FAT to Boscombe Down RW23 to fly through the Thruxton ATZ without communicating with Thruxton was contrary to Rule 39. The promulgated Thruxton procedure had been signed off by the aerodrome operators in an LOA but it appeared to civilian pilot members that this LOA could not take any precedence over a Statutory Instrument – the ANO - nor Rule 39 of the ‘Rules of the Air’ Regulations, which does not appear to allow for any ‘easement’ in the case of ac under the control of another ATSU. The pilot of the PA31, and arguably any other ac conducting an instrument approach to RW23 under the control of Boscombe was, from a civilian regulatory standpoint clearly in contravention of Rule 39(2) and Rule 39(3). However a complicating factor was that military pilots of military ac are exempt from the majority of the regulations in the ANO. Whereas JSP 550 – Military Aviation Policy, Regulations and Directives - states that it is MOD policy that military regulations in relation to the ‘Rules of the Air’ should conform to the civilian rules, clearly it not feasible for military pilots to communicate with Thruxton RADIO whilst receiving a talkdown on an IFR approach to RW23 at Boscombe. Moreover, the provisions of Rule 39 are not included within the applicable military regulations for the avoidance of aerial collisions contained in JSP550. Military and civilian members alike believed that this issue needed to be resolved and the Mil ATC Ops advisor explained that the respective units involved were already conducting a procedures review. Nevertheless, the Board agreed unanimously that the disparity revealed by the investigation of this Airprox between the ‘Rules’ and procedures agreed under the LOA and currently in use, should be reviewed and any anomalies corrected. Consequently the Board was moved to recommend that the MOD, MOD (DPA), and CAA should jointly review the applicable Boscombe Down, Thruxton and Middle Wallop aerodrome/approach procedures to ensure that these conform to the requirements of Rule 39 of the ‘Rules of the Air’ so as to ensure the safe integration of air traffic at these closely located aerodromes.

PART C: ASSESSMENT OF CAUSE AND RISK

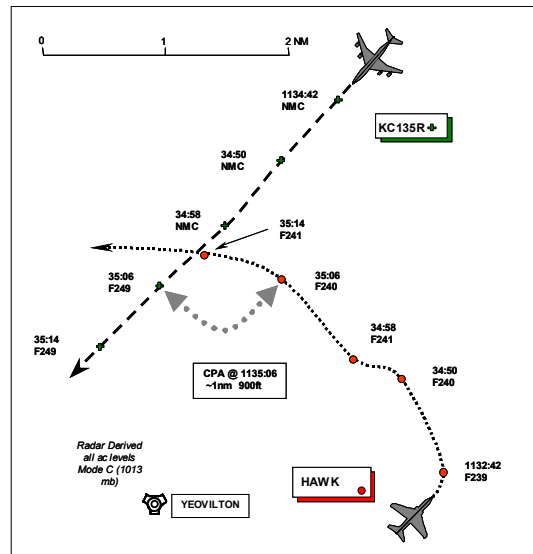
Cause: The PA28 pilot did not follow the advice contained in the UK AIP and climbed into conflict with the PA31.

Degree of Risk: C.

Recommendation: That the MOD, MOD (DPA), and CAA should jointly review the applicable Boscombe Down, Thruxton and Middle Wallop aerodrome/approach procedures to ensure that these conform to the requirements of Rule 39 of the Rules of the Air so as to ensure the safe integration of air traffic at these closely located aerodromes.

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Date/Time: 16 Jan 1135
Position: 5102N 00237W
 (Yeovilton Overhead)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: KC135R Hawk T1
Operator: Foreign Mil COMNA
Alt/FL: FL240 FL240
Weather VMC VMC Above
Visibility: NR NR
Reported Separation:
 1nm H 0 V 2nm H
Recorded Separation:
 1nm H 900ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KC-135R PILOT reports flying a grey ac under Radar Control, he thought, from LATCC (Mil), squawking as directed with HISLs selected on. While heading 235° at 430kt and FL240, en-route from BZN to VLN in the Swindon corridor, he thought, he was given TI “ eleven o’clock, 10 miles 1000ft below”. While visually searching for the traffic, they received a TCAS TA in the direction of the ATC TI. The traffic had climbed to co-altitude and changed direction to head straight toward their ac. He then received a TCAS RA at the same time as they visually acquired the ac. They complied with the RA, when the Hawk was approximately in their 9 o’clock, inside 2nm, co-altitude, by climbing to FL250 and watched the Hawk move into their 6o’clock position. The pilot called ATC stating that he was holding waiting for a climb. At the closest point the Hawk was seen inside 1nm, co-altitude, moving L to R behind them.

THE HAWK T1 PILOT reports flying a Hawk T1 ac with HISLs and Nav Lights selected on, on a sortie from Culdrose to Yeovilton. He was orbiting left at 400kt, level at FL240, overhead Yeovilton, under a RIS from Yeovil Approach in Class G airspace. During his 4th orbit awaiting clearance/handover to London (Mil) for further climb to FL300, he was informed of traffic in his 10 o’clock at approximately 5nm. Visual contact was made with a KC135 and there was no conflict. He continued to orbit left maintaining visual contact with the KC135 and received a handover to London (Mil). When on frequency he heard the KC135 pilot talking to London (Mil), and on completion of that conversation, he checked in and requested clearance to climb under Radar Control. At that time the KC135 pilot requested his callsign and seemed to be under the false impression that they were engaging the tanker. The KC135 pilot stated that they were filing an Airprox, even though the incident had been in Class G airspace with a CPA that was visually assessed as approximately 2nm passed on the RT to the tanker crew.

YEOWILTON APPROACH Controller reports that he was screening a trainee in the Approach position. At approximately 1130 a Hawk free called requesting the block FL170-FL300 with RIS for ‘spins’. At this point he had 4/5 ac on frequency conducting various sorties under various services, including 2 under a RAS. On calling LATCC requesting an un-prenoted handover LATCC told him to keep the ac ‘not above FL240’ and that they would open a console and call back for handover. The Hawk meanwhile was given free to manoeuvre in the block FL170-FL240 in the Yeovilton overhead. LATCC traffic squawking 3317 was seen tracking SW 30nm to the NE of Yeovilton and he called it to the Hawk pilot. LATCC called back for the handover and this was conducted in a slightly protracted manner due to the

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trainee's ability. LATCC accepted the ac and gave him their frequency and immediately on closing the landline the Hawk was transferred to LATCC control. At the point of transfer he believed that the KC135 was approx 10nm NE of Yeovilton tracking SW at FL240, and the Hawk was approximately 10nm ESE tracking E at FL240.

THE HAWK STATION COMMENTS that this appears to be a TCAS perceived conflict in Glass G airspace. The Hawk pilot was conducting a lazy slow left hand orbit at FL240 whilst awaiting handover to LATCC (Mil). Unfortunately the Hawk's hold was in the VLN overhead and as a result the Approach controllers would have had difficulty assessing the ac's heading. The controller and mentor were busy with several other ac on frequency (2 x RAS and other RIS traffic) however, the mentor does remember seeing the potentially conflicting KC135 at FL240 but at the same time did not consider it a risk to the Hawk (the Hawk's apparent track at the time was Eastward). The Hawk pilot believed he had received TI on the conflicting traffic although this might have been misinterpreted from a call to another ac. Nonetheless, the Hawk pilot visually acquired the KC135 at about 5nm, he thought, and since no risk of collision existed he continued his lazy left hand hold passing well astern the KC135 and to starboard. The CPA was considered to be 1.5-2 miles.

MIL ATC OPS comments that the Yeovilton RT timings were found to be 2min 30sec behind the time of the radar replay. The times indicated have been adjusted to UTC.

A KC135 was routing through the Swindon RVC to join GAT at Berry Head whilst maintaining FL240 en route. The Hawk had got airborne for general handling just to the north of Yeovilton between FL70 and FL300.

A Hawk was identified by Yeovilton Approach (APP) at 1129:25 and placed under a RIS, operating in the block FL70 - FL300. The Hawk was subsequently restricted to "...not above FL240" at 1129:37 whereon the ac requested a handover to London (Mil) to facilitate the use of the airspace up to FL300 and APP attempted to initiate an unprenoted handover to LATCC (Mil) at 1131:01. Simultaneously, the KC135 was identified and placed under a RIS by LATCC(Mil) Controller 31 (CON 31) at 1132:33, routing from the Swindon RVC to join GAT at Berry Head, maintaining FL240. Ten sec later CON 31 passed TI on traffic "...left ten o'clock fifteen miles crossing left to right, medium speed indicating FL210 slow climb" This is believed to be traffic squawking 2626, which had no bearing on the incident. At 1132:02 CON 31 rang APP to enquire whether they had an ac to hand over and there followed a protracted and non-standard handover, seemingly caused by APP having lost radar contact with the Hawk. The handover was, eventually completed at 1134:18 and almost immediately, the KC135 reported traffic "six, five miles co-altitude" to which CON 31 responded "...that traffic is now approaching onto my frequency, it's a Hawk not above FL240 and left eleven o'clock five miles manoeuvring now left eleven o'clock four miles tracking towards same level". The KC135 initiated a TCAS climb and called "...passing two five zero in the climb" at 1134:37. The KC135 reported visual with the Hawk at 1134:50 and descended back to FL240 to continue his transit. The Hawk established two-way communication with CON 31 at 1134:58 and called "tally with the traffic" which was subsequently verified as the KC135.

The Burrington radar recording showed the KC135 exiting the Swindon RVC at 1132, tracking 220° indicating 3317 Mode A and FL240. At the same time, the Hawk was manoeuvring N of Yeovilton out to a range of 7nm with its Mode C indicating FL240, +/- 200ft, from 1132:44 until after the Airprox had occurred. The KC135 continued to converge with the Hawk at a similar level until the former initiated a climb at 1134:34 when its Mode C disappeared for 2 sweeps and reappeared indicating FL249. The KC135 makes no track adjustment and the Mode C indication descended back to FL240 after the incident had occurred.

APP correctly restricted the Hawk to not above FL240 and requested an unprenoted handover with LATCC(Mil). A console at LATCC(Mil) was not immediately available and the handover was not commenced with CON 31 until one minute later. The handover was very protracted and non-standard leading to ambiguity between the controllers. The handover was further lengthened by the Hawk

disappearing in the Yeovilton radar overhead resulting in APP being unable to provide an accurate position report or heading. CON 31 identified the Hawk by use of SSR information only and restricted the Hawk's level to not above FL240 until he had identified it. CON 31 did not call the Hawk to the KC135 or ask APP if they had called the KC135 to the Hawk. At the beginning of the handover the two ac were approximately 17nm apart converging and at the end of the handover this was reduced to 10nm. At the end of the handover, however, the Hawk was tracking E and had it continued to do so would not have posed a confliction to the KC135. However, the Hawk initiated a left turn back into the path of the KC135 and triggered a TCAS RA; afterwards the crew became visual with the Hawk and descended back to FL240. It is believed from the tape transcript that the Hawk was visual with the KC135 throughout the incident and that no risk of collision existed. However, it is noted that no TI was passed by either CON 31 or APP to their respective ac, although under the responsibilities of RIS the pilot is wholly responsible for separation whether TI has been passed or not. In this instance it would have been beneficial for the KC135 to have received TI on the Hawk and possibly averted the KC135 crew from having to react to the TCAS RA.

UKAB Note (1): The issue of inaccurate timings on Military RT recordings was addressed by a UKAB recommendation following Airprox 29/03 (30 Mar 03). A response from HQ STC (Reference: 3GP.212002.1.ATC dated 05 Feb 04) advised that such inaccuracies had been overcome. However, major inaccuracies in timings on Military RT recordings are still apparent and further corrective action at units is needed on a widespread basis.

HQ3AF comments that when the peripheral elements to this Airprox are eliminated, such as the wisdom of the Yeovilton Approach Controller apparently providing a RIS in his overhead the KC135 pilot thinking he was in receipt of RC, the lengthy handover from Yeovilton to CON31, which agency did or did not warn who and when, and lastly, is there any point to RIS, a familiar situation remains. This Airprox is another example where the perception of a comfortable CPA for a pilot of a small manoeuvrable ac differed from that of the pilot of a big jet who, incidentally, was also receiving a TCAS RA. The KC135 pilot complied with the TCAS RA when the Hawk came into his 9 o'clock at less than 2nms at a similar level, The Hawk then continued on an apparent interception course as he climbed. Without any ATC intervention the Hawk pilot was clearly happy in his orbit and had the KC135 in sight from about 5nms at the same level. It was regrettable that he first aimed at the KC135 and then passed uncomfortably close - for the tanker pilot - behind it.

CINCFLEET comments that this incident is a very pertinent example of the need for all involved in aviation to adhere to SOP's in even relatively straightforward scenarios. From the original incorrect clearance for the Hawk to operate in the upper air through to the attempted handover in the radar overhead this was poorly handled by the ATCOs involved. Incomplete TI may have then compounded earlier errors. Notwithstanding the responsibilities of the pilots, who were operating under RIS in Class G airspace, it is considered that the controlling staff fell some way short of the standards that should be expected. Lessons have been recognised and appropriate unit action 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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

When the many side issues clouding the picture were removed, the Board viewed this occurrence as one of several recently where the pilot of a small manoeuvrable ac saw and avoided a much larger TCAS equipped ac by what he considered a safe margin, unlike the other pilot. Very many large ac are now TCAS equipped yet there remains a lack of understanding on system functionality by many non-users, e.g. the type of manoeuvres that will trigger a warning, which must then be reacted to by pilots.

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Board members considered it good practise to avoid large ac by a wide margin and not to point the nose of small agile ac at them, thereby reducing nuisance TCAS warnings.

At first sight, the lead up to this incident appeared not to be well handled by Yeovil APR, however, this must be seen in context. There was a trainee controller at the helm who made mistakes, but on most occasions these were picked up and corrected by the mentor as soon as practicable. It is a matter of fine judgement as to how much rope to allow inexperienced trainees. In any case, though the service was less than perfect it did enable the Hawk pilot to see the KC135 at 5nm and avoid it by what he visually estimated as a minimum of 2nm. TCAS, however, operates on closure time, not distance. The fact that an RA was triggered by the Hawk confirms that, at one stage, its closing vector was indicating under 25 secs or so to penetrating the TCAS' 'safety zone' or 'bubble'. This was the lesson. The KC135 pilot believed that he was still under an RCS and would have been surprised to see another ac in close proximity, apparently intercepting him. However, as verified by the radar recording, his range estimation was more accurate. The full reports reveal that the Hawk pilot was not conducting an intercept but simply adjusting his holding orbit, which coincidentally was being flown at the same FL as the tanker, and taking lateral avoiding action on it.

Both pilots saw each other 5nm in advance of the occurrence; the Hawk pilot took avoiding action however, not enough to prevent a TCAS RA. The KC135 pilot, in the belief that he was still under Radar Control for the Swindon RVC, had left the corridor, transferred to LATCC (Mil), been identified and placed on a RIS (from the transcript). Although the Hawk was not called to him initially he saw it visually and discussed it with CON 31, however, he took no action until the RA was triggered when he reacted to it generating a vertical separation of 900ft.

Weighing all the information available to them, members considered that, although some aspects of the control by Yeovilton were rather untidy, both pilots were on a RIS and saw one another just under a minute prior to the incident. Both avoided each other and the eventual MSD was 1nm and 900ft in Class G airspace so there had been no compromise to safety or risk of them colliding.

Members noted that the accuracy of timing information from Yeovilton RT recordings remained well outside acceptable limits. This whole topic had been addressed previously by UKAB Recommendation 29/03 to the MOD and assurances that corrective measures would be introduced had been made at the time. It was agreed that Director UKAB was to re-open the matter with MOD, as Yeovilton had no knowledge of such measures.

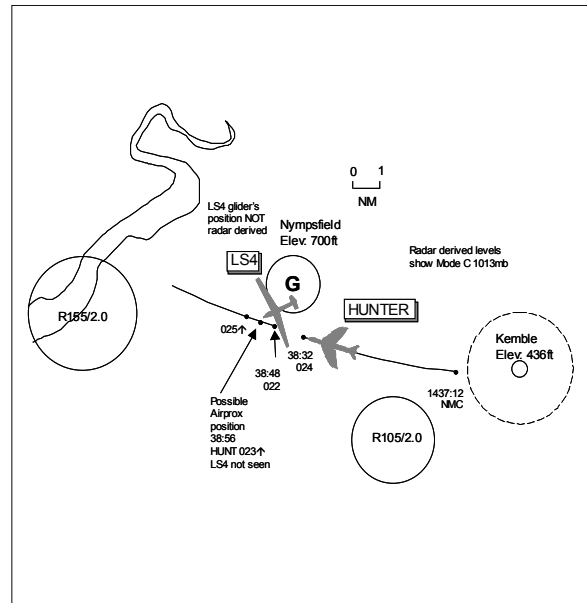
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 006/04

Date/Time: 24 Jan 1439 (Saturday)
Position: 5142N 0219W (2nm SW Nympsfield G/S - elev 700ft)
Airspace: FIR (Class: G)
Reporting Ac Reported Ac
Type: LS4 Glider Hunter
Operator: Civ Pte Civ Pte
Alt/FL: 2000ft↑ (amsl) (RPS)
Weather VMC CLBC VMC CLBC
Visibility: 10km
Reported Separation:
 50ft V 100m H not seen
Recorded Separation:
 not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS4 GLIDER PILOT reports soaring at 45kt at 2000ft amsl about 3nm SW of Nympsfield and in communication with other gliders on 130-125MHz. The weather was VMC 1500ft below cloud and the glider was coloured white with an orange nose; no transponder or lights were carried. Whilst turning R through heading 250° the Hunter was first seen over her L shoulder in her 7-8 o'clock position about 200m away, converging. Her R turn was continued, as it was taking her away, but there had been no time to take any avoiding action and the Hunter passed about 100m to her L and 50ft above by the time her glider was turning through a parallel heading. The Hunter was dark coloured overall flying in a level attitude heading approx 280°. She assessed the risk of collision as high. At the time of the incident there had been about 15 other gliders ridge soaring at similar heights within 1nm of her ac, two other glider pilots had observed the encounter.

THE HUNTER PILOT reports heading 270° at 250kt and about 2000ft RPS on a dual local sortie from Kemble. The visibility was 10km 500ft below cloud in VMC and the ac was painted in desert camouflage scheme, he thought. He had not seen the reporting glider during his transit of the area towards the River Severn. At the time, he was changing frequency from Kemble to Bristol to obtain an ATS and changing his transponder settings from 7000 to a Bristol assigned code.

ATSI comments this Airprox took place on a Saturday when Filton Radar is not available and Bristol International takes on the LARS responsibility in the Filton area and to the N of it. The Hunter pilot called the Bristol LARS controller at 1438 advising that he was 5 miles W of Kemble at 2500ft on the RPS, heading NW towards the Estuary. The controller confirmed that the ac type was a Hunter and the pilot requested a RIS. The controller responded by advising that there were a lot of primary contacts in the area and allocated a squawk of 0410. Shortly afterwards, the controller informed the pilot that he had passed the observed traffic and that nothing further was showing, on radar, ahead. He placed the aircraft under a RIS, limited owing to its altitude. The time between the Hunter pilot making his first call, and being placed under a service was 45 seconds. The pilot made no mention of any other ac seen or that he had been involved in an Airprox. No ATC errors were disclosed in this incident.

UKAB Note (1): Met Office archive data shows the Cotswold RPS 1400-1500UTC as 1013mb and the actual QNH in the Nympsfield area as 1017mb.

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UKAB Note (2): The UK AIP at ENR 5-5-1-4 promulgates Nympsfield as a Glider Launching Site centred 514251N 0021707W for winch and aerotow launches where cables may be encountered to 3000ft agl, during daylight hours; site elevation 700ft amsl.

UKAB Note (3): Analysis of the Clee Hill radar recording proved inconclusive as only the Hunter is seen but the LS4 glider pilot did provide a GPS and barograph log for the flight. The Hunter begins painting on radar at 1437:12 2.4nm W of Kemble tracking 280° squawking 7000 with NMC. By 1438:32 the Hunter is flying 1.9nm S of Nympsfield tracking 290° and showing Mode C for the first time at FL024 (2520ft QNH 1017mb). After fading for one radar sweep, 16secs later the Hunter reappears 1.5nm SSW of Nympsfield squawking 0410 indicating FL022 (2320ft QNH) climbing. The Airprox is believed to occur about the time of the next radar sweep (1438:56), the Hunter is climbing through FL023 (2420ft QNH) and the LS4 pilot's data log places the glider in the same area 2nm SW of Nympsfield at about 2000ft amsl.

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.

The gliding advisor to the UKAB said that a local agreement was in place between the Hunter operator at Kemble, Aston Down and Nympsfield. 'Fast jet' traffic should route after departure towards Michael Wood service station on the M5 (almost on the extended C/L of the Kemble RW) at about 1000ft before turning R and climbing over the Severn Estuary. This procedure was worked out to provide separation against the two gliding airfields and other users of the Cotswold edge. Members noted that as the Hunter's track had taken it 1.5nm SSW of Nympsfield Site, it would be very likely to encounter gliding activity. As gliders are usually predominantly white and notoriously hard to see, particularly against a background of white cloud, any procedure, which provides segregation, should be followed – 'best practice' being the order of the day. However, this conflict occurred in Class G airspace, where 'see and avoid' pertained and from the reports received, it was clear that the Hunter pilot had not seen the reporting LS4 glider. This had caused the Airprox.

Fortunately the LS4 pilot had seen the Hunter approaching from the rear L quarter on a converging track and, after quickly assessing that her R turn was taking her away from it, she continued the turn whilst watching the 'fast jet' pass 100m away abeam on her LHS and 50ft above. At the time, she had reported flying at 2000ft amsl, which is confirmed on the data log, and the radar recording shows the Hunter crossing the area at 2300-2400ft QNH. With the glider unsighted from the Hunter cockpit, any collision avoidance was left to the LS4 glider pilot. This was accomplished by her continuing to turn R but the Board agreed that the subject ac had passed unnecessarily close, to the extent that safety was not assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Hunter pilot.

Degree of Risk: B.

AIRPROX REPORT NO 007/04

Date/Time: 4 Jan 1305 (Sunday)

Position: 5136N 0044W
(2.25nm E Wycombe Air Park)

Airspace: FIR (Class: G)

Reporting Ac Reported Ac

Type: S313 Alouette Untraced Model ac

Operator: Civ Pte

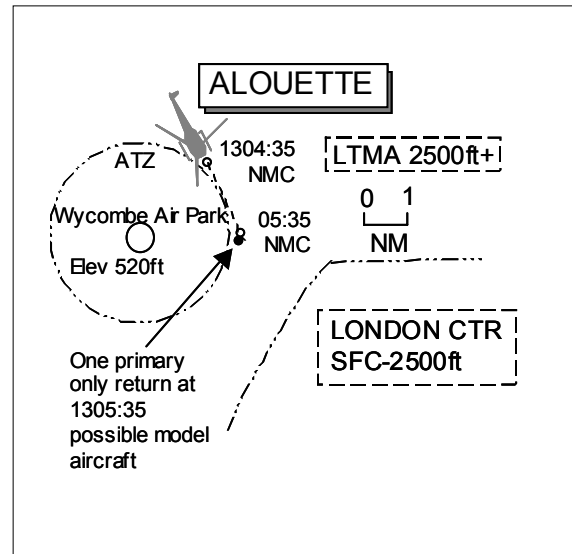
Alt/FL: 1700ft
(QNH 1024mb)

Weather VMC CLBC

Visibility: 20nm

Reported Separation:
nil V 50ft H

Recorded Separation:
0.18nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE S313 ALOUETTE PILOT reports flying a local sortie from Wycombe Air Park with 4 passengers routing to Cookham to join the H10 London Heli-Route and was establishing communications with Heathrow on 125.62MHz squawking 7000 with Mode C, he thought. The visibility was 20nm 1000ft below cloud in VMC, the helicopter was coloured white with red/blue stripes with a strobe light switched on. About 1nm W of Flackwell Heath whilst heading 180° at 75kt cruising at 1700ft QNH 1024mb, he noticed a model ac in his 11 o'clock lower quarter <100m away about 200ft below in a vertical climb on a collision course. He immediately banked L keeping the model ac in sight, which passed vertically through his level in his 4 o'clock position 50ft away. It was a low wing aerobatic type with a 5-6ft wingspan, painted in a red/white scheme identical to that of an Extra Display team's colours/markings. The model was then seen to fly a lot higher before carrying out a loop. This high-risk incident occurred during his initial call to Heathrow and he had then reported it as an Airprox to the controller. He was aware of a radio controlled model ac club which operates in the area, close to Flackwell Heath, but he had never seen any such ac before when flying on this route. He expressed concern that the radio control operator should have seen his helicopter, as well as hearing its distinctive turbine engine noise, so should have avoided such an incident.

AIS (MIL) reports that the High Wycombe and District Model Aircraft Club (HWDAC), who operate from a site 1nm W of Flackwell Heath, the Airprox position, were contacted and given the incident details reported by the Alouette pilot and were requested to ascertain if any club members were operating at the time.

THE MODEL FLYING CLUB SECRETARY reports the helicopter, flying at 1700ft amsl, would have passed over the site at about 1200ft agl, as the land is 500ft amsl. The Club Secretary stated that 2 club members have an Extra model of 5-6ft wingspan but neither were flying at the site on the day in question. Although models of this type have the capability to fly at 1200ft, it would be extremely unusual for club members to fly above 400-500ft and even more unusual for the ac to be flying in a vertical climb at 1200ft. Almost without exception, most club members who choose to fly any of the smaller or larger Extra model ac would be Grade B certificate holders and therefore extremely aware of air proximity safety considerations. The Grade B rating is awarded to highly competent flyers with considerable aerobatic experience who are licensed to fly in front of fee-paying public. Normal practice is for an observer to call 'low aircraft approaching', when one is sighted, to allow the operators to steer the model

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ac airborne out of danger. After investigations within the HWDAC, which is the only club to use the site, he did not believe that one of their members was involved. Following discussion of this incident at a committee meeting, it was agreed to remind members, through the club newsletter, about responsible flying at Flackwell Heath.

ATSI reports that the Alouette pilot commented on the Heathrow frequency, at 1306, about a minute after his first call and before he was identified, that he had just had an 'Airmiss' with a radio controlled model. Subsequently, he reported that the model was operating just to the north of Cookham at 1500ft. Further comments were made later that it had been carrying out aerobatics and was about 5ft in length and describing it as one of the aerobatic models used in competitions.

UKAB Note: Analysis of the Heathrow radar recording shortly after 1300 shows the Alouette departing Wycombe Air Park to the NE before turning R and steadying on a track of 160° at 1304:35 squawking 7000 with NMC. One minute later, as the Alouette passes 2.25nm E of Wycombe Air Park (1nm W of Flackwell Heath), its squawk changes to 7030 NMC and a single pop-up primary only return is seen just R of its 12 o'clock range 0.18nm which could possibly be the model ac. No other radar contacts are seen to conflict with the Alouette, which continues towards the London CTR.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the Alouette pilot, tape of the relevant RT frequencies, radar video recordings and reports from the appropriate ATC and operating authorities.

Although the Model Flying Club Secretary believed that no club members had been involved, the incident had occurred at, or very adjacent to, the established site. One theory put forward was that another flyer, not a club member, could have been using the site at the time. For that matter any member of the public could purchase a model ac and fly it unsupervised although a 5-6ft model ac would require a high level of flying skill (Grade B). From the limited information, members were constrained to conclude that this had been a conflict with an untraced model ac. Fortunately, the Alouette pilot had seen the model ac approaching from his 11 o'clock position range <100m away from below. He had managed to execute an avoiding action L turn to avoid the model whilst maintaining visual contact with it climbing through his level 50ft away. While his quick actions had removed the actual collision risk, the subject ac had passed uncomfortably close which led the Board to conclude that safety had been compromised significantly during the encounter.

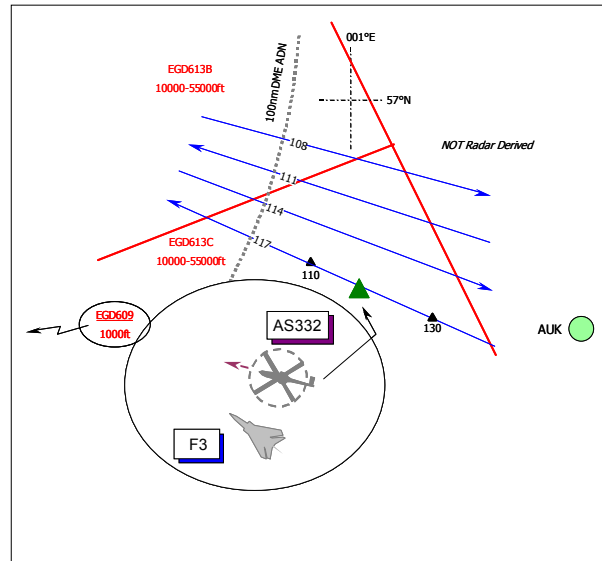
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict with an untraced model ac.

Degree of Risk: B.

AIRPROX REPORT NO 008/04

Date/Time: 5 Feb 0941
Position: 5630N 0103E
 (117°R ADN 119nm DME)
Airspace: Scottish FIR (Class: G)
Reporting Ac Reporting Ac
Type: Tornado F3 AS332L
Operator: HQ STC CAT
Alt/FL: 1000ft 1000ft
 (RPS 999mb) (RPS 999mb)
Weather VMC CLOC VMC CLOC
Visibility: 8km 6nm
Reported Separation:
 100ft V 50ft H/nil V
Recorded Separation:
 Not recorded

**BOTH PILOTS FILED****PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE TORNADO F3 PILOT reports his ac has an air defence grey camouflage scheme but the HISL was on whilst operating beneath MDA Central 'C' [EGD613C] under an Air Defence Information Service from CRC Neatishead – effectively a FIS below 5000ft. TCAS is not fitted but the ac's AI radar was serviceable and they were squawking with Mode C selected on. The surface wind was westerly at about 35kt, with the 2000ft wind registering at 50kt; the weather was slightly hazy at low level with an in-flight visibility of about 8km and no cloud to affect the flight.

Tasked as the target ac, he was required to simulate an ac flying a 20nm square search pattern between 250-1000ft asl. EG D609 was active up to 5000ft amsl with naval activity so he established a search pattern in the E of the selected area with the initial leg of the pattern on SE. He descended initially to 2000ft before turning onto NW, but because of the HMR elected to descend still further beneath it to 1000ft RATTRAY RPS (999mb). About 119nm SE of Aberdeen at 5630N 00103E, after turning onto the heading of 305° at 320kt whilst flying in '25° wing' he suddenly spotted a blue/white & red helicopter at extremely close range in the 12:30 position about ¼nm away and co-altitude. To avoid the AS332 he immediately pulled up, rolled left, then reversed the roll right to re-acquire the helicopter. During this manoeuvre he exceeded the 'never exceed' angle of attack limits of the Tornado, but full power was not applied to prevent any downwash affecting the AS332. He assessed that he probably passed about 100ft above, slightly to port, of the other ac at the closest point, but added as soon as he had started to pull, he knew he had done enough to miss the helicopter.

An Airprox was reported to Neatishead and the ac was recovered to Leuchars immediately thereafter. The helicopter crew did not appear to take avoiding action as none was observed.

THE AS332L PILOT provided a very comprehensive account reporting that his helicopter has a blue/white & red livery and the HISL was on whilst flying a routine commercial air transport helicopter flight. They were returning to Aberdeen in VMC along the 117° Helicopter Main Route (HMR) from AUK after calling at various platforms beforehand with an in-flight visibility of 6nm and no low cloud. Aberdeen was providing a FIS on 135-175MHz and they were squawking the assigned code with Mode C; neither TCAS nor any other form of CWS is fitted.

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After departing the AUK 'A' platform at 0907 they climbed to 1000ft McCabe RPS (999mb) and joined the 117° radial at 140DME from ADN - the usual transit altitude for this route is 2000ft or the appropriate flight level, but they selected a lower altitude because of strong (55kt) adverse winds. As they were approaching 119nm range from the ADN VOR, in level cruise heading 285° at 125kt with autopilot engaged, they suddenly became aware of a "roaring" noise coupled, "*milliseconds later*" by the sudden onset of harsh and severe turbulence which started with a roll and yaw to the right. The P1 grabbed the controls and looked left, across the cockpit toward the ac's 10-10:30 position and saw the P2's windscreen and quarter light filled with what they thought was the underneath of the rear section of a Tornado in a steeply banked turn away from the helicopter at a range of about 50ft. The Tornado then reversed the turn and passed ahead before climbing away toward the NW. No avoiding action was taken as the other ac had passed; he assessed the risk as "*high*" and added that the jet had closed unseen from their 8 o'clock. The Airprox was reported to Aberdeen ATC immediately after level flight was regained.

UKAB Note (1): A review of the Aberdeen RT transcript reveals that the AS332 crew called Aberdeen and reported at 0941:10, "*...we've just had an Airmisss [sic] with a Tornado he came extremely close...the turbulence was such it kicked the autopilot out*". The controller advised that he had no reports of military traffic in the area whereupon at 0941:30, the AS332 pilot added, "*...we lost about 500ft in the event and he's now climbed to about 3000 feet I guess*". When asked for the ac's position the AS332 crew responded "*117 and 118 miles*".

UKAB Note (2): This Airprox occurred outwith the coverage of recorded radar.

THE TORNADO F3 PILOT'S STATION comments that the station is confident that home based aircrew are fully aware of the conflict potential that exists when operating under the MDAs in the region of the HMRs. This incident further highlights that potential and is a reminder to crews of the need for thorough pre-flight preparation and due consideration of the risk throughout the sortie. Nonetheless, this was a very close call and has prompted the need for greater awareness of all parties using this airspace. Accordingly, a number of initiatives have already been forwarded by HQ STC Flight Safety (FS) staffs to increase awareness. These are being assessed for their practicality and feasibility. They include means for greater coordination between ASACS and Aberdeen ATC and the possible use of specific Mode 3 squawks.

ASACS SSU comments that the formation of 3 F3s was conducting a routine sortie within and underneath the confines of MDA 613C. All of the ac were in receipt of a RIS above 5000ft and a FIS below that level and the MDA had been booked for their use. At the time of the incident the subject F3 was operating underneath the MDA, below 5000ft and therefore operating under a FIS. The aircrew were thus responsible for their own safe separation from other ac.

It is clear from the Neatishead report and our own investigation that neither the AS332 nor the F3 were within cover of the available NATS or ASACS radar sources. Consequently, neither the weapons controller (WC) nor fighter allocator (FA) detected the conflict and were not aware that an incident had occurred until the F3 crew climbed out from low-level, informed the WC of the incident with the helicopter and immediately recovered to base.

The AS332 crew's choice of a transit altitude of 1000ft given the strong winds, made the likelihood of an encounter with military traffic even greater given the status afforded HMRs and the advice that "*Military operations near HMRs should normally be conducted at or below 1000ft amsl or above FL85 and with due regard for civilian helicopter operations when crossing HMRs*".

ATSI reports that there are no apparent ATC causal factors. At the time of the Airprox the Aberdeen REBROS Controller was providing the AS332 with a FIS. The Airprox occurred below radar cover and the presence/intentions of the F3 were unknown to the controller. The Aberdeen MATS Part 2, Section 4, Page 29, states that an ATS is provided to aircraft operating between 1500ft and FL85 beyond 80nm

E of Aberdeen to the Median Line. The Offshore area below 1500ft is divided into nine Traffic Areas each with a specific VHF Traffic Frequency. On this occasion the AS332 crew elected to fly beneath the HMR at 1000ft whilst enroute back to Aberdeen and it is considered appropriate for the AS332 crew to be in contact with Aberdeen ATC. The vertical operational limits of an HMR in the Northern North Sea (55N to 62N) are from 1500ft amsl to FL85. The UK AIP at ENR 1-15-5, states that: "*However, should helicopter icing conditions or other flight safety considerations dictate, helicopters may be requested to operate below 1500ft amsl and where possible pilots shall endeavour to follow the HMR and advise the appropriate ATS Unit of the new altitude giving reasons for operating below 1500ft amsl*". No mention was made on the RTF about the reason for the flight operating below 1500ft.

UKAB Note (3): In the interests of improving flight safety a meeting was held between HQ STC FS and the AS332 crew's company that resulted in some useful changes to SOPs. Helicopter crews operating on the HMRs, but not in receipt of a radar service, will now select A0040 on their transponders. Tornado crews will set their interrogators to that code when operating in the vicinity of the HMRs in an effort to improve 'electronic' conspicuity and detection. Furthermore, helicopter crews were strongly encouraged to operate 'on' the HMR at the published levels.

HQ STC comments that this Airprox occurred in class G airspace, beyond radar cover, and below the published route structures. Both aircraft had accepted and were flying in accordance with the 'see and avoid principle'. Unfortunately the conflict was only sighted very late, leading to an uncomfortably close encounter. Significantly both ac were in radio contact with control units, but neither of these units (nor the aircrew) were aware of the other's traffic.

In order to improve safety in this oversea area, a meeting (as suggested by HQSTC FS and UKAB) on 02 Jun 04, attended by representatives from the F3 station, DAS & DAP and 9 civilian representatives (including the civilian ATS provider and the 3 helicopter companies). Although agreements reached at that forum would only initially be applied to sqns based at Leuchars, initiatives that proved successful could be applied to more operators. Key decisions were that a Letter of Agreement (LoA) would be raised between Aberdeen and Leuchars. Initiatives to be covered by the LoA should include:

- a. CRC Buchan call NATS Aberdeen to co-ordinate the squawks, types, levels (highlighting 5000ft QNH base level when appropriate) and duration of sortie as the ac get airborne for MDA 613 A, B or C, and/or the areas beneath them.
- b. NATS Aberdeen pass relevant traffic information on helicopters to assist CRC Buchan e.g. time period under the MDAs, the squawks, height position, level and direction, including those outside radar cover that Buchan can't see i.e. traffic still beyond 80nm East/South East of the ADN VOR.
- c. A designated crew will make an 'awareness call', critical if they are autonomous, on the Aberdeen Frequency 134.1MHz and then switch. The F3 crews would call direct to NATS Aberdeen on 134.1 or 135.175MHz as they approached the MDAs. (It was suggested that it was duplicating what Buchan would be coordinating, however, the advantages are that it confirmed the sortie details with NATS Aberdeen directly and provided the opportunity to brief the F3s on the position of any conflicting traffic. It also told any helicopters listening on frequency what was about to happen.)
- d. NATS Aberdeen continue to pass traffic information to the helicopters.
- e. RAF Buchan pass a 'close down' call to NATS Aberdeen when a sortie is complete and they have vacated the MDAs and/or the area beneath them.

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Additionally:

NATS Aberdeen could assist in relays etc to low level Mil ac using the Tx/Rxs on the Fulmar, Forties and Brae platforms (135-175MHz) when outside the range of Buchan Txs. RAF crews will take avoidance action if informed of helicopter traffic. Why do the F3s operate so far north? This was due to pressure from the South where RAF Leeming operate and this pressure will increase with the introduction of the Typhoon. The RAF agreed to use the ADN VOR/DME as a common reference point for traffic information.

It was agreed that IFF interrogators could not be relied on for traffic avoidance: - an F3 could fly a sortie without a serviceable IFF interrogator, and could lead the crews into relying on their interrogators/radars instead of looking out. Conversely they could lead the helicopter pilots into a false sense of security because they thought they would always be seen.

Planned introduction of the Multilateration system in the REBROS area (the non radar area East of Aberdeen outside 80nm where all the rigs are), will present the controller with a pseudo radar picture, based on auto triangulation measurements using the Mode A and C transponder responses from helicopters and anything else squawking in the area. It is intended to place a number of Rx on certain platforms and will hopefully provide coverage over certain areas (clusters) down to deck level and in the order of 500-1000ft amsl for the remainder of the REBROS area so that all traffic should be seen. However, the introduction may be still 18 months away. The CAA was apparently considering to make it mandatory for any helicopter associated with the oil and gas industry to be:

- a. In 2 way contact with an ATS agency at all times. This has provided the necessary impetus for the introduction of the extra 8 Tx/Rx required to fill the known gaps in RTF coverage in the North Sea.
- b. To be monitored on Flight following equipment, hence the need for multilateration. Multilateration would 'see' Mode S and also Autonomous Dependant Surveillance (ADS).

Military crews needed to be aware of the 'low level inter rigging transit convention' i.e. southbound at 500' and northbound at 1000'. Thus helicopters may be flying down to 500' between platforms.

It is intended that a follow up meeting will be organised for September 2004.

THE AS332L PILOT'S COMPANY declined to add anything further.

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 reports from the appropriate ATC and operating authorities.

It was apparent from the respective reports that the AS332 crew had elected to transit at an altitude of 1000ft because of strong 55kt head-winds along their desired track to Aberdeen above that altitude. In a helicopter pilot member's opinion, this head-wind would not have induced any particular handling difficulties and so the decision was not for any flight safety advantage but more one of convenience where the lower altitude should improve their speed made good. However, this had the unwelcome consequence of taking the helicopter into the very altitude band where the F3 was operating - unbeknownst to the AS332 crew at the time. Whilst it was evident that the helicopter crew had a legitimate reason for flying at this altitude and the Board recognised they were perfectly entitled to do so in Class G airspace, it meant flying below the promulgated HMR structure, which extended upwards from 1500ft amsl. Notwithstanding the caveat in the AIP and reproduced in RAF Flight Information Publications provided to military crews about helicopters flying below this altitude owing to icing, the F3

crew's decision to operate at 1000ft was based purely on the knowledge that commercial helicopters would normally operate at 1500ft and above, on the HMR. Thus the F3 pilot had specifically chosen his operating altitude to reduce the potential of encountering a helicopter on the HMR and was thereby attempting to afford in general terms 500ft separation beneath the route to avoid disrupting civilian operations. Pilot members understood the significance of compliance with established procedures and the significance of military ac staying clear of the HMRS. Unfortunately, and unbeknown to the F3 crew, the AS332 crew had breached one of the fundamental safety nets in the off shore operating environment by descending below this published route altitude. Civilian helicopter pilot members believed that this was unwise as use of the established route structure is fundamental to flight safety throughout the 'offshore tapestry', which the Board as a whole strongly endorsed. The HMR structure had been established solely for use by helicopters servicing the offshore oil installations in this airspace that was devoid of radar coverage; any decision to fly off-route must be balanced against the associated risk of encountering military or other operations (fishery protection flights etc) that had been planned around them. Therefore, in the Board's opinion, the decision by the AS332 crew to leave the protection of the HMR structure had been a significant contributory factor to the Airprox.

The ASACS SSU report had explained that both the helicopter and F3 were beyond the coverage of radar detection and the AD service provided by CRC Neatishead could not have prevented this occurrence. Nor could the FIS from Aberdeen unless the two agencies had exchanged specific information about their ac's operations and that the AS332 was at 1000ft RPS. The discussion then moved to the provision of improved ATSS to off shore operations and improved co-ordination between the CRC and ATC at Aberdeen where some actions had already been taken. The NATS Ltd advisor also explained that whereas significant development work had been done on the provision of the Multilateration system in the REBROS area, which might indeed be achievable, it could only be made operational if funding was made available from those that would utilise the service. Unfortunately, it would seem that the offshore companies/operators were reticent to commit funds for what would be a significant investment. TCAS was also conspicuous by its absence here and the Board was surprised that CAT helicopters had not been fitted with this invaluable piece of equipment which had undoubtedly proved its worth and could potentially have given the AS332 crew a vital early warning of the presence of the jet and any other traffic around. This equipment argument applied equally to the Tornado but here the Board was briefed that progress had been made and while funding had been allocated much development work was still needed to create a 'military CWS'. On a positive note, it was evident that this Airprox had engendered a comprehensive dialogue between the various operators/agencies/companies, which was very encouraging. The Board noted that significant proposals for improved procedures for use by both military and civilian crews were being staffed and the considerable amount of good work that had been done recently; the Chairman requested that the HQ STC member keep the Board apprised of developments in this area.

Returning to the encounter itself, it was evident that without TCAS, the helicopter crew would have been unable to detect the jet approaching in their rear hemisphere any earlier than they did, before it moved into their field of view forward of the helicopter's beam. Although the F3's AI radar was serviceable the AS332 was not detected beforehand, which was of considerable concern. But with no other means of CWS to alert them, it remained solely up to the F3 crew to sight the AS332 in time to 'give way' as they were required to do under the 'Rules of the Air'. Again members reiterated that this was another example of why the jet crews should be provided with a TCAS/CWS. As it was, the Tornado crew should have been able to see the helicopter in the reported visibility of 8km earlier than they did (at about ¼ nm away) whereupon the F3 pilot executed his robust avoidance manoeuvres. A civilian helicopter pilot member extolled the advantages of high conspicuity colour schemes in the often-murky conditions of the N Sea and wondered whether the poor conspicuity of the company livery was a factor here. This, coupled with the tail-on aspect of the small helicopter as the jet approached with 200kt overtake from astern, with little crossing motion to draw attention to it, all conspired to mask the AS332's presence from the F3 pilot until the last moment. After assiduously weighing all these factors, the Board concluded that this Airprox had resulted, nonetheless, because of the very late sighting by the Tornado F3 pilot.

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Once the helicopter was seen the F3 pilot's actions were extremely robust and it was evident he had endeavoured to take due account of the affect of his ac's wake on the helicopter. Nonetheless, from the AS332 pilot's account it would appear that the affects were still quite dramatic as he reported on RT moments later that "*..it kicked the autopilot out*", and "*we lost about 500ft in the event*". These disturbances to the helicopter's flight path could not have occurred until the jet was passing the AS332 – not before. Some helicopter pilot members acknowledged that the action of grabbing the helicopter's controls after being startled at the onset might also have tripped-out the autopilot, but there was no way of confirming this suggestion. What was clear was that this had been a very close encounter that the helicopter crew was totally unprepared for; in the Board's view there was little else that the crew members could have done to prevent the encounter once they had levelled at 1000ft. The F3 pilot's intuitive avoiding action when he pulled up, rolled L, then reversed the roll R to re-acquire the helicopter, enabled him to achieve about 100ft above the helicopter he said. But during this manoeuvre he would have been 'belly up' and blind to the helicopter for a few moments until he over-banked to the R. This might explain the anomaly of how the P1 in the AS332 saw the jet cross-cockpit through the P2's windscreen and quarter light. However, it was also feasible that the helicopter was banked slightly to the R as the jet passed by on the port beam. Without a radar recording it was not feasible to determine the minimum separation that existed during this encounter but the AS332 pilot's estimate of 50ft horizontally – just about one rotor diameter – convinced many members that there had been an actual risk of collision. From the F3 pilots perspective he had exceeded the 'never exceed' angle of attack limits of the Tornado while manoeuvring his jet up and away from the helicopter. However, he was in 25° wing – the best wing sweep for manoeuvrability and he had reported that "as soon as he had started to pull, he knew he had done enough to miss the helicopter". Whilst some members agreed that he had done just enough to avert a collision, safety had certainly been compromised in this situation, which by a narrow majority after a vote was the decision of the Board.

It was clear that both the Company and Command flight safety staffs involved had taken a very pragmatic approach in seeking to resolve some of the very difficult safety issues that were exposed by this Airprox. Such positive attitudes were very refreshing and augured well for the interchange of ideas by all concerned with the common aim of improving flight safety for those involved in air operations in the unforgiving environment of the northern North Sea. The Board commended the significant strides that had already been taken toward this goal, nevertheless, members charged the Chairman with bringing the important issues raised by this Airprox: - high-conspicuity helicopter colour-schemes - following promulgated HMRS and the fitment of TCAS to CAT helicopters - to the attention of the helicopter operators through the good offices of the BHAB.

PART C: ASSESSMENT OF CAUSE AND RISK

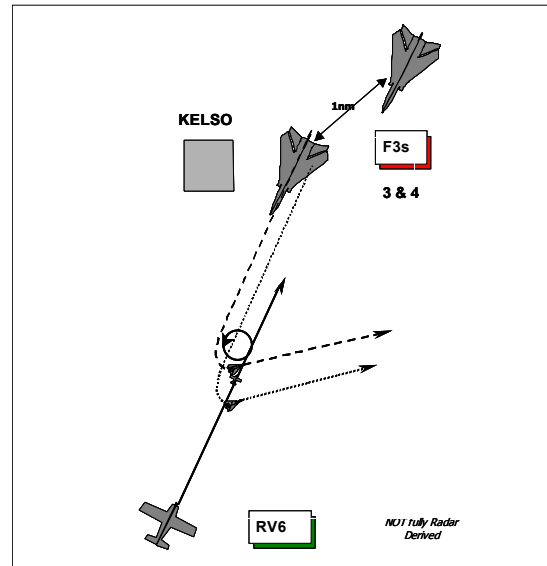
Cause: Very late sighting by the Tornado F3 pilot.

Degree of Risk: B.

Contributory Factors: The AS332 crew elected to fly at an altitude below the promulgated base altitude of the HMR.

AIRPROX REPORT NO 009/04

Date/Time: 9 Feb 1045
Position: 5534N 00225W
 (1½ miles S of Kelso)
Airspace: Scottish FIR (Class: G)
Reporting Ac Reported Ac
Type: RV6 Tornado F3
Operator: Civ Pte HQ STC
Alt/FL: 3100ft NR
 (QNH 1031 mb)
Weather VMC CLBC VMC
Visibility: >10km NR
Reported Separation:
 100m H 0 V NR
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE RV6 PILOT reports flying a white red and yellow ac with wing tip strobes switched on a local sortie from a strip near Selkirk. While heading 030° at 145kt and 3100ft amsl a Tornado approached from his 8 o'clock (he thought), and level with him and upon seeing him turned away at a range of 100m. He did not see the Tornado until it had passed him and was already turning away. As the ac passed he circled left in an attempt to see if there was another ac and a second Tornado passed astern of him at a range of 900m and well clear. Both ac then continued on track of approximately 090°. He believed that if he had turned away from the first ac he would have turned into the second. He assessed the risk as being Medium to High if the other ac had not seen him.

THE TORNADO F3 PILOT reports that he was not contacted until 3 months after the event and had no recollection of the sortie other than that he flew as No3 in a routine air defence training 4-ship sortie against a pair of GR4 ac in the Borders area. He does not recall seeing the other ac.

UKAB Note (1). Due to an error in the allocated squawks from Neatishead the other ac involved in this incident was initially misidentified. It was not until the first pilot submitted a report that it became clear, due to the significant difference in reported altitudes, that further research was required. A second in-depth analysis of the radar recording was then carried out with reference to the sortie map provided by the GR4 crew. This confirmed that his ac was not involved in the incident and it was one of a formation of 4xF3s opposing them. Unfortunately by the time the pilot of the F3 ac involved was traced and contacted he had no recollection of the sortie details.

UKAB Note (2). The radar recording shows up to 6xF3 and GR4 ac operating in the SE of Scotland on an Evasion training sortie. None of the contacts paint continuously. At the position, time and alt of the Airprox (as reported by the RV6 pilot) 2xF3 ac in fairly close proximity displaying Neatishead Squawks can be seen on a Southerly Track before turning to the E. The other 2xF3s were well displaced and the 2xGR4s did not paint but were last seen at low level several miles to the S as they disappeared heading W, presumably below the radar horizon. At 1045.49 a pop-up contact is seen approximately 4nm S of the reported position heading N but it disappears 50sec later just to the S of the reported position. At the time the primary contact disappears the 2xF3s involved are seen to execute a left turn on to an Easterly track roughly in the reported position. From this and the squawks it was deduced that the ac involved was the No3 ac of the F3 formation. The actual Airprox however, was not recorded on radar

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and there is no other information available to support or contradict that in the report provided by the RV6 pilot. The approximate geometry of the incident shown on the radar recording however, is not dissimilar to that reported by the RV6 pilot. While not entirely satisfactory, the lack of any supporting or contradictory information means that the RV6 pilot's estimation of the miss-distance must be accepted as 'best available'.

HQ STC comments that the geometry reported by the RV6 pilot (sighting left 8 o'clock then turning) does not quite match the picture of the F3s closing from the RV6s 11/12 o'clock then turning. The lack of recollection of the incident by the F3 crews does not give confidence that any accurate assessment can be made. The F3s may have seen and avoided the RV6 and been unconcerned or they may not have seen it at all and passed close by. Due to the lateness of the tracing action and reply, HQ STC are unable to make any comment that would be other than speculation.

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 appropriate operating authority.

The radar recording showed the F3s throughout the encounter but the RV6 only briefly before the Airprox occurred so the actual geometry at the time of the incident was impossible to determine.

Unfortunately due to the difficulty and time taken in tracing the Tornado involved, the pilot was unable to recall any detail of the mission or seeing any other particular ac. It is probable that had he come close to another ac he would have recalled it. This left two possibilities either he saw the RV6 and did not consider it a threat or he did not see it. Since there was no other amplifying information, the Board did not offer an opinion on which was more likely.

The F3 crews would have been in high workload situations, committing an attack on the GR4s to the S but nonetheless all 4 crew should have been in a position to see the RV6, albeit presenting a very small target initially virtually head-on. During an engagement such as this the F3 pilots would be maintaining an intense lookout for their prey, albeit biased to looking down rather than straight ahead.

Although the RV6 pilot was in a position to see the F3s, they had been closing at a very high rate, head-on, below cloud in low light conditions and just on the horizon all combining to make early visual acquisition very difficult. As it was, the F3s moved unseen by the RV6 pilot from his front hemisphere into his rear quarter before being acquired. Understandably, a mistaken conclusion on the F3s flight path had been reached by the RV6 pilot.

Since no other information was available the Board assumed that the miss-distance reported by the RV6 pilot (100m, co-altitude) was the best estimate. Owing to the lack of any picture of precisely what took place at the point of the conflict (the radar picture did not verify the RV6 pilot's report) the Board was unable to determine the degree of risk. Further, although a possible cause was offered, as stated below, the level of confidence in this assessment was lower than members would have liked.

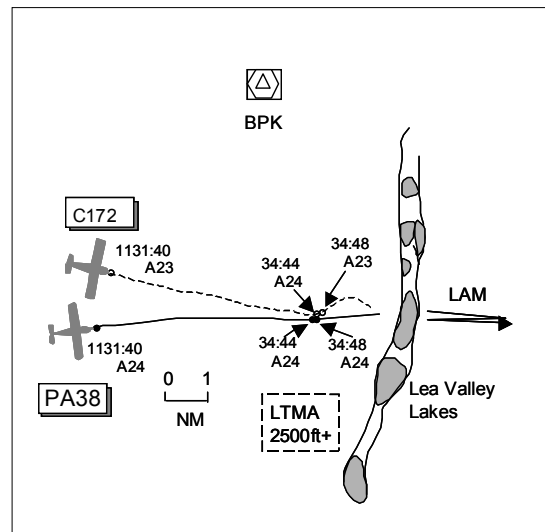
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Possible non-sighting by F3 crews and an effective non-sighting by the RV6 pilot.

Degree of Risk: D.

AIRPROX REPORT NO 010/04

Date/Time: 9 Feb 1135
Position: 5140N 0003W (8nm W LAM)
Airspace: FIR (Class: G)
Reporting Ac Reported Ac
Type: C172 PA38
Operator: Civ Pte Civ Pte
Alt/FL: 2300ft 2400ft
(QNH 1035mb) (QNH)
Weather VMC CLNC VMC CLNC
Visibility: >30km >30km
Reported Separation:
nil V 100m H nil V 300m H
Recorded Separation:
0.1nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE C172 PILOT reports heading 095° at 95kt cruising at 2300ft QNH 1035mb and listening out with Elstree on 122.4MHz squawking 7000 with Mode C. The visibility was >30km in clear sky VMC, the ac was coloured white with red/blue stripes and the strobe lights were switched on. Passing over the Lea Valley lakes, his passenger spotted a PA38 Tomahawk ac, coloured white with a thin stripe, in their 5 o'clock position range 100m at the same level heading directly towards them. He immediately executed a descending L turn to avoid it and believed that had neither ac deviated at all, the risk of collision would have been high. After regaining his track towards LAM VOR, the Tomahawk was now in front and he watched it diverge away to the NE, apparently not having altered course or altitude.

THE PA38 PILOT reports heading 090° at 90kt cruising at 2400ft QNH and listening out with Essex RADAR on 120.62MHz squawking 7000 with Mode C. The visibility was >30km in clear sky VMC, the ac was coloured white with red stripes and the strobe lights were switched on. When W of the Lea Valley he saw a high wing white/light coloured Cessna overtaking him on his LHS, he had been watching it for about 5-10min as it slowly caught him up from behind. In accordance with the Rules of the Air, he waited for the Cessna pilot to see him and to take appropriate action. He kept watching it in case he was unsighted, particularly as vision from the Cessna's cockpit, owing to the high wing, was not good in his direction and because their tracks were converging. He deduced that the other pilot did see him as the Cessna reached his 10 o'clock position range 300m and altered course by turning steeply to the L and descending before turning R to pass behind. He maintained his course whilst watching the Cessna continue diverging to the SE. He believed that there had been no risk of collision.

UKAB Note (1): The Rules of the Air Regulations 1996 Rule 17 Rules for avoiding aerial collisions para (2) Converging (b) (i) states "...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". Para (4) Overtaking (a) states "...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, and shall not cease to 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".

UKAB Note (2): The London QNH was 1036mb.

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UKAB Note (3): Analysis of the Heathrow radar recording clearly shows the incident as described by the PA38 pilot. At 1131:40 the C172 is seen 13.5nm W of LAM tracking 100° squawking 7000 indicating 2300ft QNH 1036mb with the PA38 to the SSW of it range 1.5nm tracking 090° squawking 7000 indicating 2400ft QNH. Both ac continue on steady converging tracks, the C172 very slowly overhauling the Tomahawk until the CPA occurs at 1134:44, both ac indicating 2400ft QNH, with the C172 in the PA38's 10 o'clock range 0.1nm. The next sweep 4sec later show the subject ac 0.2nm apart with C172 diverging on a 070° track at 2300ft QNH, 100ft below the PA38's level. The ac continue to diverge until displaced by 0.4nm before the C172 turns towards the SE to pass behind the PA38.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

It was clear that Rule 17 pertained during this 'see and avoid' encounter in Class G airspace. Unbeknown to the C172 pilot, he had slowly overtaken the PA38 for several minutes whilst both ac had been on a converging course. However, the C172 pilot had only seen the PA38, which had 'right of way', after he had pulled ahead of it and once his passenger pointed it out to him. Being startled by the PA38's position and proximity at this first sighting, the C172 pilot had believed the Tomahawk was in conflict and had executed a descending L turn away. Members agreed that what had taken place amounted to a non-sighting by the C172 pilot and that this had caused the Airprox. The PA38 pilot had watched the overtaking/converging C172 for several minutes, and had been mindful that its pilot may not have seen him. However, some members thought that the situation had warranted some sort of action also. Whilst the Tomahawk pilot had always been in a position to manoeuvre if required, it may have been prudent to do so until he was certain that the Cessna pilot had seen him, notwithstanding any 'right of way' priorities. As it transpired, despite this view, safety had remained intact.

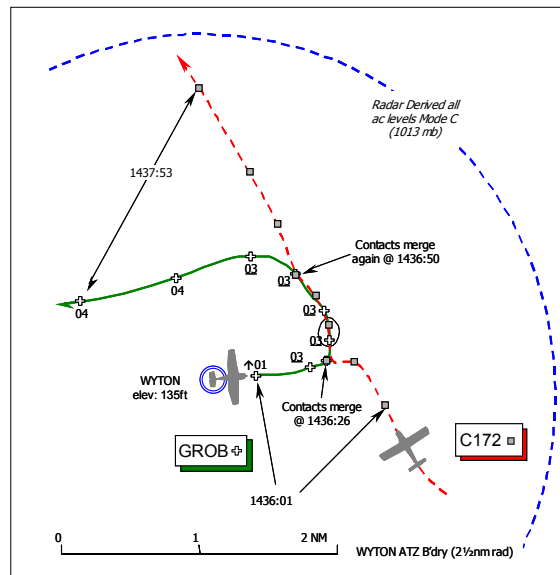
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the C172 pilot when overtaking the PA38 on a converging course.

Degree of Risk: C.

AIRPROX REPORT NO 011/04

Date/Time: 11 Feb 1436
Position: 5221N 0006W
 (Wyton A/D Cct - elev 135ft)
Airspace: Wyton ATZ (Class: G)
Reporting Ac Reported Ac
Type: Grob Tutor C172
Operator: HQ PTC Civ Pte
Alt/FL: 700ft↑ 1100ft
 (QFE 1026mb) (QNH 1027mb)
Weather VMC HAZE VMC CLOC
Visibility: 4000m 15km+
Reported Separation:
 50m H/50ft V 75yd H
Recorded Separation:
 Contacts merged

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE GROB TUTOR PILOT, a QFI instructing a student, reports that his aeroplane has a predominantly white colour scheme and the landing lamp and HISL were on, shortly after take off from RW09 into the aerodrome Cct at Wyton. He was in communication with Wyton TOWER on 245.375MHz and squawking A7000 with Mode C.

Whilst turning L through 070° at 80kt, as he was approaching 500ft QFE (1026mb) in the climb, he spotted a single engine light aircraft (LA) approaching from the starboard side about 500m away, heading NW and slightly above his ac. The downwind turn was continued as it was the best avoiding action and the LA passed 50m ahead from R - L and 50ft above his Tutor, whereupon he was able to identify the ac's registration letters. The pilot of the LA took no avoiding action and continued on a steady course out of the Wyton Cct area. No transmissions were heard from the LA pilot to either Wyton APPROACH or Wyton TOWER who were unaware of the ac before the incident occurred. Given the intensity of Cct traffic, in his opinion, this was a highly dangerous infringement of the ATZ and he assessed the risk as "high".

THE CESSNA C172 PILOT reports his ac had a white colour-scheme and the anti-collision beacon was on whilst in transit from Duxford to private strip N of Leeming under VFR at 100kt. He had been in receipt of a FIS from Cambridge on 123.6MHz and was flying clear below cloud with an in-flight visibility of 15km+. A squawk of A7000 was selected, but Mode C is not fitted.

His intended track was east of the Wyton ATZ, but on this return leg he had to fly lower than his preferred cruise altitude to remain VMC. Heading 340° in level cruise at 1100ft QNH (1027mb) just as he was about to establish communications with Cottesmore, he spotted another low-wing single engine ac about 1000yd away off the port wing and 500ft below his ac. He also saw a runway beyond and realised that he had drifted to the west of his intended track. There was no point in altering course at that point because the other ac would have passed well behind him and the separation was increasing, but it then turned onto the same course he was flying and continued climbing, following his ac below and to port. He watched the other ac for some time as it gradually caught him up until eventually it peeled off at a range of about 75yd. He assessed the risk as "none". On landing he telephoned Wyton ATC to explain that he may have inadvertently entered their ATZ.

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HQ No1 EFTS comments that this Airprox occurred as a result of a civilian light ac infringing the Wyton ATZ. Conditions were fit for Cct work but the visibility, at 4000m, was relatively poor. Earlier sighting of the Cessna was further prevented by the climbing attitude of the Tutor, which would have obscured the intruding ac under the right hand side of the Tutor's nose. Fortunately, the Tutor pilot was keeping a good lookout and he saw the Cessna in good time to take avoiding action, albeit that the miss distance was minimal. It seems that the Cessna pilot, already unaware of his proximity to a busy airfield, did not see the Tutor or if he did then did not take any avoiding action; this is disturbing.

The key points are the importance of being fully aware of ATZs and the need to keep a good lookout at all times. It is easy when in the Cct to just look inside the Cct pattern to locate known traffic but this Airprox emphasizes the value of looking outside the Cct pattern and to be vigilant for the unexpected.

THE WYTON AERODROME CONTROLLER (ADC) reports that shortly after the Grob Tutor took-off from RW09, whilst turning cross-wind, the pilot reported sighting a light single engine ac in the ATZ. He then spotted the white C172 himself at a height of about 800ft very close to the Grob. Later, during the down-wind leg the Grob pilot reported the C172's registration. The C172 pilot was not in contact on any Wyton frequencies and maintained a non-deviating track of about 290°(M) before departing the Wyton Zone, seemingly unaware that he was crossing a busy ATZ. LATCC (Mil) was informed for tracing action. No traffic information was passed, as he had not spotted the C172 before the Grob pilot reported it; he assessed the minimum separation as 50m at the same height

[UKAB Note (1): The 1450 Wyton weather (14min after the Airprox) was reported as: sfc wind: 360/9kt; >10km nil Wx; SCT-1400ft; OVC-1800ft; QFE: 1026mb; QNH: 1031mb; CC GREEN.]

[UKAB Note (2): The UK AIP at ENR 2-2-2-4 notifies the Wyton ATZ as a radius of 2½nm centred on RW09/27, extending from the surface to 2000ft above the aerodrome elevation of 135ft amsl. The Wyton LA Cct height is 800ft.]

UKAB Note (3): The Debden radar recording shows the Grob Tutor departing from Wyton (after a stream departure of similar ac) as it climbs into radar cover at 1436:01, squawking A7000 indicating 100ft unverified Mode C (1013mb). Meanwhile the C172 is shown [no Mode C fitted] approaching from the SE after penetrating the ATZ boundary. The Grob levels at 300ft (1013mb) – which equates to a height of about 690ft Wyton QFE (1026mb) that is maintained thereafter as the C172 turns west for a short while. The contacts merge at 1436:26 at 0.83nm in the climbout to RW09. Thereafter the C172 is shown just ahead of the Grob Tutor before the latter closes and the contacts appear to merge once more at 1436:50, 1nm NE of the aerodrome though it may be that radar contact on the C172 is lost at that point. Afterwards, the Grob turns downwind in conformity with the Cct pattern and the C172 maintains a NW track to clear the ATZ.

ATSI had nothing to add to the ADC's report.

HQ PTC comments that in the absence of any Mode C data from the Cessna, there can be no certainty as to the proximity of the 2 ac. However, we are satisfied that the Tutor pilot saw the Cessna sufficiently early that he had only to continue his circuit to keep safely clear of the Cessna and (coincidentally) to identify it. We concur with 1 EFTS' remarks – an ATZ boundary is no fireproof barrier against incursions.

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 operating authority.

It was reported that the C172 pilot had taken care to plan his homeward bound route clear of the Wyton ATZ. However, the radar recording clearly illustrated that the Cessna had entered the ATZ and flown

across the climb-out from RW09 as the Grob took-off into the Cct. Members recognised that the C172 pilot had not navigated accurately enough to ensure that he stayed out of the Zone, as he was required to do in the absence of any communication with the controlling ATSU who had not issued any permission to enter beforehand. The Wyton TOWER controller confirmed the C172 pilot had not called on any of the Wyton frequencies but had instead called Cottesmore. Some members wondered why he had done so when passing so close to Wyton, a busy training aerodrome. While Cottesmore was the most suitable ATSU from which to acquire a radar service, it could have been quite helpful if the C172 pilot had called Wyton APPROACH on 134.05MHz to advise ATC that he was passing by, as intended, outside the ATZ. Unknown to the Cessna pilot, a wave of about 6 similar training ac had departed from RW09 out to the NE immediately before this incident occurred, so it was indeed fortunate that the C172 pilot had only encountered the Grob flown by the reporting pilot. Unfortunately, when the Cessna pilot realised that he had drifted into the ATZ without the permission of Wyton TOWER he made no attempt either to exit the Zone expeditiously, or, more importantly, to call ATC on RT to report his presence. An ATZ is a controlled environment and all traffic within it should be known to ATC. Civilian pilot members highlighted an important flight safety lesson to pilots here – if you realise you are in the wrong place and have inadvertently strayed into an ATZ tell ATC as soon as practicable. Here, the ADC had not acquired the C172 before the Airprox occurred and since there may have been other ac in the vicinity it would have been wise if the Cessna pilot had asked ATC for traffic information.

The Grob Tutor pilot said that he spotted the C172 some 500m away. By that stage the C172 pilot had seen the Grob some 1000yds away to port and some 500ft below, climbing; in broader terms this was a distance of ½nm and members noted that both pilots having seen each other at these ranges closed further. The Grob pilot had turned, crosswind toward the downwind leg at first sighting to avoid the C172, while the latter's pilot had flown on without taking any action, perhaps thinking that the Grob was going to pass behind. This led the Board to agree, unanimously, that the Airprox had occurred because the C172 pilot had penetrated the Wyton ATZ without permission and had flown into conflict with the Grob Tutor in the aerodrome Cct.

It was not clear why the Cessna pilot apparently turned his ac west toward the aerodrome just before the merge at 1436:26, as shown on the radar recording. But the head-on aspect of the meeting between these two white ac would have made the C172 more difficult to spot from the Grob pilot's perspective, a difficulty that was shared also by the ADC in the Control Tower. Nevertheless, both pilots had acquired each other's ac before the CPA and each pilot had been in a position to afford greater separation if need be. Although the radar recording showed that the contacts had merged, which accorded with the minimum range reported of 50–70m, it was not feasible to determine independently the minimum vertical separation because the C172 was not fitted with Mode C. However, after carefully weighing all these factors, the Board concluded unanimously that no risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C172 penetrated the Wyton ATZ without permission and flew into conflict with the Grob Tutor.

Degree of Risk: C.

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AIRPROX REPORT NO 012/04

Date/Time: 19 Feb 0856

Position: 5604N 0200W
(12nm NE of SAB VOR)

Airspace: Scottish FIR (Class: G)

Reporting Ac Reported Ac

Type: Jetstream 41 Tornado F3 pr

Operator: CAT HQ STC

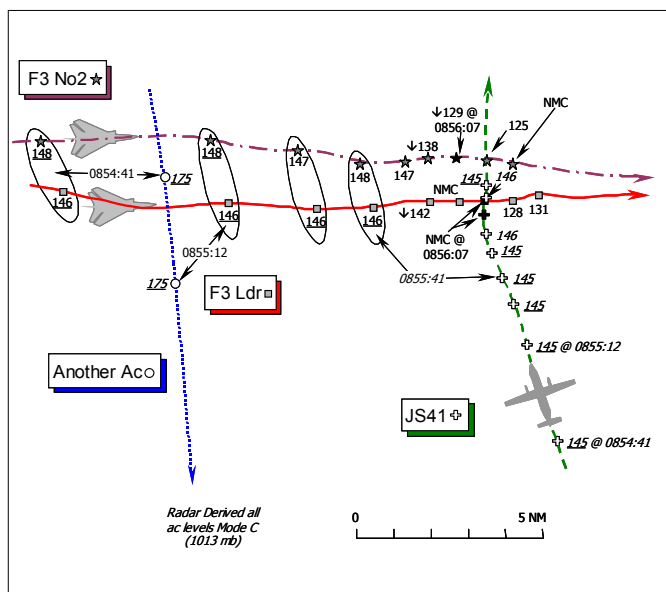
Alt/FL: FL145 15000ft
RPS (1029mb)

Weather: VMC CLOC VMC CLAC

Visibility: 10km+ NR

Reported Separation:
150ft V/200m H 1nm H/2000ft V

Recorded Separation:
JS41 v Lead F3: 0.32nm H
JS41 v No2 F3: 1.1nm H/2100ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports that his ac has a white, red and blue livery and the HISLs were on whilst flying under IFR in “good” VMC between Humberside and Aberdeen at 280kt. He was in receipt of a RIS from SCOTTISH CONTROL on 124.5MHz and squawking the assigned code with Mode C; TCAS is not fitted.

Whilst heading N, about 85nm S of Aberdeen at FL145, the controller passed traffic information about an ac at 10 o'clock - 10nm away at the same level as his ac. At this point he asked for descent, but when he stopped transmitting heard on the RT the end of another message from the controller “??..4nm”, whereupon he sighted two conflicting Tornado jets at the 0930 position about 2nm away. By this stage the jets had already commenced a descent and to avoid them he also turned R about 40° as the two Tornados passed about 150ft beneath his ac.

He did not assess the risk involved but added that all the ac’s lighting was on, along with ‘mapping mode’ on the ac’s radar, which he had been led to believe improved their chances of being detected by a fighter’s onboard sensors.

THE TORNADO F3 PILOT provided a very comprehensive account reporting that he was leading a pair of F3s in transit to D613C at 15-16,500ft RPS (1029mb) under an ADIS from CRC Buchan on 282.2MHz. The pair has an air defence grey camouflage scheme but the HISLs were on whilst flying some 10000ft clear above cloud, but into sun. The assigned squawk was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

Heading 090° toward D613C at 400kt, they had been instructed not to climb above 16500ft [1029mb] because of a “stranger” to the NE heading S, which Buchan had co-ordinated above them. Subsequently, a further “stranger” to the SE heading N was called [the JS41] but with no level and apparently no co-ordination applied. His wingman acquired the second ac [the JS41] on AI radar from about 10nm and maintained this contact throughout. However, his own ac’s AI radar had not detected the other ac and this contact was not passed to him by his No2 because of intensive RT on the frequency. The CRC controller called the second ac – the JS41 - to them again using a tactical bearing at a range of 4nm and his wingman gained a ‘tally’ [visual contact] immediately just out of the sun. His

No2 called him to descend so an immediate descent was initiated; he acquired the Jetstream at a range of 3nm and his formation passed by the Jetstream about 1nm away and in excess of 2000ft, he thought, below the airliner. He added that it would have been easier to go above the JS41, but with their co-ordinated top altitude of 16500ft they were not guaranteed to be clear of the other traffic. He assessed the risk as “nil”.

THE TORNADO F3 PILOT’S STATION comments that safe separation was achieved during this occurrence albeit at the last moment. However the position of the southerly Jetstream relative to the fighter formation was held by both the CRC controller and the F3 wingman. Notwithstanding the intensity of RT communications at the time, it was the responsibility of the No2 F3 crew to pass to his leader the Jetstream’s position thereby ensuring safe and controlled separation. The incident underscores the importance of good RT discipline.

ScACC ATCI reports that the Jetstream 41 crew was inbound to Aberdeen via SAB VOR, under a RIS from the ScACC TAY SC on 124.5MHz. The flight was operating IFR in VMC conditions by day, at the correct quadrantal flight level of FL145. TAY Sector was manned with both a PLANNER and TACTICAL controllers with good radar cover from both Lowther Hill and Great Dun Fell Radar heads.

At 0854:50, STCA activated. TAY TACTICAL first passed traffic information to the Jetstream crew to warn them of the presence of Tornado pair squawking A1524 and A1523 with Mode C at 0855:20, when 10nm W of the airliner - tracking E, saying “...two military aircraft in your ten o’clock at ten miles going to cross your left to right, unverified Mode C indicates similar height to you”. To which the JS41 crew responded “..looking”. [UKAB Note (1): These codes are assigned to CRC Buchan within the UK SSR Code Assignment Plan notified in the UK AIP at ENR 1.6.2, but they are not annotated as either unvalidated or unverified.] The pilot replied “...looking”. The SC updated the information shortly afterwards at 0855:40, “...coming into your 11 o’clock now, about 4 miles”, but the pilot queried “say again” so the controller responded “they’re in your eleven o’clock now, about 3 miles” whereupon the JS41 crew reported immediately “traffic in sight”.

SMF was not activated but the radar recording shows that as the lead Tornado crossed the Jetstream’s nose, vertical separation was estimated to be approximately 1400ft Mode C. The JS41 and the lead F3 were 2¼nm apart (converging) when at the same level. The No2 F3 initiated a descent to clear the JS41 at a range of about 3nm.

At 0856:03 the JS41 pilot transmitted “...they’ve gone just right underneath us...”. Later at 0856:35 the pilot commented, “I appreciate we’re in the open FIR here but that was a wee bit too close for comfort for these Tornados, but thanks for telling us about them”. The controller replied: “There’s nothing I can do about them, I’m afraid”, to which the pilot said “I appreciate that, I’ll say something when I get back to base”.

[UKAB Note (2): The ScACC Lowther Hill Radar recording shows the F3 pair tracking eastwards towards D613C squawking A1524 and A1523 [respectively the No2 and the Lead F3] – in a 1-2nm wide battle formation - the latter being the more southerly and hence closer to the northbound Jetstream. The pair pass beneath and astern of the other co-ordinated southbound ac at FL175 as reported by the F3 lead. At 0855:41, the lead F3 indicated FL146 Mode C at a range of 4nm from the subject Jetstream and the No2 indicated FL148. The Lead F3 is shown descending through FL142 at 0855:54, some 300ft below the Jetstream at a range of 2nm from the latter, having descended through its level of FL145 whilst the No2 is shown still 200ft above the airliner. No Mode C can be seen for 2 successive radar returns of the lead jet as it passes about 0.32nm ahead of the JS41 from L-R at 0856:07, with the No2 shown passing FL138 and FL129 respectively. The lead Tornado is next observed at FL128 Mode C at 0856:10, some 1800ft below the JS41, which had climbed momentarily to FL146 as the No2, crossed about 1.1nm ahead of the JS41 indicating FL125 Mode C – some 2100ft below the latter. Thereafter the lead F3 climbed back through FL138 at a range of 2.3nm, to FL148 at 3.7nm and the No2 at FL141 respectively, as the JS41 continued northbound at FL145.]

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It is recommended that steps taken by NATS over past months to establish a combined NATS/Military forum to examine recent civil/military encounters are progressed with vigour by the MOD.

ASACS SSU comments that the F3 Pair were outbound to their operating area in D613C and in receipt of an ADIS 5000ft from the Buchan Weapons Controller (WC). The WC had previously co-ordinated southbound traffic at FL175 and limited the F3 pair to not above 16500ft. However, neither the Buchan WC nor the ScATCC TAY SC initiated co-ordination for the subject JS41, which was also operating under the terms of a RIS. The WC initially called the JS41 to the F3 pair at approximately 13nm but the call was not acknowledged by F3 leader, probably because the call was made immediately after passing sortie admin calls to another F3 pair also on the frequency. The WC passed a further 'stranger' warning to the subject F3 pair at 0855:28, "[C/S] *previously called traffic [bearing] 100, 7 miles heading north indicating 145, any joy?*" However, the next transmission was partly stepped on but apparently the two separate F3 pairs were unsure which of them the 'stranger' call was applicable to. The WC made a further 'stranger' call at 0855:40, "...*that call for [the subject F3 pair's C/S] traffic right 1 o'clock indicating 145 heading north range now 4 miles*". Whereupon at 0855:49, the subject F3 pairs leader called "[C/S] *visual and [the subject F3 pair's C/S] descend*' with a further call "*Traffic's right 2 o'clock just under the sun now*".

Although a late sighting of the JS41, the subject F3 pair descended steeply and passed some 1800ft and 2100ft respectively clear below the Jetstream. Understandably, the JS41 pilot was concerned having also sighted the F3s late, but having obtained visual contact and ascertained they had already initiated a descent, the prudence of turning belly-up and unsighting himself is perplexing. The Buchan WC did fulfil his obligations under the terms of the RIS, but it would appear that both of the F3 crews', and possibly also the JS41 crew, did not realise the significance of the first stranger warning passed to them by the respective controllers thereby potentially delaying early resolution of the conflict. This regrettable incident occurred in Class G airspace with both flights receiving a RIS; the aircrew were thus responsible for their own safe separation from other ac. The late sighting by the JS41 crew and their subsequent R turn away from the F3's may have contributed to the mistaken impression by the Jetstream crew of the separation that actually existed. CRC Buchan correctly identified the lack of acknowledgement by the F3 crew of the stranger warning as a contributory factor and has disseminated the lessons learnt to their control team.

ATSI had nothing to add.

HQ STC comments that the F3 formation would have been working a split search-responsibility between their 2 AI radars - splitting the search areas of responsibility (AORs) high and low. This was why only one Tornado detected the JS41 that was slowly approaching 90° from their flight path. However, the lesson to be learned by the wingman navigator, in contact with the JS41 on the radar, was to call the traffic both in cockpit and on the RT to all concerned. This lapse of CRM, coupled with the JS41's position relative to the sun, caused the formation to have low awareness of the airliner and a subsequent late reaction.

See and avoid prevailed in this occurrence, and given the large recorded separation, we feel that the formation avoided the JS41 by a reasonable margin in Class 'G' airspace (well outside that offered when flying UK quadrantal cruising-levels which gives a minimum vertical separation of 500ft under IFR). However, it is probably the tardiness of the avoidance that alarmed the JS41 crew rather than the miss distance. Their subsequent choice of a R turn towards the F3's direction of travel remains a mystery, with hindsight it would have been better for the JS41 to remain predictable having seen the F3s manoeuvring to avoid.

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 report provided by ScACC made it plain that the TAY SC had detected the presence of the F3 pair in excess of 10nm away, just after STCA was triggered and in time to provide the JS41 with a suitable warning as the jets closed on the airliner at 400kt. This was conscientiously updated on two further occasions at ranges of 4 and 3nm whereupon the JS41 crew reported sighting the F3s. It was clear to the members that within the terms of the RIS provided, the controller had 'painted a comprehensive picture' for the JS41 crew as the jets approached: this was essential in Class G airspace where 'see and avoid' prevailed. Some members were surprised that the Jetstream crew had chosen not to take more positive action at an earlier stage. Although they had reported flying under IFR at the correct quadrantal, a RIS is in essence a VFR service whereby traffic information is provided to enable the crew to sight the other ac and thereby effect their own visual separation from it. The Board was reminded of the difficulties encountered by ScACC controllers in years gone by when endeavouring to provide a RAS in the Open FIR, which had led to the unfortunate decision by the Unit to withdraw the provision of this service to 'off-route' GAT in the Scottish FIR. It was accepted that the provision of an ATS to traffic in the Open FIR outwith CAS comes fairly low on the controller's list of priorities at ScACC. Nevertheless, it was unfortunate that in the subject case neither the TAY SC nor the Buchan WC had attempted to initiate co-ordinate with one another. The ScACC member opined that some difficulties had been encountered previously when trying to co-ordinate with the CRC, who insisted on using the RPS as an altitude reference when operating above the transition altitude. The STC member explained that it was standard practise with AD crews to use the RPS – as here - because their exercises usually generated so many climbs and descents through the transition level that the use of an altitude reference reduced the potential for terrain clearance errors. Controller members recognised the potential for confusion here, but the ASACs advisor assured the Board that CRC controllers do take into account the pressure differential when concluding co-ordination agreements. The ScACC member stressed that the information available to controllers about verified/unverified codes had been corrected. Nevertheless, the delays encountered in actually trying to reach the CRC controller concerned promptly on the landline were such as to dissuade ScACC controllers generally from attempting co-ordination with the CRC in the first instance, a point worthy of consideration by the ASACS SSU.

Pilot members considered that when operating outside the protection afforded by CAS there is little point in obtaining traffic information unless it is used to assist avoidance of other ac in the FIR. Whilst recognising that the JS41 had 'Right of Way' under the 'Rules of the Air', the crew had evidently not seen the jets until they were about 3nm away and then promptly turned R. Some members had contended that this was a late stage to be taking avoiding action but up until this point the F3's were still closing rapidly on the JS41 at the same level with no apparent action on the part of the leader to avoid the airliner, as they were required so to do. The JS41 pilot's contention that they were more conspicuous to military AI radar's in 'mapping mode' was correct. However, the STC fast-jet member said that whilst it did indeed advertise the presence of the radar to F3 crews, it would be just one more of the myriad of radars detected that was operating at that bandwidth – including maritime radars. Whilst some might contend that the Jetstream crew should not have been placed in this uncomfortable situation, the 'Rules' can only work if the other pilot has spotted your ac and there was clearly no indication to the JS41 crew that their ac had been seen up until the time that they had initiated their R turn. Furthermore, it was not surprising to some CAT pilot members that the JS41 crew had reported the vertical separation as 150ft and the horizontal 200m, somewhat closer than the radar recording indicated. The crew were apparently unsighted on the jets at the closest point but probably saw the F3s just before the latter descended and then picked them up again when the jets regained their transit altitude, unaware - without TCAS - of the vertical separation as they passed underneath the airliner.

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The ASACS report had made it clear that the F3 pilots had been warned about the JS41 by the WC at a range of 13nm but the lead crew had not acknowledged this transmission. This was a salutary lesson to all controllers alike - worth repeating here - to ensure that critical information has been received by those that need to know about it. If the WC had repeated this call and the leader had picked up the presence of the JS41 at that point, the situation would probably have changed significantly. HQ STC had explained the AI radar search rationale, so as it was, only the No2 F3 crew held the airliner on his scope at this stage and did not pass this information on. Both the F3 station and HQ STC had commented on this lapse and it was clear to members that the No2 crew should have prompted their leader earlier. The next update call by the WC at 7nm was prudent but the apparent uncertainty amongst the two pairs of F3s, to whom the transmission was addressed, evidently delayed any action still further. It was not until the lead F3 had closed to about 2nm that its crew had realised there was a confliction, reported descending below the airliner at 0855:49, with the descent apparent on the radar recording moments later. Although this was certainly less than ideal and possibly just after the JS41 spotted the jets, members agreed that the lead F3 crew had spotted the JS41 in time to manoeuvre the more nimble jets around it, giving an appropriately wide berth below the airliner. The F3 leader had explained in his report why he had opted to descend, not climb, to avoid the JS41 because of the extant co-ordination and it was unfortunate that the WC had not promptly lifted the level restriction when the pair had passed the other southbound ac: such action might have given the pilots a little more flexibility. Evidently from the radar recording, the lead F3 had passed about 0.32nm clear ahead of the JS41 – not a lot but in addition it would appear to have been a significant amount underneath the J41, the ScACC report suggesting 1400ft although the lead F3's Mode C was not shown for three sweeps [possibly due to the rapid descent] - whereas the No2 passed over 1nm ahead and 2100ft below the airliner. After weighing all these factors carefully the Board concluded, unanimously, that this Airprox had resulted from a conflict in Class G airspace resolved by the F3 pair's descent which had removed any risk of a collision.

The Board noted the concerns expressed by ScACC and the request for a joint forum to review such occurrences as these in this locality. The STC member briefed the Board that a team had indeed been constituted: he explained that following an AAIB Safety Recommendation suggesting a joint review of airspace in the NE of the UK by the CAA and MOD, ADAP2 at the Directorate of Airspace Policy had been appointed as the Chairman of this joint review team, which consists of both civil and military experts with significant experience between them. The Team formally accepted their TORs at their first meeting in August 2004 and plan to meet once a month whilst progressing their review. Several actions have been placed on the Team by the Director of Airspace Policy with the objective that they should be reporting their recommendations to the Airspace Policy and Safety Regulation Group Policy Committees within 6 months.

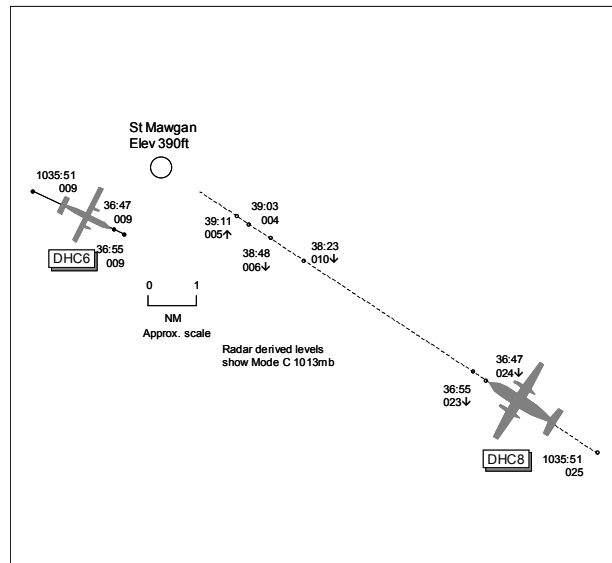
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the F3 pair.

Degree of Risk: C.

AIRPROX REPORT NO 013/04

Date/Time: 19 Feb 1039
Position: 5025N 0457W
 (2nm SE St Mawgan - elev 390ft)
Airspace: ATZ (Class: G)
Reporting Ac **Reported Ac**
Type: DHC8 DHC6
Operator: CAT CAT
Alt/FL: 600ft↓ <300ft↓
 (agl) (QFE 1013mb)
Weather VMC CLBC VMC CLBC
Visibility: 17km 17km
Reported Separation:
 200ft V <1nm H 500ft V 2nm H
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE DHC8 PILOT reports heading 305° at 120kt flying a straight in approach following vectoring to delay behind 2 Falcon ac approaching ahead. They were cleared for the approach and were fully established in the landing configuration speaking to Newquay TALKDOWN on 125.55MHz. Whilst descending through 600ft agl, a DHC6 Twin Otter, of which they had no prior notification, cut in at 90° from the L and turned in to land ahead of them. ATC told them to carry out a 'go-around' to avoid it and during this manoeuvre they climbed over the top of the DHC6; minimum separation distances had been 200ft vertically and <1nm horizontally. The weather conditions were good so the collision risk was low. He opined that if both ac had been coordinated sooner, he could have slowed down on final approach to allow space for the other ac to get in. As it was, their flight had a strong tailwind whilst the Twin Otter had turned into a strong headwind on base leg.

THE DHC6 PILOT reports flying inbound to St Mawgan from the Isles of Scilly and in receipt of an ATS from St Mawgan TOWER on 123.4MHz. Earlier when approaching the aerodrome, the Approach controller had instructed them to join downwind LH for RW31 as there was departing traffic and several inbound ac, one of which was making an instrument approach. ATC then told them to change to the Tower frequency, which they did, and they entered the cct as cleared. The Capt, PNF, called 'downwind' and at this time, and for all of the cct, the flight was in good VMC. The crew had the departing traffic in sight and were searching for the inbounds. They easily spotted the first 2 ac, a pair of Falcons flying in close formation and remaining N of RW31 as they tracked NW to position around to join downwind LH behind their ac. Also, they soon saw a third Falcon Jet following the pair and joining in a similar fashion. The Tower controller responded to his call with information on further instrument traffic joining for RW31. By the end of the downwind leg, they had the DHC8 (instrument traffic) in sight, it was still some way out (about 7nm distant), but nevertheless he asked the controller to confirm his position in the traffic sequence before he turned onto base leg, also confirming that they were visual with the DHC8. The Tower controller told them that they were No 1 so being conscious that the Falcons were joining behind them, faster and also now unsighted, they turned onto base leg to give best traffic separation. The DHC8 was in sight until they turned onto final approach in front of it onto heading 310° at 80kt, at which time they received landing clearance, estimating that he was 500ft below and 2nm ahead. He offered to 'land long' to facilitate the DHC8 which the Tower controller agreed and this was accomplished shortly thereafter, touching down half way along the RW. They taxied and exited at the NW'ly (far) end of RW31

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as expeditiously as possible and only after vacating did they notice that the DHC8 had initiated a go-around.

THE ST MAWGAN TOWER MENTOR reports on duty in the VCR supervising a trainee. He had been notified of 6 ac inbound to the aerodrome for landing on RW31 which included a DHC6 making a visual approach from the W and a DHC8 making an ILS approach. He assessed his personal workload as Mod/High increasing to High in the instructional role. The DHC6 crew called on frequency and the trainee cleared the flight to join downwind LH with instrument traffic, a Grob Tutor, overshooting from a PAR within the cct area. He saw the DHC6 entering the downwind leg as 2 DA20 Falcon ac called to join via initials. Also, he observed a radar contact on the Hi-Brite display at a range of 8nm and discussed with his trainee a landing order and a safety option if the intended sequencing did not work as planned; this included the possibility of breaking off the DHC8 and, if necessary, instructing it to fly through and then to rejoin the visual cct. A call was then received from a Jetstream flight for a visual join from the N onto R base but, after receiving the traffic situation, its pilot elected to join overhead; the Jetstream was sighted approaching from the E. The 2 DA20s overflew the RW and broke into the cct behind the DHC6, who was at this stage late downwind, and the Jetstream positioned downwind as No4. The trainee allocated an order of landing in which the DHC6 was No1 with the DA20 formation instructed to extend downwind behind the DHC8. The DHC6 crew said that they would *“keep it tight”* and was given landing clearance shortly thereafter. He first became aware of a possible problem with the integration plan when the DHC6 turned into wind on L base (the surface wind was NE'ly) and the ac's groundspeed reduced. Aware that the option to 'break-off' the DHC8 was viable, he chose to allow it to continue its ILS approach to 2nm, confident that his trainee would be able to give the flight landing clearance in due course. As the DHC8 approached 2nm, the DHC6 was still on short finals ahead so the student issued an instruction to the radar controller to 'break-off' the DHC8, which was seen to initiate an overshoot, climbing to 1000ft. The DHC8 crew called on frequency and were instructed to join the visual cct which was completed without incident. Later the DHC8 crew reported that they would be filing an Airprox.

UKAB Note (1): Met Office archive data shows the St Mawgan METAR EGDG 1050Z 05015KT 9999 FEW022 BKN250 06/M00 1027 BLU NOSIG=

MIL ATC OPS reports that all timings in this report are UTC and the RT timings have been adjusted by -25 sec to synchronise with the radar recording. SATCO St Mawgan has confirmed that the RT recording clocks at his unit have been reset and a procedure is now in place to ensure that they are kept accurate.

At 1035:11 the DHC6 crew called St Mawgan Tower (TWR) to report joining *“downwind...left for 31”* and the pilot confirmed that he was visual with a departing Grob. At 1036:00 the DHC8 crew called St Mawgan Approach (RAD) reporting *“...on the localiser with 1013 (mb)”*, which was acknowledged with a request to *“ report descending on the glidepath”*. At 1036:50, the DHC6 crew reported to TWR *“Downwind left err DHC6 c/s visual with the pair on the err northside”* and TWR acknowledged the call and gave the surface wind. RAD did not make a 7nm liaison call to TWR in accordance with local orders. However, TWR had already observed a radar return which he believed to be the DHC8 on the Hi-Brite (Radar display used to judge distance from touchdown) and broadcast *“...Dash 8, 7 and a half miles...”* on the TWR frequency at 1037:12. Following this broadcast the DHC6 crew reported *“...visual with the Dash 8”* and shortly afterwards requested *“...which number are we please?”* TWR transmitted *“...you're number 1, radar traffic at 5 miles”* and the crew confirmed that they were *“...turning to keep it tight now”*. At 1038:44 TWR received a 3 mile call from RAD requesting a clearance for the DHC8 to land; TWR gave an instruction to delay the clearance until 2nm by stating *“...call by two”*.

[UKAB Note (2): RAD then told the DHC8 crew at 1038:49 *“DHC8 c/s final clearance delayed continue the approach”* which was acknowledged.]

TWR then broadcast *“Dash 8, 3 miles continuing”* before he asked the DHC6 *“...confirm you're finals?”* The DHC6 crew replied *“Just above to turn finals now sir”* and at 1039:01 TWR informed the DHC6 crew that

they were "...clear to land wind 060 15". The DHC6 crew read back the clearance adding "...we are happy to and well up if that helps". Almost simultaneously at 1039:09 RAD used the radar clearance line again to call TWR and requested a 2¼ mile clearance for the DHC8 to land. TWR instructed RAD to break off the DHC8's approach stating "...break off the approach with 3 in acknowledge". At 1039:15 this break-off instruction was passed to the DHC8 crew who reported "...going around". RAD then instructed the DHC8 to "continue on runway track to 1000 feet initially" and the DHC8 crew read back this instruction. The DHC8 was given TWR's frequency, two-way contact was established with TWR at 1040:37 and the DHC8 was told "...join RW31, QFE 1013 err 3 in".

[UKAB Note (3): The Airprox is not shown on the Burrington recorded radar and ranges described hereafter are all approximate owing to lack of accurate range scaling information. At 1035:51 the DHC8 is seen approx 11nm SE of St Mawgan heading NW squawking 0463 maintaining FL025 (2500ft QFE 1013mb) with the DHC6 2nm W of St Mawgan, heading SE on the downwind leg for RW31 squawking 0466 at FL009 (900ft QFE). The DHC6 is last seen on radar at 1036:55 just under 2nm SSW of the aerodrome before fading. Meanwhile the DHC8 has commenced descent on the ILS at 1036:47 and continues its approach until 1039:03 when about 2nm final for RW31 Mode C indicates 400ft QFE followed 8sec later 500ft QFE as the ac commences a climb].

The TWR position was staffed by a U/T and a mentor, both of whom were experienced controllers. The traffic levels were reported as very light but by the time of the incident they had increased rapidly within a relatively short space of time with an ac carrying out an overhead join and a pair carrying out a visual join. Although RAD did not give TWR the appropriate liaison call at 7nm, TWR had pre-empted this and made an appropriate broadcast on the TWR frequency. The U/T Controller and the Mentor discussed different options for sequencing the visual and instrument traffic and decided that it was highly likely that the DHC6 would be sequenced first with the DHC8 behind. They also agreed that if their plan did not work they would first be able to delay the clearance of the DHC8 and ultimately could break the DHC8 off. Both controllers agreed that, so long as a clearance or break-off instruction was passed to the pilot of the DHC8 by 2nm their plan would remain safe, though it could prove not to be the most expeditious course of action. As the DHC6 turned finals it was apparent to TWR that the sequencing distance was tight, but they still believed that the DHC6 could land ahead of the DHC8. TWR opted to issue a landing clearance to the DHC6 and delay the DHC8's clearance until 2nm. As the DHC6 turned into wind the effect on the ac's groundspeed was far more dramatic than TWR had anticipated. They chose to instruct the DHC8 to break off the approach and the instruction was passed via RAD to the pilot by 2nm. St Mawgan routinely operates a mixture of civilian and military ac and civilian flights are "...subject to military flying regulations for civil aircraft..." Consequently, it is normal for TWR to sequence the mixture of visual circuit and instrument traffic in accordance with JSP552. SATCO St Mawgan reported that following the incident he had spoken to the pilot of the DHC8 who had acknowledged that he was not familiar with the military system for sequencing visual and instrument traffic. In this instance the DHC6 had reported visual with the DHC8 whose crew were given an instruction to break off before 2nm, followed by visual cct joining instructions. With the benefit of hindsight, TWR may have made a better appreciation of the effect that headwind could have on the DHC6 and could have chosen to sequence the ac behind the DHC8. This may have been more expeditious but would have had a knock on effect on the other circuit traffic. In addition, if TWR had passed the reason for breaking off the DHC8 with the break off instruction e.g. "Break off the approach with one landing ahead," then the pilot may have been better able to anticipate the appearance of the DHC6 ahead of him.

UKAB Note (4): The Mil AIP promulgates St Mawgan ATZ as a circle 2.5nm radius centred on 502626N 004943W from the surface to 2000ft agl active 0650-2359A Mon-Thu and 0650-2200A Fri-Sun.

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.

From the outset, it was clear to the Board that there were differing perceptions and understandings by the subject acs' crews and ATC about the procedures in use at St Mawgan. Civil pilot members agreed that the DHC8 crew would have expected priority on the instrument approach against visual cct traffic. Also, the DHC6 Twin Otter crew had, unbeknown to the DHC8 crew, asked for and had been given their position as No1 in traffic i.e. to turn in front of the DHC8 on long final. Civil ATCOs informed members that at civil aerodromes the DHC8 crew would have been given TI on the traffic turning in ahead and almost certainly would have been afforded sufficient spacing from the Twin Otter, to allow it to execute its approach and landing. Military ATCOs opined that even though the DHC6 crew had been given clearance to turn in ahead of the DHC8 as No1 in the traffic sequence, they would have had better a appreciation of the wind effect on their ac during the approach. Members agreed however that the situation was always going to be 'tight' irrespective of the wind effect.

The St Mawgan TWR controller was cognisant of the faster traffic that had joined the cct behind the Twin Otter and had decided on a traffic sequence order. If he had given the DHC6 crew No2 to the DHC8, it would have caused problems with the DA20 formation and Jetstream trying to follow the much slower Twin Otter on its extended cct. Although the "break-off" option was an SOP at military aerodromes, military ATCO members agreed that to continue an approach beyond 3nm to 2nm was normally only used if there was assurance that the landing clearance would be forthcoming. It was felt that perhaps the TWR controller should have made that 'break-off' decision earlier when it became apparent that the Twin Otter's groundspeed had slowed during the base leg/final approach phase of its flight. Pilot members understood the concern of the DHC8 crew when, without prior notification, the Twin Otter had turned in front of them to land and they had been broken off at, as they saw it, the last minute with an instruction to execute a visual go-around climbing to 1000ft QFE. At civil aerodromes, traffic on an instrument approach (ILS) is transferred to the TWR frequency once fully established which allows the crew better situational awareness of other aerodrome cct traffic. Civil operators using MOD aerodromes can obtain aeronautical information from the military Aeronautical Information Documents Unit (Civil UK AIP AD1-1-3 refers) although members expressed doubt whether the basic ATC procedures used by Military ATCOs as SOP in this incident would be explained in the MIL AIP in sufficient detail, given that it is already fully covered in JSP552. (The JSP is not, however, available in the public domain.) During this incident the investigation had revealed that the subject acs' crews and ATC had complied with the procedures/regulations in force. The unexpected late go-around instruction to the DHC8 crew had undoubtedly caused them concern: with hindsight, earlier TI on the DHC6 or increased spacing may have alleviated the situation. In the end, the Board agreed that this had been a conflict on final approach to St Mawgan and the go-around issued by ATC and executed by the DHC8 crew had been effective in removing any risk of collision.

Members were mindful of an ongoing review within the MOD, following previous Airprox, concerning the integration of VFR and IFR traffic and elected not to put forward a further safety recommendation.

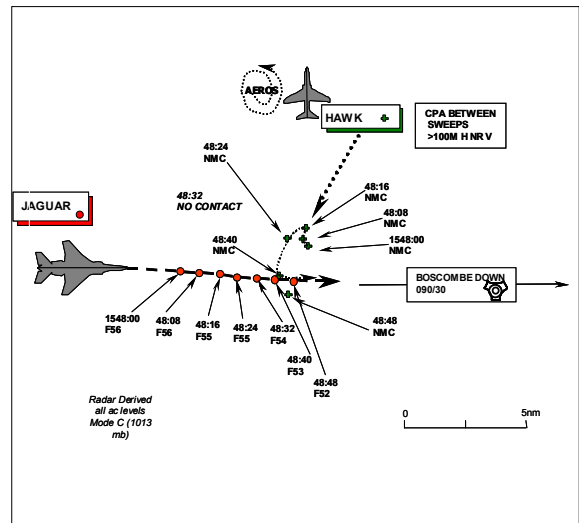
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict on final approach to St Mawgan.

Degree of Risk: C.

AIRPROX REPORT NO 015/04

Date/Time: 20 Feb 1548
Position: 5110N 00238W
 (30nm W of Boscombe)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: Hawk T MK1 Jaguar T MK2A
Operator: DPA DPA
Alt/FL: FL53 FL51
Weather VMC Above VMC Above
Visibility: >10km >10km
Reported Separation:
 0ft H 150ft V 0ft H 200ft V
Recorded Separation:
 >100m H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE HAWK T MK1 PILOT reports flying a red, white and blue Hawk ac on a Test Pilot instructional sortie with anti collision and nav lights switched on, squawking with Mode C and in receipt of a RIS from Boscombe Down. While heading 170° at 430kt following the completion of aerobatic manoeuvres, and in a shallow descent passing FL53, a Jaguar was spotted coming from behind the canopy arch in the 1.30 position less than 1km away. It was at close range and on a constant bearing with a 90° aspect so avoiding action in the form of a high G pull was initiated to negate the potential collision and, as a result, the non-flying pilot in the rear cockpit suffered minor neck strain. After the avoiding action, the front cockpit G meter indicated 9.7G, and the rear cockpit 10.2G. The ac was recovered to Boscombe via a straight in approach having first completed a low speed handling check. Throughout the general handling phase of the sortie, RIS was being provided by Boscombe Radar.

THE JAGUAR T MK2A PILOT reports flying a red white and blue Jaguar T2A on a Test Pilot instructional sortie with nav and anti collision lights switched on, squawking with Mode C and in receipt of a RIS from Boscombe Down. While straight and level at FL51, heading 090° at 300kt on recovery to Boscombe Down simulating asymmetric, TI was received on a Hawk in their 10 o'clock at 10,000ft. Approximately 30sec later the rear crewmember spotted the ac to their left. They estimated the Hawk to be 1000m away and approximately 100ft above so a small bunt was initiated to increase the vertical separation, however on initial sighting they assessed there to be enough separation to avoid a collision and the Hawk was obviously pitching up, therefore only a small bunt (0G) was performed to increase the separation.

SATCO reports that the incident was not reported on the RT, but was phoned through to the ATC Supervisor after the ac had landed. Unfortunately, this prevented accurate assessment of workload and the radar picture at the time. However, it was a typical day for Boscombe ATC, with fairly standard traffic loading for the time of year and a typical background picture with numerous ac from several sites operating in the area. A trainee controller manned the Radar position with an experienced mentor sitting behind him. Initially they had 3 ac on frequency all conducting GH under RIS to the W of the airfield when the Hawk was handed over from Lyneham Zone and although this raised the workload it was still considered to be within their capacity. Shortly thereafter, the ac requested recovery in quick succession. While the 3rd ac, the Jaguar, was being positioned for recovery the Hawk descended into close proximity. Avoiding action was instigated by both ac.

AIRPROX REPORT No 015/04

Prior to the incident regular TI was being passed to the various ac on each other and on other unknown tracks. This undoubtedly created a difficult and complex air picture for the aircrew to assimilate however, this is not unusual for this airspace. The situation was made more complex by Boscombe operating on RW 05, which reduces the time and airspace available for positioning and sequencing. Given that the Jaguar was already established on its recovery, it is feasible that the Hawk pilot believed the Jaguar to be further E than it actually was. The controller had passed TI on the Hawk to the Jaguar pilot as he called for recovery but did not reciprocate to the Hawk pilot at the time. The mentor controller remembered seeing the Mode C of the Hawk indicate FL85 while the trainee was passing the weather to the Jaguar, which still gave 3000ft vertical separation, but then the Mode C disappeared until after the incident is believed to have occurred. Furthermore, the Jaguar pilot requested a repeat of the weather because the Airprox occurred while it was being passed first time. Subsequently, the Hawk called for recovery and informed the controller that he was visual with the Jaguar and was positioned for recovery behind and above it.

With the exact science of hindsight it is possible that the passing of TI on the Jaguar to the Hawk pilot before commencing the recovery of the former might have produced a different outcome to this incident. However, the mentor is confident that everything was being done appropriate to the circumstances at the time and that given the added pressure of positioning for RW 05, the indications that the Hawk was well above the Jaguar and the passing of TI to the Jaguar pilot, the trainee controller's actions were reasonable.

THE STATION comments that this incident highlights the traffic density found in the Class G airspace to the W of Boscombe Down, particularly when both Boscombe and Yeovilton have a busy flying programme. Even under VMC, the radar service provided to traffic in this relatively restricted area is fundamental to safe operations and the tape transcript provides ample proof of the complex and rapidly changing picture. Although none of the individuals involved was at fault in this instance, a review is needed on how the allocation of available airspace is co-ordinated. Boscombe Down will now review the sequencing of the station flying programme in an attempt to rationalise individual Squadron requirements and reduce periods of congestion. In a parallel activity, the controlling authority for the danger areas above Lyme Bay will be consulted with a view to utilising this airspace to reduce traffic density in their current operating areas.

MIL ATC OPS endorsed the SATCO's report and had nothing further to add.

DPA comments that this Airprox occurred in Class G airspace which has a very high density of fast moving traffic undertaking a vast array of tasks and roles. That said, a suggestion to the Hawk to remain above a suitable base level until the Jaguar which was being vectored for a recovery, was sighted might have been prudent. This, of course, assumes sufficient time, and as eloquently put by SATCO, 'with the exact science of hindsight...' all things are possible! The reality is that this was a very late sighting by the crews of both ac; the lesson remains the same, if you are flying VFR then you must maintain a good lookout. In the Boscombe Down area in particular a very, very good lookout as there is a tremendous amount of activity there.

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.

At the time of the incident both ac were in receipt of a RIS from the same unit in good weather conditions, in a busy section of airspace, and expecting warning of other ac; one was on recovery and the other about to commence one. The Jaguar pilot was passed TI on the Hawk enabling him to see it, albeit late, as it descended into conflict. The Hawk pilot, however was not given reciprocal information and

continued his descent until he saw the Jaguar at a range of 1000m slightly below, on a constant bearing and reacted with a high G pull. While accepting that the pilots were responsible for collision avoidance, specialist members considered that Boscombe Down APR should have given the Hawk pilot TI on the Jaguar. Had this happened in a timely manner, it was thought probable that the Hawk pilot would have modified his flightpath to avoid the other ac, thereby preventing the encounter. While accepting that the trainee controller was busy, the mentor should have advised him to reprioritise his actions and to concentrate on passing TI to the Hawk rather than the weather to the Jaguar, which was of much less urgency. In addition, despite both ac being in receipt of a RIS, specialists considered that the controllers should have considered giving the Hawk a height limitation until it was visual with, or clear of, the Jaguar.

Members were unable to determine why the Hawk pilot considered that such a violent avoiding manoeuvre was required when he sighted the opposing ac 1000m away in the 1:30 position; however, he obviously thought that it was required to prevent a collision and it had undoubtedly removed any such risk in good time. As a consequence, the Jaguar pilot meanwhile had been relatively unconcerned deeming only a small bunt to be needed since the other ac was seen to be already avoiding him. In this instance both pilots did see the other ac. They were able to avoid each other although not by as much as they would have liked, but there had not been a risk of their colliding. The absence of TI to the Hawk pilot had undoubtedly contributed to his late sighting of the Jaguar and the ensuing overstress of the ac.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by both crews resolved by the Hawk pilot.

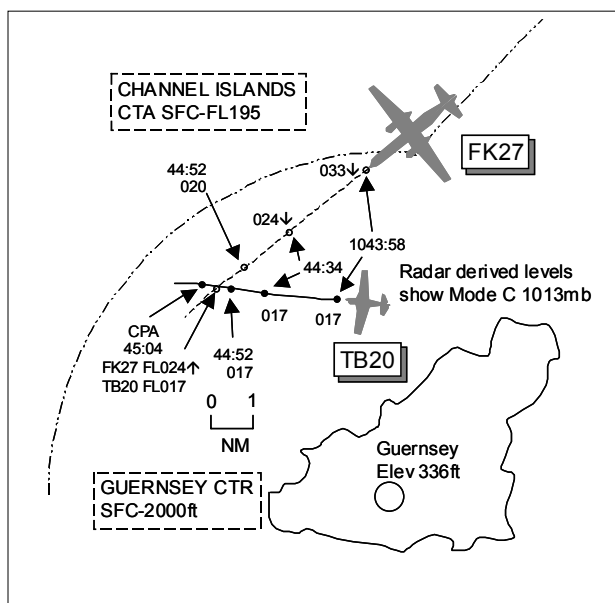
Degree of Risk: C.

Contributory Factors: Inadequate TI from Boscombe Down APR.

AIRPROX REPORT No 016/04

AIRPROX REPORT NO 016/04

Date/Time: 19 Feb 1045
Position: 4931N 0242W
(6nm NW Guernsey - elev 336ft)
Airspace: CTR (Class: A/D)
Reporter: Guernsey APR
First Ac Second Ac
Type: FK27 TB20
Operator: CAT Civ Trg
Alt/FL: 2400ft↓ 2000ft
(QNH 1024mb) (QNH)
Weather VMC CLOC VMC
Visibility: 10km
Reported Separation:
400ft V >500m H NR
Recorded Separation:
700ft V 0.25nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GUERNSEY APR reports that both ac were being vectored for an ILS to RW09, the TB20 was maintaining 2000ft heading 280° downwind being positioned No2 to the FK27 which was cleared to 3000ft on a heading of 235° routing overhead the TB20 then positioning onto base leg. The FK27 was seen to descend through 3000ft and as it reached 2700ft she asked the crew if they were levelling off at 3000ft. The FK27 crew replied that they were climbing in response to TCAS so she immediately passed TI to the TB20 pilot, as the FK27 was about to pass over the top of it climbing through 2500ft. The FK27 crew then called 'visual' with the TB20 and both ac subsequently continued with vectors to the ILS.

UKAB Note (1): The Guernsey METAR was EGJB 1050Z 04024G34KT 9999 FEW022 SCT030 06/00 Q1024=

THE FK27 PILOT reports flying inbound to Guernsey heading 210°, he thought, at 210kt and in receipt of an ATS from Guernsey APPROACH squawking an assigned code with Mode C. ATC had cleared him to descend to 2000ft, which resulted in a TCAS RA warning on traffic crossing L to R at 2000ft. Fortunately the crew had visually acquired the traffic prior to the TCAS warning. It was a dark coloured single engine light ac, which was seen crossing their nose from L to R, eventually passing >500m to their R and 400ft below and he considered the risk of collision as low. Initially the APR had commented that their cleared level had been 3000ft but during a subsequent telephone conversation after landing, the controller confirmed that he had been incorrectly cleared to 2000ft.

THE TB20 PILOT reports flying inbound to Guernsey on a training flight heading 300°, he thought, at 140kt and in receipt of an ATS from Guernsey APPROACH on 128.65MHz squawking an assigned code with Mode C. He was being vectored on a downwind LH pattern for RW09 at 2000ft QNH when a FK27 reported a TCAS warning. ATC gave him TI and he saw the FK27 in his aft R window crossing behind at about 3000ft altitude.

ATSI reports that both flights were inbound to Guernsey Airport under IFR, the FK27 was from Hurn while the TB20 Trinidad was from Lelystad Holland. The incident occurred approximately 6nm NW of the Airport, while the two flights were being positioned by the Guernsey APR for an ILS approach to RW09. Traffic loading and workload at the time of the incident were assessed as 'low'.

Approaching Guernsey from the E, the TB20 pilot made his first call to Guernsey Approach at 1031:45. He reported routing direct to the 'GUR' VOR, descending to FL50, his release level from Jersey ATC, and in receipt of the appropriate arrival information. The APR responded by instructing the flight to continue its descent to 3000ft on the QNH 1024mb. Offered a choice of a visual approach or vectoring to an ILS, the pilot elected the latter and, at 1034, was placed on a radar heading of 280° to position it N of the island, LH downwind for RW09.

At 1035:33, the FK27 crew established communications with Guernsey, descending through FL100 for FL50 and tracking SW direct to the island. The flight was instructed to maintain FL50 on reaching. This crew also elected to receive vectors to an ILS approach, as glare from the sun was precluding a visual approach. Although some distance apart at this stage, the two flights were, nevertheless, on tracks which were converging. The APR stated that as both flights had requested an ILS approach and the FK27's aircraft type was faster, she decided that this flight would be number one in the sequence. She explained that to achieve this, her plan was to maintain vertical separation between the two flights, with the TB20 at 2000ft and the FK27 at 3000ft, until their respective tracks had crossed and the requisite horizontal separation had been established. Thereafter, vertical separation could be dispensed with and each flight would be vectored towards the ILS centreline in the desired landing order.

At 1036:35, the TB20 pilot was instructed to continue its descent to 2000ft. Two minutes later the APR placed the FK27 on a radar heading of 225° for positioning towards a base leg. The APR then intended to issue the FK27 with a descent clearance to 3000ft, in accordance with her plan. However, the clearance she issued to the flight, at 1040:36, was "*FK27 c/s descend to altitude two thousand feet QNH 1024*". The pilot clearly read back the clearance issued to him, but the difference between this and the clearance intended was not detected by the APR and, consequently, not challenged. This was unfortunate as it was the only clue that the error had been made, the fps having been marked by her to indicate a clearance to 3000ft, the intended level, had been issued. The APR was convinced at the time that she had issued the FK27 with a descent clearance to 3000ft and could not account for her error. Various scenarios were explored in an attempt to seek a possible explanation but the error would appear to have been simply a result of a human 'slip' (ie: action not as planned) and not a procedure or system shortcoming.

The erroneous clearance, which the APR had unwittingly issued, now placed the two flights into potential conflict. The radar recording shows that at this point they were about 10nm apart, still on converging tracks, with the TB20 at 2000ft (FL017), while the FK27 is indicating FL67 in the descent. Over the next few minutes both flights were issued minor heading changes, each 10° R. Then during a routine scan of the radar the APR noticed that the FK27's height readout was indicating a descent below 3000ft, it now showing 2700ft (FL024), with the TB20 at 2000ft (FL017) in its 11 o'clock position at a range of 1.5nm. Convinced that she had earlier cleared the flight to only 3000ft, her immediate thought was that it had just made a brief excursion below the cleared level, consequently she transmitted at 1044:40 to the FK27 pilot "*FK27 c/s confirm you're maintaining altitude 3000 feet*". The response made no reference to level, the pilot stating only "*We've just got TCAS warning we still await traffic*". The APR recalled hearing the reference to TCAS and had interpreted this to mean the pilot was now readjusting to 3000ft while reacting to a TCAS instruction. She therefore turned her attention to the TB20 transmitting "*TB20 c/s traffic information for you in your right er one o'clock at a range of less than one mile is an F27*" to which the pilot responded "*searching.....maintaining two thousand*".

While the FK27 pilot's message contained no actual reference to an RA its content was nevertheless ambiguous and the APR's interpretation and reaction was perhaps understandable. However, in view of the other ac's close proximity, it may have been more prudent, in the first instance, for the APR to have issued the FK27 with an immediate climb instruction back to 3000ft and provided it with accurate TI. (Note: the ATC Unit involved intend to place greater emphasis on the handling of TCAS events and incident resolution in future TRUCE exercises). Although never announced by the pilot on the RT, it transpires that the flight did receive and react to a TCAS RA climb, but not before it had descended further (see radar analysis below). In his written account, the pilot reports that he had already seen the

AIRPROX REPORT No 016/04

'light aircraft' before the TCAS RA, however, this information was not shared with the controller. The necessity for clarity of communications during TCAS events cannot be over emphasised. The MATS Part 1 guidance in Supplementary Instruction, 3/01, para 6, describes the recommended TCAS phraseology as "*.....clear, simple, concise and to the maximum extent devoid of ambiguity and potential to cause operational confusion. It provides:*

The means to ensure that the pilot and controller have, whenever possible, a clear mutual understanding of the progression of a TCAS RA manoeuvre.

The means to delineate the point at which the responsibility for the separation of aircraft directly affected by the manoeuvre is transferred from the controller to the pilot, and, at the completion of the manoeuvre, from the pilot back to the controller." Examples of pilot announcements are given, including, "TCAS CLIMB (or DESCENT)" or in the case of being unable to comply with an ATC clearance due to an RA "UNABLE TO COMPLY, TCAS RA".

Analysis of the radar recording shows that while the TB20 pilot was being provided with TI, the FK27 continued its descent, reaching 2300ft (FL020) just as the TB20 was about to pass through its 12 o'clock position at a range of 0.5nm at 2000ft (FL017). The FK27 then commenced a climb (under a TCAS RA), reaching 2700ft (FL024) as it passed 0.25 astern of the TB20, still indicating at 2000ft (FL017). Thereafter, the tracks started to diverge and the pilot of the FK27 sought confirmation from the controller that he had been cleared to 2000ft. The APR advised, wrongly, that the cleared level had been 3000ft, but that the flight could now descend to 2000ft. No further discussions took place on the RT, each flight subsequently completing a safe landing in the order planned.

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 could not uncover any hidden factors and agreed with the ATSI findings that a simple, but honest, error had been made. The Guernsey APR had intended to issue the FK27 pilot with a descent clearance to 3000ft but had unwittingly instructed the flight to descend to 2000ft. This placed the flight into conflict with the TB20 which had caused the Airprox. The FK27 pilot's accurate read back to the unintended instruction went undetected by the Guernsey APR which then allowed the chain of events to unfold and which had contributed to the incident.

The fpss had been marked according to her intended plan, which re-inforced her belief that all was well, and therefore they did not reveal the correct 'picture'. The APR first noticed the potential conflict as the FK27 descended through 3000ft but the pilot's response to her 'challenge', which mentioned TCAS, had been ambiguous, causing her to believe that the FK27 crew were reacting to a TCAS command. She had then passed TI to the TB20 pilot who saw the FK27 in his R rear quarter crossing behind about 1000ft above. The FK27 crew had received an RA 'climb' warning, which was followed, but after having visually acquired the TB20 crossing ahead from L to R; they watched it pass >500m to their R 400ft below. The recorded radar had shown the FK27 'bottoming out' at 2300ft just before the TB20 crossed 0.5nm ahead with the FK27 climbing rapidly thereafter and crossing 0.25nm behind and 700ft above at the CPA. This visual sighting by the FK27 crew when combined with their robust avoiding action 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: The Guernsey APR unwittingly descended the FK27 into conflict with the TB20.

Degree of Risk: C.

Contributory Factors: The APR missed the correct read back to her unintended instruction.

AIRPROX REPORT No 017/04

AIRPROX REPORT NO 017/04

Date/Time: 1 Mar 1530

Position: 5137N 00250W (Upfield Farm
Landing Strip nr Newport)

Airspace: London FIR (Class: G)

Reporting Ac Reported Ac

Type: RANS S6 Hawk

Operator: Civ Pte HQ PTC

Alt/FL: 800ft 500ft
(QFE 1037 mb) (RPS)

Weather VMC Haze VMC

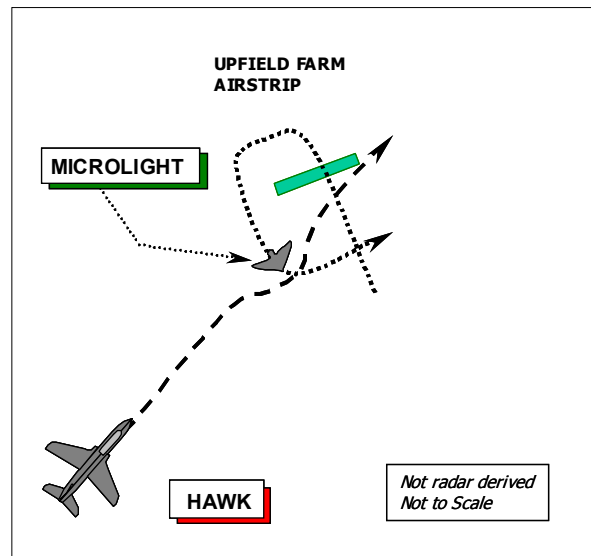
Visibility: 8km NR

Reported Separation:

150ft H 4/500yds H 0 V

Recorded Separation:

NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MICROLIGHT PILOT reports flying a yellow and purple fixed-wing microlight from a farm strip and not in communication with any agency. He had flown a standard overhead join and descended dead side for a left hand circuit and landing. He was crossing the upwind end at 800ft on QFE1037, heading 160° at 60kt and was about to turn onto the downwind leg when he saw a Hawk ac about 150ft away. The other ac had taken avoiding action and he noted that his starboard wing was down and he could see the underside of his port wing.

At that point he looked away since he knew that it had missed and he started looking for any partner ac as he thought it likely there were 2ac together; therefore he could not recall which direction it came from or departed to. He assessed the risk as being very high as there was no time to take any avoiding action.

THE HAWK PILOT reported that he was flying a black Hawk on student solo Hi Lo tactical sortie in Wales and SW UK. After transiting up the Severn and avoiding Newport at 1000ft he descended to 500ft. While heading 036° at 420kt, just to the W of Chepstow he saw a high wing green, yellow and purple microlight at a distance of 500yd in his 12 o'clock. The microlight was a very late spot as it appeared camouflaged against the forest background and did not seem to have any movement relative to the ground. He initiated an immediate break to the right but he only had a glimpse of the other ac. He continued the sortie and reported the incident to his duty authoriser on landing and noted the details of the incident. The risk of collision was high until he manoeuvred to avoid the ac when it reduced to low.

[UKAB Note (1): At the time of the incident Upfield Farm was not notified in the UKMilAIP 1-2-7-9 as a Microlight site although it has subsequently been added.

THE HAWK STATION comments that this Airprox occurred in fine weather as the student pilot was descending his ac back into low level after a transit at 1000ft. The student estimated the minimum range to have been 500yds with the Hawk at the same altitude as the microlight. On spotting the microlight he took immediate avoiding action, breaking to the right and up, and considered the risk of collision to have been low. At the end of the sortie the student pilot correctly raised the issue with his supervisor and the decision was made to record the incident on the relevant maps and in the authorisation sheets.

The incident serves as a timely reminder of how difficult it is to see small, slow moving objects with no conspicuity markings or lights against dark backgrounds. Staff and students have been briefed about the incident and reminded of the need for constant vigilance and thorough lookout.

HQ PTC comments that this seems to be an increasingly common encounter on weekdays in airspace, which both military fast-jets and (slow) sport aviation find themselves sharing. It was resolved by a relatively inexperienced Hawk pilot and despite the poor background contrast afforded by the microlight. This sort of encounter is likely to remain without a solution – even the mandated fitment of TCAS is unlikely ever to reach microlights. But lightweight transponders would be a considerable safety enhancement.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar video recording, and reports from the Hawk operating authority.

At the time of the incident the student Hawk pilot was flying a solo sortie without a Rad Alt and was in a moderate to high work-load situation descending slowly back to low level through a congested area, dispensing with a FIS from Cardiff and changing to the LFS frequency. The Microlight was almost head-on to him and had minimal relative movement to either the background or his ac and it was climbing up from below. Further, there was a slight haze and although the light level was good, the colour of the Microlight (yellow and purple) was such that it blended in with the forest background.

The Microlight pilot too was busy, concentrating on his circuit but, since the Hawk was positioned almost in his 12 o'clock, its headlight would have been visible to him for at least 30 sec. Several Airprox incidents have occurred recently when ac were very vulnerable in the circuit at small airfields, often unprotected by ATZs (as here), and specialist Board members reminded GA pilots that good lookout in the circuit is an essential survival tool which comes at no cost.

It had not been possible to determine accurately the miss-distance due to both pilots sighting the opposing ac only fleetingly. The Hawk pilot's estimation was made while he was breaking away from the Microlight, whose pilot had understandably then looked away to see if there was another Hawk. Although the Microlight pilot did not have time to take any avoiding action, the Hawk pilot's effective, but last minute, break had prevented there being an actual risk that the ac would collide. Owing to the lateness of the manoeuvre however and the resulting proximity of the ac, members considered that safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

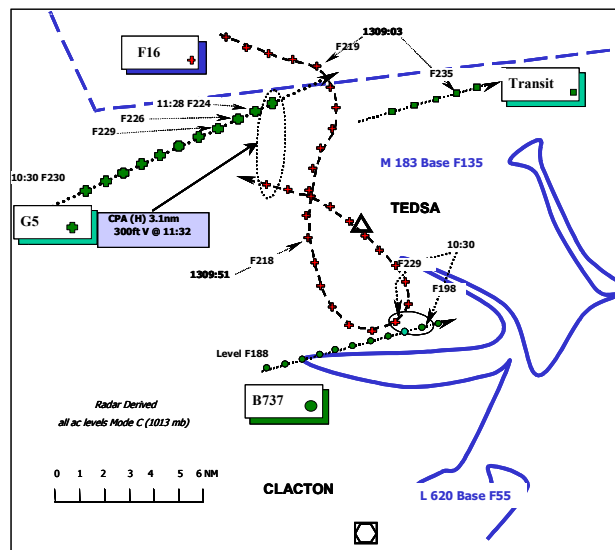
Cause: A late sighting by the Hawk pilot and a very late sighting by the Microlight pilot.

Degree of Risk: B.

AIRPROX REPORT No 018/04

AIRPROX REPORT NO 018/04

Date/Time: 4 Mar 1309
Position: 5203N 00107E (6nm NW TEDSA)
Airspace: Airway M 183 (Class: A)
Reporting Ac Reported Ac
Type: Gulfstream G5 F16
Operator: Civ Comm Foreign Mil
Alt/FL: FL230 FL200
Weather IMC VMC HAZE
Visibility: NR NR
Reported Separation:
200ft (TCAS) 2000ft H Low V
Recorded Separation:
3.1nm H 300ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GULFSTREAM G5 PILOT reports flying a commercial sortie from Luton to Amsterdam. He was on a radar heading of 070° at 300kt on Airway M183 at FL230 when he was instructed by London Control to climb to FL240. As they entered the climb on autopilot, ATC instructed them to expedite the climb due to unidentified traffic ahead. At the same time, they had a TCAS RA to descend which they followed and advised ATC of their actions. They disconnected the autopilot during the manoeuvre; when clear of the conflict it was re-engaged and the ac re-established at FL230. As the incident happened very quickly, he did not note the level of the other traffic, but he thought that the TCAS had shown it to be 200ft above them as they passed. He assessed the risk of collision as being high.

THE F16 PILOT reports flying a NATO Tactical Leadership Programme (TLP) sortie as part of a package from Florennes in Belgium into the UK FIR. He was heading 170° at 380kt flying at FL200 in the designated TLP exercise area (he thought) and reacted to a call given by the AWACS “turn to 270°” and turned as instructed. While in the turn he saw a contact on his AI radar and requested a ‘hostile declaration’. After a ‘positive declaration’ by AWACS he commenced a stern conversion on the target. He considered that there were no flight safety issues because he positively identified that the other ac was an airliner “with a tail aspect” and broke AI lock. When he realised that the AWACS was unaware of the situation and area, he began a turn to leave CAS at once and proceeded with the rest of the flight. On landing the sequence of events was discussed with TLP Staff and recorded.

THE AWACS Base comments that due to a shortage of personnel the TLP staff was advised by the AWACS Sqn that only 2 controllers would be available for the TLP mission on which the occurrence took place. It was therefore decided to support only the ‘Blue’ packages and to give a ‘broadcast control service’ to ‘Red’ air [including the subject F16] if time permitted. Only one radio was therefore selected to give admin information to Red air. The Fighter Allocator (FA) who passed the RPS information and a broadcast control service made the initial contact. The first Red player on this frequency was C/S X and the second, C/S Y [the ac involved in the Airprox], reported on station 25 min later. At that time the first Blue package was returning to Florennes with ATC and the second was outbound to the simulated target area. When the incident occurred C/S Y formation split into 2 elements, one ac was fighting against the second Blue package, the second one flew close to the S border of his assigned area and it looked to the controller that he was manoeuvring to re-enter the fight. As depicted on the AWACS radar picture he entered CAS by not more than 1nm. The controller recommended to the F16 pilot that he worked

further N of his present position and even gave an update on the Blue package which was as well to the N. At the same time C/S X formation reported off station and RTB as they free-called ATC.

No transmissions on UHF guard to C/S Y flight were heard by any of the mission crew members.

After a further 10min C/S Y also returned to Florennes with ATC.

UKAB Note (1): Broadcast Control is defined as follows: 'A form of ac mission control used in the absence of full capability or if the tactical situation precludes close or loose control, in which tactical/target information is passed to enable the ac to accomplish the assigned task. The controlling unit, when possible, provides adequate warnings of hazards, but the ac commander (s) is (are) responsible for ac navigation and collision avoidance. Two-way communications are not pre-requisite for this type of control'.

UKAB Note (2): Although they were not made available directly to the Board, the graphical output of the E3A mission tapes was reviewed by HQ STC on their behalf. HQ STC offered the following comment:

E-3A's do not have a voice recording facility so no transcript of the incident is available.

The mission crew of the E-3A AWACS were providing 'Broadcast Control' to the F16. It is evident from the Radar Graphic that the E-3A radar returns on the F16 were sporadic at best with only 4 disparate returns within the CAS. Additionally, the Weapon Controller (WC) responsible for the Broadcast to Red Air would have been focused on the COMAO to ensure an accurate tactical picture was available to the opposing fighters. Given this focus and the poor radar detection of the F16 by the AWACS sensors the WC is unlikely to have been able to warn the F16 of the proximity of the CAS. Furthermore, the pilot of the F16 was entirely responsible for ensuring he remained clear of CAS. This requirement was part of the mission briefing given to TLP students at the mass briefing prior to launch for the mission. TLP staff state that unfortunately in this instance the F16 pilot lost his situational awareness and infringed the CAS to the south of the operational area.

This regrettable incident occurred because the F16 pilot entered CAS without authorisation whilst responsible for his own navigation.

UKAB Note (3): The procedures for AWACS ac within the UK FIRs/UIRs in peacetime are contained within HQSTC 'Interface Document No 8'.

THE LACC CONTROLLERS reported that London Sector 12, 13 and 14 (Clacton) Planner and Tactical were combined. At the time of the incident Swanwick Military (LJAO) were controlling TLP sorties and the controller was expecting ac on a south-westerly heading through SONDO at FL190 inbound to KOKSY (in Belgian Airspace).

The Tactical Controller climbed an unrelated B737 from FL170 to FL330 as there was no TLP ac observed and the G5 was maintaining FL230 heading 070°. At approximately 1305 she noticed a 4717 squawk [the F16] showing FL217-220 to the N of the B737 heading S inside CA so she stopped the climb of the B737 at FL120 and then a short while after cleared it to FL200 as she saw the Mode C readout of the unknown ac fluctuating. After consultation with the London (MIL) Controller it transpired the ac wasn't under anybody's control. At this point it became clear the unknown ac would pass behind the B737 just as the G5 pilot called on frequency, heading 070° climbing to FL230. The unknown ac then executed a L hand orbit rolling out on a NW track and climbed to FL230 bringing it into conflict with the G5 which had levelled at FL230; STCA activated at this time. The Planner then contacted TC to warn them to beware.

The Tactical Controller then instructed the G5 to climb to FL240 and gave the pilot TI, unfortunately in her anxiety giving the wrong position of the ac; the pilot however, advised her of a TCAS descent, which

AIRPROX REPORT No 018/04

was acknowledged and she gave further TI. The unknown ac then turned L and passed behind the G5 and left CAS.

She estimated the minimum separation was about 2nm and 300ft.

Immediately after the incident another ac, squawking 4716 and indicating FL230 was observed to enter CAS and she again telephoned TC to advise them and put a "SHOW CROSSER" on the TDB to assist with avoidance. This ac [the F16] then turned and left CAS without incident.

THE NATS UNIT REPORT was endorsed by ATSI and stated that the G5 was en route from Luton to Amsterdam and the ac squawking 4717 was the F-16 apparently under the control of a NATO AWACS.

A TLP exercise had been taking place in the airspace to the N of Sector (S) 12 and a Cleared Flight Path of FL190 had been agreed for ac leaving the exercise and routing through S12-14 airspace. Previous crossing traffic had been under the control of LJAO and had displayed converted TLP SSR C/Ss.

The 4717 squawk was an unconverted background track and, as a result, did not appear as a rogue sector entry. The brightness setting for background tracks was not considered an issue in this incident.

S12-14 Tactical reported that she was expecting TLP ac on a SW heading through SONDO at FL190 when she noted a 4717 squawk showing FL220 heading S, to the N of a B737. Enquiries indicated that the ac wasn't under the control of any known unit so she stopped the climb of the B737 at FL210 and then, a short while later, at FL200 as she observed the mode C of the unknown ac fluctuating. The controller noted that several military ac had been operating in the airspace to the N of S12 for some time and, as a result, only became aware of the threat posed by the unknown ac as it came within 5nm of the sector boundary.

Analysis of the radar recording shows the unknown ac [the F16] approaching CAS heading S and, since LJAO advised that it was not under their control, the track was hooked to make it more visible: at the time its mode C indicated FL218.

S12-14 Tactical then started looking for potential conflicts between the unknown which was heading S and a westbound ac since the immediate threat of a collision between the unknown and the B737 was over. Analysis of the radar recording showed that the unknown made a L turn in behind the B737 and rolled out heading N and climbed to FL230 placing it into conflict with the G5.

S12-14 Tactical reported that the G5 pilot had checked on frequency climbing to FL230. The unknown then executed a L hand orbit rolling out on a NW heading and climbed to FL230. The G5 had levelled at FL230 and was in conflict with the unknown ac so she instructed the G5 pilot to climb to FL240 and gave TI but he reported he had the traffic on TCAS and was performing a TCAS descent. The STCA activated at 1310:54, simultaneously with the initial instruction to the G5 pilot and at this point the unknown F16 was 9.1nm away at the same level and on a converging heading.

At 1311:20, S12-14 Tactical amended the TI. The G5 had descended to FL226 in response to his TCAS RA, and the unknown indicated FL231.

Analysis of the Debden radar shows that minimum separation of 3.1nm and 300ft occurred between the ac at 13:11:32 as they passed abeam one another.

The phrase 'avoiding action' was not used. S12-14 Tactical reported that she had not expected the R turn made by the unknown, and in the heat of the moment neglected to say them. She opined that she had initially given traffic information to the G5 in the incorrect direction for the same reason. She had decided to climb the G5 as the unknown had previously been occupying lower levels, and thought it

safer to climb the G5 in case the unknown descended again. As a result of the TCAS RA, the G5 descended to FL224 before climbing again to FL230.

THE COMMANDANT OF TLP comments that the pilot concerned was removed from the course and he, along with the other F16 pilot in the ac, were sent back to their home base. The pilot concerned lost situational awareness while receiving information from of an AWACS and believed the ac he intercepted was being declared hostile. There was some confusion in his mind as he had become separated from his wingman.

HQ STC comments that the chances of recurrence of this Airprox has been reduced by the subsequent actions by the TLP staff. It illustrates the potential for conflict when running an exercise with foreign crews in unfamiliar airspace that is very close to CAS; a fact that TLP staff are all too aware of and amply brief to those concerned. Unfortunately, you cannot allow for a random failure of situational awareness (SA) that occurs in conditions that are designed to replicate the fog of war.

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 controllers involved and reports from the appropriate ATC and operating authorities.

Despite that there was never any risk that the 2 ac involved in this Airprox would collide, the Board viewed this to be a most serious violation of a very busy section of Class A CAS. Members welcomed the uncompromising follow up taken by TLP staff and endorsed by HQ STC. Similar CAS violations, also leading to Airprox, have happened on several occasions on previous multi-national exercises in UK airspace and this incursion was by no means unique or isolated. Members were not reassured by the HQ STC comment that this was a 'random failure of Situational Awareness' and were unanimous in their view that the MOD should put in place measures to prevent such potentially very dangerous incursions in the future. Members considered that there was a comprehensive Air Defence Radar network in the UK and that it ought to be possible to provide a radar based Air Safety Cell to monitor all players and ensure that potential violations are spotted early enough to be prevented. If such a system is not considered possible, or the safety of ac in CAS cannot be **guaranteed** by some other means, then the Board considered that large exercises should only take place in areas well removed from CAS. Although it is most unusual for the Board to comment on potential rather than actual risk, members were unanimous in their view that this was a most serious breach of flying discipline which had the potential at best to disrupt the orderly flow of traffic in the London area and at worst to result in a mid-air-collision.

Members recognised that the LACC Controller had not handled the incident in a perfect manner but sympathised with her predicament in a very rapidly changing situation with a totally unpredictable rogue ac in her very congested sector. With this in mind, members agreed that she had not contributed in any way to the incident and had done her best to resolve the situation in difficult circumstances. They also noted the thorough and frank unit report.

Following the ramble through CAS, this Airprox, as reported by the G5 on the F16 which was about to leave CAS, was reduced almost to a non-event by the appropriate avoiding action taken by the G5 pilot following the TCAS RA. Fortunately, there was no traffic below and in any case he too was about to leave CAS to the N of TEDSA (the CAS boundary changed and moved to the N shortly after the incident). Members were not able to determine if the F16 pilot had seen the G5 descending in his 1 o'clock below since it is not mentioned in his report. Nonetheless, bearing in mind the separation that was actually achieved and that the 2 ac had passed as the CPA was reached, members concluded that safety had not been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

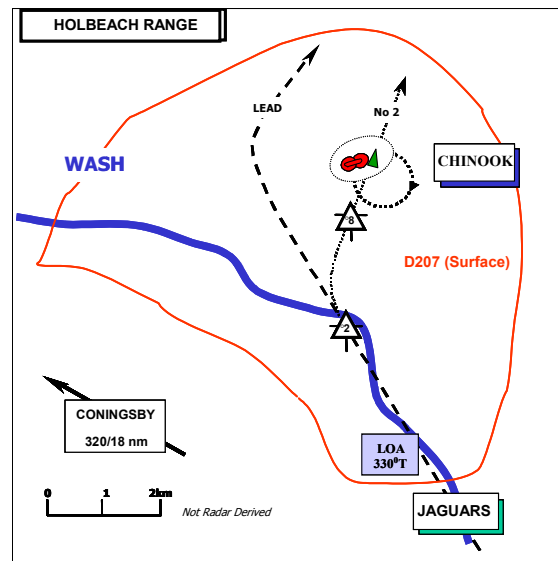
Cause: The F16 pilot penetrated CAS without permission and flew into conflict with the G5.

Degree of Risk: C.

Recommendation: The MOD should review the safety arrangements in respect of major air exercises with a view to establishing an Air Safety Cell for each such exercise in order to minimise the risk of participating aircraft infringing Controlled Airspace.

AIRPROX REPORT NO 020/04

Date/Time: 9 Mar 1822
Position: 5253N 00012E (Holbeach Range)
Airspace: EGD 207 Class G
Reporting Ac Reported Ac
Type: Chinook Jaguar
Operator: JHC STC
Alt/FL: 200ft 450ft
 (Rad Alt) (Rad Alt)
Weather VMC CLBC NR
Visibility: 25km NR
Reported Separation:
 50/100m H 0 V 100/200m H
 50/100ft V
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE CHINOOK PILOT reports that he was flying a day into night, crewman currency training sortie with a Limited Combat-Ready co-pilot and 6 crewmen in a dark green ac with red strobes and both landing lamps on. They were a singleton sortie conducting air to ground gunnery on Target (Tgt) 8 at Holbeach Range, squawking 7002 and in contact with Range Control. During twilight they were instructed by the Range Control Officer (RCO) to hold to the N of Tgt 8 while 2 Jaguars conducted an FRA (First Run Attack) on Tgt 2 from the E. They stopped firing, made their weapons safe and held in orbit at 200ft amsl (Rad Alt) at 80kt. They elected to hold NE of Tgt 8 to afford more clearance on the Jaguars and chose a right-hand orbit to allow the handling pilot and the No2 crewman maximum visibility of the other ac. When established in the hold they informed the RCO and heard him warn the Jaguar leader of the presence of the Chinook which was acknowledged. They watched the first Jaguar's run and his bomb being dropped and shortly after the second ac dropping his; just after the release however, they turned to the E and lost sight of the [second] ac. The RCO then cleared them to re-engage Tgt 8 and they continued their turn on to the gunnery heading of SW. As they passed through an Easterly heading the 2nd Jaguar passed across their nose, at the same level, slightly right wing down. The captain then called to the RCO that they had just had an ac pass in front of them at 100m range and the Jaguar pilot replied that he had them visual. As he responded that it was very close they flew through the Jaguar's wake turbulence. He had no time to take any avoiding action and assessed the risk of collision as high.

THE JAGUAR PILOT reports that he was No2 of a pair flying at twilight on NVGs, entering Holbeach range for a pre-booked FRA. His leader called '*joining from Hunstanton for an FRA Tgt 2 and departing to the North*' and the RCO replied that a Chinook was holding just N of Tgt 8 until the FRA was complete. He was concerned that the RCO had not given the Chinook a minimum height for the duration of the FRA, particularly as Tgt 8 lies to the N of Tgt 2. Due to the high light levels on the 330° LOA [line of attack], (looking just North of the setting sun) his leader stated on the formation discrete frequency that the attack height would be raised to 450ft agl from the normal EO (Electro-Optical) attack height of 250ft. The formation was in 30sec trail and climbed to 450ft then completed the attack. After passing the Tgt he commenced a gentle right hand turn and began searching for the Chinook and his leader. He could just make out what he perceived to be his leader's formation lights and began to take 'lead' on the lights to reduce trail separation to 20sec for the next attack at Donna Nook Range. Moments later the rotating blades of the Chinook, which was in a right hand turn at approximately 3-400ft, were seen emanating from the formation lights and the pilot realised that he was rapidly closing on the Helicopter. He

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increased the rate of the turn for a moment to ensure a clear flight path and then rolled off some bank to maintain visual contact as he passed down the right hand side of the Chinook. He thought that he had passed no closer than 1-200m to the right of the Chinook and 50-100ft above it.

UKAB Note (1): The document governing the use of Holbeach Range is HQ STC Air Weapon Range Orders (STCAWROs). It permits the limited conduct of FRAs in other user's slots, affording them priority (after the booking is accepted) and requiring the slot owner to hold clear as follows:

"Control of FRAs. The RCO is to deconflict range traffic from a FRA and released weapons either laterally and/or by a minimum of 1000ft vertically. If necessary, range traffic may be instructed to clear the range". et seq.

UKAB Note (2): The range departure procedure being used by the Jaguars is published in STCAWROs as follows:

"VFR Low Level. When approved, ac are to climb to 1000ft before going 'Feet Dry' and maintain this level until clear of PMR 225".

Although it is not specifically covered in STCAWROs, if there are no conflicting departures from Wainfleet Range (which is adjacent) or other conflicting traffic low-level departures to point Alpha (approx 040° 20nm from the range) are normally authorised by the RCO.

UKAB Note (3): A written report from Holbeach Range was not available. However, when contacted, the RCO on duty at the time of the Airprox was most helpful and provided considerable detail of the mission. His recollection of the incident largely verified the detail in both pilots' reports and that it was almost dark at the time. He verified the Chinook Captain's report in its entirety and that both the Chinook and the Jaguars were on the same frequency (Range Secondary). He recalled passing details of the Chinook's position and intentions to the Jaguar leader. Further, because of the potential for confliction, he instructed the Jaguar formation to extend off Tgt 2, remaining to the S and W of Tgt 8 until clear of the Chinook; this was acknowledged by the leader and is recorded on the RT tapes. Although it was becoming difficult to see, as it was almost dark, he thought that the No 2 Jaguar had cut the corner in an attempt to close the distance between him and his leader.

THE CHINOOK STATION comments that the Chinook pilot ac would appear to have complied with the instructions issued by the RCO and made every effort to keep clear of the Jaguar formation's anticipated track. The Chinook aircrew had visual contact with both the Jaguars in turn but lost sight of the second one as their ac manoeuvred in the holding pattern. Having been cleared to re-engage its target, the Chinook was continuing its clockwise turn when the second Jaguar flew directly in front of it. It seems that the second Jaguar did not follow the same path as its formation leader off Tgt 2. While it would appear from his reported transmission that the pilot of the second Jaguar could see the Chinook, there was no doubt in the minds of the Chinook aircrew, who were unsighted until the last moment, that the separation afforded them by the Jaguar pilot was inadequate. Although pilots flying under VFR must see and avoid other ac, co-ordinating authorities responsible for airspace in which ac may come into close proximity should ensure as far as possible that their procedures reduce to a minimum the risk of collision.

THE JAGUAR STATION comments that the Airprox appears to be the result both of poor co-ordination and a reluctance to confirm or question that co-ordination by any of the parties involved: the tacit assumption by all was that deconfliction would occur. A low level FRA using NVGs in difficult light conditions creates a very high workload and both Jaguar pilots would have correctly expected the Chinook to be deconflicted from their planned path for the duration of the FRA. Their uneasy assumption that this was the case proved incorrect: despite the high workload, the No2 Jaguar pilot should have confirmed the vertical separation from the Chinook. That said, the Chinook crew should have confirmed the FRA profile and positioned to deconflict themselves from the Jaguars. Furthermore,

the Chinook pilots exacerbated the situation by not maintaining visual contact with both Jaguars during the critical period when the ac were likely to be closest together. A number of options could have prevented this Airprox. The simplest and safest would have been to ensure vertical separation, which could have been achieved by the RSO giving the Chinook a holding height above that of the planned maximum height of the Jaguars during the FRA. Even if neither ac type had gained visual contact with the other, safety would have been assured. Secondly, the Jaguar pilots could, and should, have ascertained the height the Chinook was holding at and then modified their profile to give vertical separation during the off-target manoeuvre. Additionally, the Chinook pilots could have maintained visual contact with both Jaguars during the period when the ac were expected to be closest together. Any of these options would have decreased the probability of the Airprox and improved safety during the FRA.

HQ JHC comments that it would appear from the above statements that the Chinook crew followed the correct procedures and instructions of the RCO. As the Jaguar formation were aware of the presence and position of the Chinook, and were visual at the time of the Airprox, it would appear that there was no risk of collision. However, good airmanship dictates that the No2 Jaguar should have followed his leader and given a wider berth to the Chinook. Further, the pilot should have been more aware of the effect that wake turbulence can have on rotary ac: it was fortunate that in this case the ac had sufficient power to counter the effects.

HQ STC comments that poor co-ordination and communication led to this Airprox. The height and the position the Chinook held at was inappropriate for a fast jet FRA on NVGs and this was later demonstrated by the crew losing sight of the Jaguars while operating at a similar height. With the benefit of hindsight, the RCO should have positioned the Chinook further to the E and deconflicted it by height from the Jaguars. Further, the Jaguar pilots should have realised that the Chinook would conflict with their intended flight paths and offered it lateral separation on their egress. Finally, if they believed that safety could be compromised, the RCO or Chinook Captain, who had the range slot booking, could have declined the FRA request as permitted by STCAWROs.

What is disturbing is that everyone involved in the incident was 'happy to go with the flow'; any one of them however, could have broken the sequence of events that led to this very close encounter.

Finally, HQ 1Gp are re-writing their STCAWROs to place emphasis that RCOs should, where possible, increase lateral, and use vertical, separation when 2 or more elements are working within an AWR.

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 Range Control Officer involved and reports from the appropriate operating authorities.

The Board noted that the Chinook is not a regular AWR user and the pilots may not have been familiar with, or have previously experienced, fast jet ac conducting First Run Attacks in their allocated range slots. This would have been known to the RCO and members considered that he should therefore have been extra vigilant in deconflicting the ac, perhaps by directing a minimum holding altitude for the Chinook. He did, however, direct the Jaguar formation to extend off the target and informed them of the position of the Chinook. The Jaguar leader stated in his report that he was concerned about the altitude of the Chinook but did not pass on his concern to the RCO. Although it appears that the Jaguar leader followed the instruction to extend off the target, the No2 did not. He then initially misidentified the Chinook for his leader and attempted to rejoin on it before realising too late to avoid the Chinook by a safe margin bearing in mind the light levels and visibility, both visually and on NVGs. The no 2 pilot took so much 'lead' on the ac that he actually passed ahead of it by 100m or so rather than opting for the safer path behind or climbing above it indicating that he realised his mistake at a very late (close) stage.

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Although the Chinook captain elected to hold NE of Tgt 8 rather than N, thereby slightly increasing the safety margin, members felt that he too could have been more proactive in ensuring that there was adequate separation.

Members considered that there had been a slight degree of complacency by all involved, any one of whom could have taken positive action to ensure the safety of the situation. The Jaguar pilot saw the Chinook well in advance even though the Chinook crew did not see the Jaguar until it was too late to initiate avoiding action. Even before it became apparent that the lights were that of the Chinook not his leader, the intention of the no2 pilot would have been to formate (loosely) on the ac: therefore there was no real risk of the ac colliding. The situation was not however fully controlled and the Board agreed that the safety of both ac had been compromised.

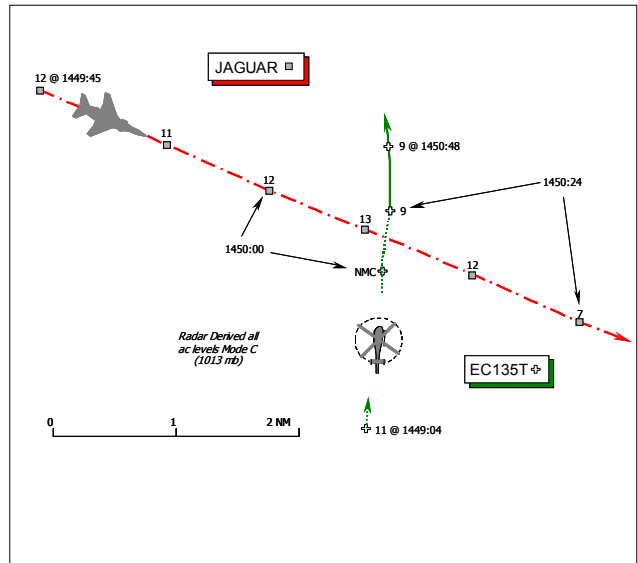
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The pilot of the No2 Jaguar did not follow the instructions of the RCO and flew into conflict with the Chinook.

Degree of Risk: B.

AIRPROX REPORT NO 021/04

Date/Time: 10 Mar 1450
Position: 5316 N 0344 W
 (3NM ESE of CONWY)
Airspace: London FIR/LFS (Class: G)
Reporting Ac Reported Ac
Type: EC135 T1 Jaguar
Operator: Civ Comm HQ STC
Alt/FL: 1200ft 760-1200ft
 (QNH 1032 mb) (Rad Alt)
Weather VMC HAZE VMC CLBC
Visibility: 4-5km NR
Reported Separation:
 50m H/250-300ft V Not Seen
Recorded Separation:
 Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC135 T1 HELICOPTER PILOT provided a very comprehensive account reporting that his ac has a blue/yellow colour scheme and the port/starboard fuselage and tail fin strobes plus the 2 landing lamps were all on whilst conducting a VFR observer navigational training exercise. In addition to himself, the crew comprised 1 qualified observer and two student observers and they were in communication with RHYLL RADIO A/G station on 123.475MHz and squawking A0032 with Mode C; TCAS is fitted.

Flying at about 1200ft QNH (1032mb) heading 320° towards Rhos-on-Sea at 100kt, TCAS showed another ac as a proximate traffic advisory [within 4nm range & within +/- 1200ft of his ac's altitude] initially at the 11 o'clock position 3-4nm away and 100ft below his helicopter. All the crew looked out, but nothing was seen in the prevailing haze. The TCAS indication on this traffic then 'jumped' to the 9-10 o'clock at about 2nm away at the same altitude and quickly changed to a traffic advisory, accompanied by an audio warning "TRAFFIC TRAFFIC". The qualified observer then spotted conflicting traffic at 9-10 o'clock about ¼ - ½ nm away, and called "conflicting". Simultaneously, to avoid the other ac and so that he could acquire it he put his helicopter into a steeply descending L turn and 1-3sec later spotted what he thought was a Tornado GR4 in the 11 o'clock position passing about 50m ahead from L – R and 250–300ft above his EC135. He opined that if avoiding action had not been taken there was a very high risk of a collision, or the helicopter being seriously affected by wake turbulence.

THE JAGUAR PILOT reports that his ac has a grey camouflage scheme. He was flying as the bounce ac for a Jaguar pair, thus he was not in receipt of an ATS, but squawking A7001 with Mode C; neither TCAS nor any other form of CWS is fitted. Following an engagement over the sea he was positioning for the next engagement in the vicinity of CONWY in LFA7 at 480kt. The weather at 1200ft Rad Alt deteriorated so to remain VMC he descended and continued along his route at 760ft Rad Alt, but no other ac was seen.

UKAB Note (1): This Airprox is not shown on recorded radar. The Great Dun Fell radar shows the EC135T helicopter S of the reported Airprox location turning from SW onto a northerly heading at 1449:04, indicating 1100ft unverified Mode C (1013mb) but the ac contact then fades. Meanwhile the Jaguar is shown coasting in and approaching the area from the NW, southeast bound at 1449:45, indicating 1200ft unverified Mode C (1013mb). The jet is shown at the same level two sweeps later at 1450:00; at this point only the helicopter's Mode A code is displayed - with no supporting position symbol

AIRPROX REPORT No 021/04

at all - thereby only giving an approximate location for the EC135T. The Jaguar climbs to 1300ft on the next contact at 1450:08, which is probably about the point that the Airprox occurred. After descending from 1200ft the Jaguar is shown down at 700ft Mode C at 1450:24, when the helicopter is next shown northbound to the N of the Jaguar's track at 900ft Mode C and after the Airprox has occurred.

It is not feasible to determine the minimum vertical separation with certainty, however, the Jaguar is shown at 1300ft (1013mb) before the projected tracks crossed – equating to an altitude of about 1870ft (1032mb) some 670ft above the EC135T pilots reported transit altitude of 1200ft (1032mb). However, the helicopter is shown at 1100ft (1013mb) before the encounter suggesting that if this level was maintained vertical separation in the order of 200ft might have existed before the tracks crossed and before the avoiding action descent effected by the EC135T pilot, which is broadly in line with his report.

THE JAGUAR PILOT'S STATION could offer no useful additional comment because the Jaguar pilot did not observe the incident.

HQ STC comments that the EC135 crew made a good tally on the Jaguar (with the assistance of TCAS) and took sensible avoiding action. It is likely that the Jaguar was always slightly higher than the helicopter, thus making it difficult for him to acquire the EC135T.

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 operating authority.

The EC135T crew exhibited good teamwork throughout this encounter and in the Board's opinion the helicopter pilot exercised sound airmanship by descending once he had been alerted to the presence of the jet by the combination of the TCAS TA and his Observer's warning. Once again TCAS had proved its worth with a valuable 'heads-up' alert, but the 'jump' of subsequent indications was a reminder of its limitations in azimuth, in the low-level environment, at close range with rapidly crossing traffic. Although the EC135 pilot's L turn did take the helicopter closer toward the jet the pilot was wise to try and acquire the Jaguar visually, because ultimately he succeeded in sighting the jet, which then enabled him to resolve this conflict.

This was an unfortunate encounter in the upper reaches of the military LFS [2000ft agl and below] where the Jaguar pilot was descending to remain VMC along his route. A helicopter pilot member opined that civilian pilots are encouraged to operate in height bands above that regularly used by military fast-jet pilots (500ft agl and below) for some flying operations e.g. Pipeline Inspections and thought it unwise for the Jaguar pilot to press on in the weather conditions reported here. Nevertheless, jets must descend through these levels to achieve their low-level operating band, indeed pilots will operate at the highest level consistent with their sortie requirements and civilian pilots should be in no doubt that jets could theoretically be encountered at any height above 250ft agl; so it was evident that the Jaguar pilot was legitimately operating where he was. However some military pilot members questioned the wisdom of flying at 480kt in what was apparently marginal weather conditions and thought a reduced transit speed would have been more appropriate as the Jaguar pilot was not conducting an IP to target run, nor an engagement of other members of the formation, at the time he flew through the area. Although the Jaguar pilot had not reported his flight visibility at the location, probably because he was unaware of the Airprox and the subject helicopter at the time, the latter's pilot had reported a visibility of 4-5km which was below the minima required by FW jet pilots [though the vertical separation from cloud need only be 500ft to maintain VMC in the LFS]. From the Jaguar pilot's report he had not detected the presence of the helicopter at all in the prevailing haze, and the Board concluded this non-sighting was the fundamental cause of the Airprox.

Turning to risk, the HQ STC member opined that it was not always feasible to judge visibility accurately in marginal weather conditions and so curtail military low-level flying, although a civilian pilot member voiced his concern at this. The helicopter's livery was designed to assist aerial conspicuity from above against the background terrain but here it was evidently ineffective. The jet pilot – without the advantage of a CWS to provide a warning of the helicopter - had not seen the EC135T at all, potentially heightening the risk. However, the helicopter pilot with the advantage of a TA coupled with his alert observer's sighting, had turned L and acquired the jet himself. In the end he said he achieved 250-300ft of vertical separation as the jet crossed ahead; it was unfortunate that the radar recording did not show both ac at the critical moment, but it suggested that he was not far out at all. The EC135T pilot – the sole pilot who witnessed the event - had opined that the risk was "*very high*" if avoiding action had not been taken. However, the same basis was not used by the Board to assess risk - only what had actually occurred. Whilst not doubting the seriousness of the situation from the helicopter pilot's perspective, his prompt and effective action convinced the Board that he had done enough to avert a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

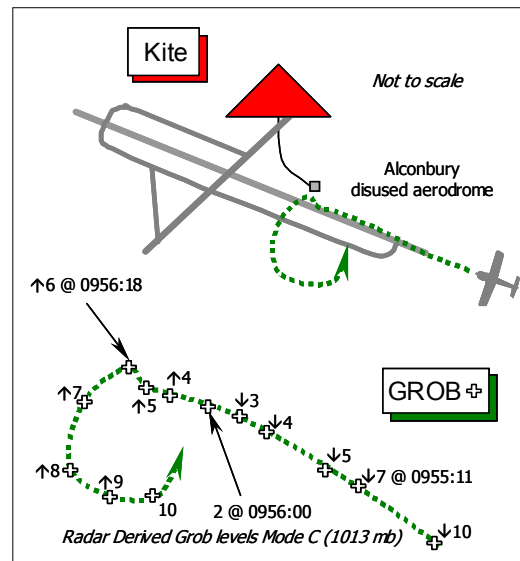
Cause: Non-sighting by the Jaguar pilot in marginal weather conditions of a conflict, which was resolved by the EC135 pilot.

Degree of Risk: C.

AIRPROX REPORT No 022/04

AIRPROX REPORT NO 022/04

Date/Time: 23 Feb 0956
Position: 5222N 0013W
(Alconbury disused aerodrome)
Airspace: London FIR (Class: G)
Reported Ac Reporting Ac
Type: Grob Tutor Static Kite
Operator: HQ PTC Civ Comm
Alt/FL: 800ft Wyton QFE <750ft
(1018mb) agl
Weather VMC CLOC NR
Visibility: 25km+ NR
Reported Separation:
100m H/150ft V Not observed
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB TUTOR PILOT, a QFI instructing a student, reports he had just departed from Wyton and was in communication with Wyton TOWER when he initiated a Practise Forced Landing (PFL) for the benefit of his student. The simulated engine failure exercise resulted in a PFL being flown to the northwesterly RW at the disused aerodrome at Alconbury [elevation about 157ft]. At the termination of the PFL his aeroplane was climbed away heading 300° over the RW surface after having descended no lower than 500ft Wyton QFE (1018mb) along the centreline, he thought. Passing about 800ft QFE in the climb at 80kt about 1/3 of the way along the RW, a large static bird scaring kite was seen about 150ft above and 150m away in the 12 to 1 o'clock position. To avoid the kite an emergency break to the south was executed (the wind was from the North), as he passed the kite about 100m away to starboard and some 150ft above his Grob. The height of the kite was later established to be between 900 - 950ft Wyton QFE [Wyton a/d elevation: 135 ft]. He opined that the risk of colliding with the kite was “high” and with the unseen tethering rope “very high”.

UKAB Note (1): Alconbury was last listed as a non-active aerodrome - “closed – out of use. Maybe in use however for other purposes...”

UKAB Note (2): The static bird scaring kite operator in a telephone conversation with UKAB staff advised that until the date of the Airprox he regularly flew a kite at the disused aerodrome at Alconbury to train falcons and also for the purpose of scaring nesting birds. He could not recall if it was himself or his assistant that was flying the kite on the day of the occurrence, which was not observed. Two sizes of triangular shaped kite are utilised – 3ft or 6ft across – coloured yellow & red and flown using a nylon line. Normally, the belaying point for the kite was about 1/3 of the way along the disused main NW/SE RW to the N of the hard RW surface. Depending on the prevailing wind the kite might achieve an estimated height of 600ft agl, the maximum length of the tethering line is 750ft. The kite was flown for periods of 30-60mins, some 3-4 times per day during daylight hours and raised or lowered by means of a winch. Heretofore, the kite would be lowered if any ac was seen to be approaching the vicinity. Before this occurrence he was not aware that to fly a kite above a height of 60m agl was contrary to the provisions of the Air Navigation Order 2000 Article 86 (2) (b) (v), which states that:

“a kite shall not be flown at a height of more than 60 metres above ground level” [outside an Aerodrome Traffic Zone]...without the permission in writing of the CAA....”

Subsequent to this occurrence he received a complaint from Wyton and has not flown the kite since he learned of the restriction cited above. He has now applied to the CAA for permission to use the kite for the forthcoming season and is now aware of the need to NOTAM the activity in advance.

UKAB Note (3): This Airprox is not shown on the Debden Radar recording as, understandably, the kite is not evident at all. However, the track of the Grob can be followed during the PFL to the disused RW from its SSR return. The Grob is shown passing 700ft unverified Mode C (1013mb) at 0955:11, descending to a minimum level of 200ft Mode C at 0956:00, that equates to a height of about 350ft Wyton QFE (1018mb) (+150ft) and in the order of 330ft above Alconbury disused aerodrome. Thereafter the Grob is shown climbing away before commencing a R turn passing 500ft Mode C and then immediately reversing into a L turn through 600ft Mode C – about 730ft above Alconbury and probably when the Airprox occurred. The aeroplane continued to climb to 1000ft Mode C – about 1150ft Wyton QFE after turning about through E.

HQ PTC comments that now the kite operators have had their responsibilities pointed out to them regarding NOTAMs, Wyton operators need to consider whether they really have a pressing need to use Alconbury for PFLs, outside the NOTAM'd kite hours. If they do, then we would counsel that some diplomatic face-to-face education by one of their QFIs might disabuse the owners of any perception of danger to their property from PFLs.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Grob pilot and comments from the static kite operator, radar video recordings and a report from the appropriate operating authority.

Although some might wonder why the Board was considering this encounter with a tethered object for assessment, members were advised that it had been decided to accept this report as there were some significant lessons for operators contained herein, worthy of wider dissemination.

The Board was reassured to learn of the static bird scaring kite operator's very responsible attitude once the facts had been pointed out to him and that he had temporarily stopped flying his kite. Clearly, lessons had been learned here and whilst noting that the operator was awaiting permission from the CAA to resume this activity, the Authority in their consideration of the issuance of any 'permission' would in all probability require a NOTAM to cover any kite flying at these heights in the future. Members stressed that any NOTAMs issued as a warning to pilots about this hazard should provide precise and timely information. 'Blanket warnings' over broad periods with little detail are not helpful; members encouraged such operators to provide the most comprehensive and accurate information possible regarding location and heights to be flown, together with an accurate indication of the period and times when the activity will occur so that it can be taken into account during pre-flight planning by other airspace users. In addition a quick phone call to Wyton ATC to highlight the presence of the kite when airborne might be worthwhile.

Turning to the Airprox itself, the radar recording had shown the Grob's track as the ac descended and then climbed away from the PFL. Clearly, if the kite had been restricted to a maximum height of 60m – about 200ft – then the instructor pilot would, potentially, have completed his exercise well above it as from his account he had not descended below 500ft Wyton QFE. However, the recorded Mode C data suggested that the PFL had been flown a little lower than the Grob QFI had recalled - down to a minimum height of about 330ft above Alconbury's disused runway – though it was stressed this was an unverified Mode C indication. Moreover, if a NOTAM had been issued and the QFI had been aware that the kite was being flown above 60m, then in the Board's view he would not have conducted the PFL here at all and, in all probability, stayed well away from the vicinity. The Board concluded, therefore, that this Airprox had resulted because the static kite operator had allowed his kite to be flown above 60m agl, in contravention of the provisions of the Air Navigation Order 2000 Article 86 (2) (b) (v).

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Turning to risk, the members noted that the Grob QFI had reported sighting the static kite just to starboard of the nose from about 150m away – some 150ft above his aeroplane – whereupon he executed an emergency break to the S, probably more concerned at the time of the proximity of the invisible tethering line. The Board thought the pilot had done well to spot this small kite some 3-6ft across from this range but it was apparent that he had managed to take control of the situation in time to fly some 100m clear of the kite. Whilst this was enough to avert a collision with the static kite, it was fortunate that the QFI had the presence of mind to turn L away from it as he did in this northerly wind: some members thought the unseen tethering line might potentially have posed a greater danger to his aeroplane. Though it was reported subsequently to be a nylon line (of unknown breaking strain) the Board was keenly aware of the damage that might ensue from contact with wires. The Board agreed unanimously that although the QFI's avoiding action turn had proved effective in preventing an actual collision, safety had not been assured by any means.

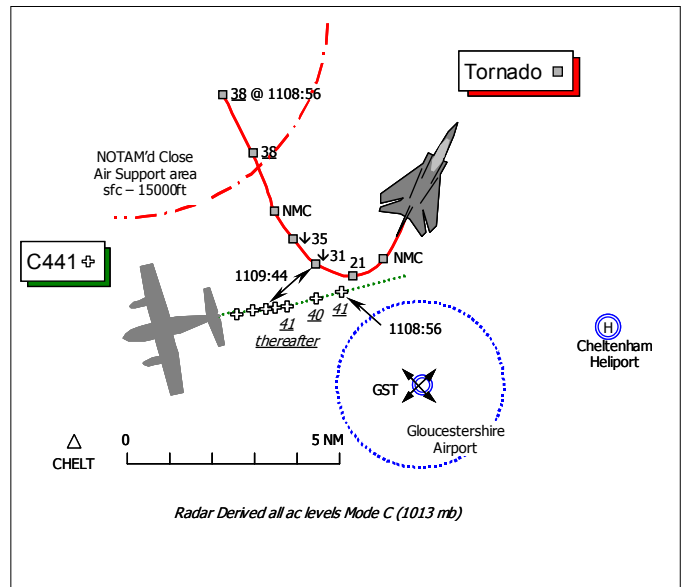
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Kite operator allowed his kite to be flown above 60m agl, in contravention of the provisions of the Air Navigation Order 2000 Article 86 (2) (b) (v).

Degree of Risk: B.

AIRPROX REPORT NO 023/04

Date/Time: 18 Mar 1109
Position: 5155N 0215W (3½nm NW of Gloucestershire Airport elev: 101ft amsl.)
Airspace: London FIR (Class: G)
Reporter: Gloucestershire ATC
First Ac **Second Ac**
Type: Cessna 441 Tornado GR4
Operator: Civ Pte HQ STC
Alt/FL: FL40 250-3000ft (Rad Alt)
Weather VMC CLBL VMC CLBC
Visibility: 10km+ >10km
Reported Separation:
 200ft V Not Seen
Recorded Separation:
 1000ft V @ 1.5nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE GLOUCESTERSHIRE COMBINED APPROACH/APPROACH RADAR CONTROLLER (APP) reports that he was providing an advisory/procedural approach control service to the C441 crew that was inbound to GLOUCESTERSHIRE Airport. At about 1110 UTC a fast moving radar contact was observed about 10nm NW tracking towards the overhead so a traffic broadcast was made on the frequency of 128.55MHz warning all ac of possible jet activity. Shortly afterwards, the pilot of the C441 reported that a Tornado jet had passed 200ft below his ac passing from the 3 to 6 o'clock position in a descent. The contact faded from radar about 3–4nm from the overhead but a Tornado was then visually observed descending rapidly in a steep turn tracking away from the airfield. The C441 pilot advised that he was not inclined to file a report but was informed that ATC would be filing an Airprox.

The 1050UTC Gloucestershire METAR: SW: 210/10kt VIS: 9999 CLOUD: FEW006 SCT016 BKN090, QNH: 1017mb.

THE CESSNA 441 PILOT reports that his ac has a white & blue colour-scheme and the wingtip and tail strobes were all on whilst inbound to Gloucestershire Airport IFR. He was in receipt of a "advisory approach control service" from GLOSTER APPROACH on 128.55MHz; Mode A1431 and C was selected and the ac is fitted with a 'SKYWATCH' traffic alert system. Flying at FL40, he was VMC 1000ft clear of cloud between layers with an in-flight visibility of greater than 10km. Whilst outbound in the GST hold heading 265° at 160kt the SKYWATCH alerted him to another ac indicated at 3 o'clock some 2nm away and 200ft below his ac. He then observed a Tornado jet passing below crossing in a L bank behind his C441 from starboard 200ft below and apparently descending as it passed through the 4:30 to 6 o'clock position. No avoiding action was taken as the incident was over too quickly. GLOSTER APPROACH was advised of the incident immediately on RT and he assessed that there had been "a possible risk of a collision".

THE TORNADO GR4 PILOT reports his ac has a dark grey camouflage scheme and the HISL was on whilst flying as a 'singleton' on a NOTAM'd close air support exercise. They were operating VFR below a cloud base of around 5-6 oktas of broken cloud with a base 3–4000ft, in "good" visibility but flying into

AIRPROX REPORT No 023/04

the sun. A squawk of A7001 was selected with Mode C and he was monitoring the LFS frequency of 300.8MHz.

The exercise was entirely within Class G airspace and they were flying between 250-3000ft Rad Alt below cloud in the vicinity of Ledbury (N5205 W00220) at the time of the reported Airprox he perceived he was southbound at 400kt, conducting training with Forward Air Controllers (FACs) on the ground. This is a high workload exercise and involves the pilot looking out whilst the navigator is "heads in" noting the FAC's report from a 9-line brief and plotting the target position within the ac's navigation/attack system, or positioning to attack whilst being talked onto a target by the ground party. Whilst they were aware of other ac during the sortie, none required any avoiding action. However, they did not see the C441.

UKAB Note (1): The UK AIP at AD2-EGBJ-1-6 notifies the Gloucestershire ATZ as a radius of 2nm centred on RW09/27, extending from the surface to 2000ft above the aerodrome elevation of 101ft amsl.

UKAB Note (2): The close air support exercise was promulgated by NOTAM H1376 on 021003z MAR for the day of the Airprox: 0930 – 2359, "*multiple fast jets will conduct a close air support exercise within 5nm radius of 52°02'N 002°22' W (Eastnor). Ac will conduct high-energy manoeuvres and may be unable to comply with the rules of the air. Surface to 15000ft amsl.*" A contact telephone number was included. An extensive NOTAM was also issued for aviation activity at the Cheltenham Gold Cup Meeting relating to helicopter operations from the licensed Heliport established there.

UKAB Note (3): The Clee Hill Radar recording illustrates this Airprox broadly as described by the C441 pilot, whose ac is shown outbound from the GST, level at 4100ft Mode C (1013mb) whilst the Tornado approaches from the NNW indicating 3800ft Mode C (1013mb). The Tornado jet maintains its level some 300ft below the C441 before commencing a descent at a range of 2.22nm from the Cessna. Minimum horizontal separation of 1.5nm is shown at 1109:44, as the GR4 descends through 3100ft and turns about to the N – some 1000ft below the C441, which maintained 4100ft.

GLOUCESTERSHIRE AIRPORT ATC reports that in order to regulate the flow of GAT during the Cheltenham National Hunt Festival, the Airport had initiated a PPR 'slot' scheme for fixed wing IFR arrivals. Poor weather conditions during the morning had resulted in delays to some arrivals and also affected helicopter traffic to the racecourse, some of which were requesting instrument approaches at Gloucestershire for a 'cloud break'. Consequently GLOSTER APPROACH was experiencing a very high workload. The position was manned by one APC/APR but due to the high traffic volume, the SATCO was acting in a supporting role, effecting co-ordination with adjacent units and aerodrome control. The weather had improved slightly and low-level military jet traffic had been visually observed operating to the N of the airport.

Gloucestershire Airport predominately operates a procedural approach control service but frequently uses a 3cm primary SRE to provide SRA's and sequencing within 20nm up to FL80. However, ac in the 'GST' holding pattern cannot normally be seen on radar, due to the proximity to the radar 'overhead'. Military operations continued at various times throughout the day, between 3–10nm from the airport at various levels. The unknown and unpredictable nature of these flights increased the workload of Gloucestershire Airport's ATCOs. During the 3 days of the Cheltenham Festival, there were over 800 flights to/from Gloucestershire Airport, 150 transits and over 60 helicopters/day operated to/from Cheltenham Racecourse ATZ, which was notified as active. The wisdom of conducting military operations in close proximity to high intensity civil operations in Class G airspace is questionable.

ATSI comments that the controller was providing the C441 with a procedural approach control service at the time of the Airprox. The primary radar was operational and being used to enhance the service provided where possible, however, traffic in the holding pattern, based on the 'GST' NDB which is situated on the airfield, tends to be in the radar overhead. The RTF recording confirms that the controller's workload and traffic loading was very high so the spot of the Tornado and provision of traffic

information, albeit late as far as the C441 pilot was concerned, is commendable. The controller initially suspected that the Tornado was at low level, so the traffic information was primarily directed at the helicopter traffic operating in and out of the Heliport at the racecourse. The unit was not aware of the NOTAM describing the exercise in which the Tornado was involved but does not believe that they would or could have operated significantly differently even if they had been. In future, given the traffic that the Cheltenham National Hunt Festival generates, re-scheduling or re-locating such exercises may be worth considering where possible.

THE TORNADO GR4 PILOT'S STATION comments that the sortie was planned, briefed, authorised and executed in a correct and professional manner. There is little more to add to the pilot's report and the crew correctly conformed to the 'Rules of the Air', but although they were aware of other ac during the sortie they did not see the C441. The crew admitted that FAC Close Air Support missions are work intensive and they train to ensure at least one pair of eyes is "out of the cockpit" at all times but it is possible that the crew were involved in taking information from the FAC during the time span of this occurrence.

HQ STC comments that it is unfortunate that two high intensity air activities were planned for the same time period in adjacent areas. These activities often involve extensive co-ordination and forward planning. Possibly by providing greater advance notification of intended activities, potential conflicts could be identified early and activities adjusted accordingly. Notwithstanding the extra air activity, the 2 ac in this incident were never on a collision course, and both pilots successfully cleared their flightpaths with their visual scans.

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 authority.

It was evident to the Board that the planned activities of the GR4 crew were not known in advance to the Gloucestershire ATCOs, as it was reported that the ATSU was unaware of the NOTAM promulgated for the CAS exercise. This was surprising to some but may explain in part why ATC was caught unawares. Although busy because of the increased traffic generated by the Cheltenham race meeting, all involved here were legitimately proceeding about their own purposes, apparently unaware of each other's activities as can very often occur in Class G airspace, where 'see and avoid' prevails. Furthermore, the jet's crew had 'Right of Way' under the 'Rules of the Air. Nevertheless, it might have been helpful if the GR4 crew had contacted APP beforehand, to advise what they were doing that close to the aerodrome patterns and possibly maintained a listening watch with APP on VHF.

The Board recognised that the limited radar coverage of the Gloucestershire SRE denied the APP controller a complete picture of what was going on. Whilst the C441 pilot's report of an ac observed on TCAS passing 200ft below the twin may have concerned the reporting controller who did not have access to Mode C data, it was clear from the Cleve Hill Radar recording that the Tornado GR4 was always heading to pass astern of the C441, some 300ft below it. In the event, at the CPA the jet passed 1000ft below the C441 at a minimum range of 1.5nm. Although the GR4 crew said they had not seen the C441 at the time, some pilot members suggested that as the jet was always on a vector to pass behind the twin, it might not have been in the GR4 crew's field of view as they cleared their flight path into the port turn away from the C441. Things may have been different if the turn had been to starboard, but it had not.

As it was the APP controller had conscientiously reported a situation, which he considered with the limited information available to him, had been more serious, than it actually was in the Board's opinion. The C441 pilot had been aware of the jet from his TCAS, moreover as it turned out, the GR4 descended

AIRPROX REPORT No 023/04

1000ft clear below the Cessna, convincing the Board that this Airprox was the result of a controller perceived confliction, where no risk of a collision had actually existed.

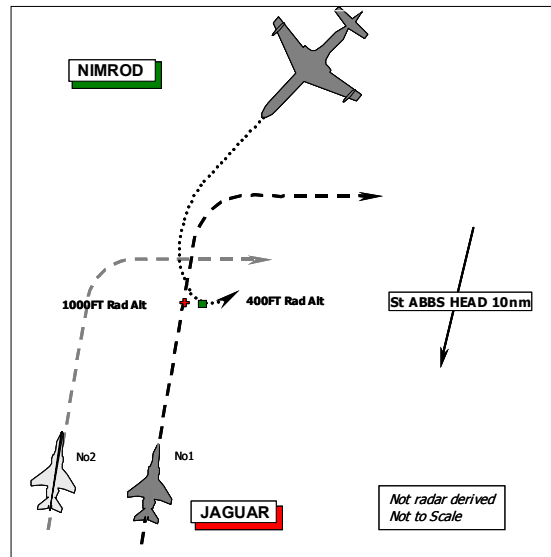
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction.

Degree of Risk: C.

AIRPROX REPORT NO 024/04

Date/Time: 18 Mar 1148
Position: 5600N 00158W
 (10nm NE St Abbs Hd)
Airspace: LFA 16 (Class: G)
Reporting Ac Reported Ac
Type: Nimrod MR2 Jaguar
Operator: HQ STC HQ STC
Alt/FL: 400ft 1000ft
 (Rad Alt) (Rad Alt)
Weather VMC CAVOK VMC CAVOK
Visibility: 20km 15km
Reported Separation:
 ~200m H 0 V 1500ft H 500ft V
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE NIMROD MR2 PILOT reports flying a Hemp coloured ac with HISLs and Taxi lights on, on a crew-training sortie in receipt of a FIS from RAF Leuchars and squawking with Mode C. While passing heading 225° in a gentle left hand turn at 220kt and 400ft Rad Alt with the crew conducting photographic runs on surface ships, the RH seat pilot saw a fast jet in the 12 o'clock, at half a mile at the same height. The pilot carried out a tight left-hand turn and observed the Jaguar carrying out the same manoeuvre (a turn onto East) and 3 crewmembers on the starboard side assessed the Jaguar to pass down the side at a distance of approx 200m. The Jaguar then appeared to clear to the S. Leuchars Radar reported no traffic in the area, or radar contact from the Nimrod. The Jaguar did not paint on the Nimrod's radar, either as a primary or secondary contact. He assessed the risk of collision as moderate.

THE JAGUAR PILOT reports leading a formation of 2 grey Jaguar T4 ac on a low level tactical sortie, with HISLs switched on squawking 7001 and not in receipt of an ATC service. Instructor and student pilots occupied both ac. While heading 010° at 450kt and coasting out at 1000ft Rad Alt both the student and he spotted a Nimrod at low level in their 12 o'clock at 5.7nm slightly low moving from left to right. The student initiated a gentle climb to pass over the other ac about 500ft above with a lateral displacement of 1500ft to the W. The formation then completed a pre-planned turn on to E and the No 2 passed ¼nm across the Nimrod's nose, 300ft above, and wing wagging to acknowledge the sighting. He assessed there was no risk of collision due to the early sighting.

THE NIMROD STATION comments that the practice of low level photography over the sea is a busy time for Nimrod crews with obvious dangers from birdstrikes. This is compounded by the risk of collision from other low flying ac and helicopters. The need for lookout is constantly reinforced to Nimrod crews and in this instance it proved worthy in that the Jaguar ac was seen in time and avoiding action taken. It is not surprising that the Jaguar was not detected on the Nimrod radar as the system would have been set up for a surface search and not for collision avoidance. The need to maintain a good visual lookout particularly when conducting low level operations will continue to be reinforced to Nimrod crews.

THE JAGUAR STATION comments that this possible conflict in the open FIR was resolved by the Jaguar formation at a very early stage but still caused concern to the Nimrod crew. Both elements were relying on the 'see and avoid' principle and it appears that the Jaguar formation were visual with the Nimrod in plenty of time to avoid it successfully. The Nimrod crew, however, appear to have been

AIRPROX REPORT No 024/04

surprised by the sudden appearance of the Jaguars, even though they were initially flying towards the Jaguar formation and it was skylined above them throughout the encounter. Yet again, this reinforces the requirement for all crews operating in the open FIR to ensure they maintain the best possible lookout.

HQ STC comments that the Jaguars saw the Nimrod in sufficient time to adjust their flight paths and comfortably avoid the Nimrod. However the late sighting by the Nimrod appears to have caused the crew concern. All pilots should attempt to give wide avoidance margins to avoid startling other crews.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted only of reports from the pilots of both ac and a report from the appropriate operating authority.

All pilots in the Jaguar formation saw the Nimrod early at about 5nm and afforded it what both handling pilots considered to be safe separation and the rear seat instructors verified this. The Nimrod pilot was in a position to see the Jaguar formation that was high relatively, in his 12 o'clock and, although into sun, would have been skylined; however, he saw only one of the ac, late at a distance of ½nm and was alarmed by it as it passed from his view in the turn.

Unconcerned by the separation, the Jaguar formation had then executed their pre-planned R turn on to E and this may have confused the Nimrod pilot's mental air picture thinking that there was only one ac. The Nimrod's tight L turn with a corresponding relatively high bank angle, may have given a false impression to rear crew lookouts that little or no vertical separation existed. However, since all of the ac involved were maintaining height with reference to Rad Alt, their reported heights could be regarded as being very accurate giving a bigger vertical separation than reported by the Nimrod and nearer to the 500ft reported by the Jaguar pilot. Further, if the Nimrod's rear crew saw a Jaguar through the side window as reported, there must also have been lateral separation.

On considering all the information members considered that there had not been any risk of the ac colliding during this encounter that had been resolved by the sensible actions of the pilots concerned.

PART C: ASSESSMENT OF CAUSE AND RISK

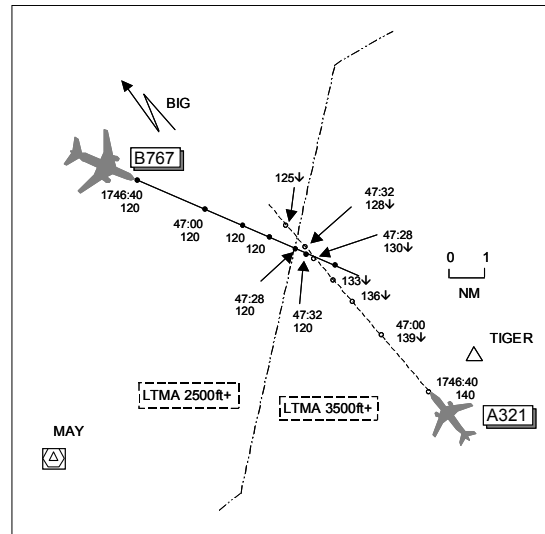
Cause: A conflict in the LFS resolved by both pilots.

Degree of Risk: C.

AIRPROX REPORT NO 025/04

Date/Time: 18 Mar 1747
Position: 5107N 0019E (9nm NE MAY)
Airspace: TMA (Class: A)
Reporting Ac Reported Ac
Type: A321 B767-300
Operator: CAT CAT
Alt/FL: FL125↓ FL120

Weather IMC IICL NK NR
Visibility:
Reported Separation:
 500ft V 500ft V
Recorded Separation:
 900ft V 0.15nm



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports flying inbound to Heathrow at 250kt in IMC and cleared to descend to FL110 by London on 120.52MHz. Descending through FL125, opposite direction traffic appeared very quickly on the Navigation Display (ND). It was 500ft below his level but climbing towards him, he thought; TCAS gave a TA alert. Immediately it appeared that he was heading towards a collision. The A/P was disconnected in anticipation of an RA warning, the Flight Directors were switched off and the ROD was reduced – separation became 700ft with the opposite direction traffic still climbing as they crossed. Although in IMC, he caught a glimpse of the other ac at this point, possibly a B747, which he identified from its tail shape. It had been obvious from the initial contact with ATC that they were very busy at the time and both he and his FO were reflecting on this just before the incident happened.

THE B767 PILOT reports heading 095° at 290kt outbound from Heathrow maintaining FL120. Opposite direction traffic in his 12 o'clock at 5nm range caused a TCAS TA alert whilst it was 1500ft above and descending. The ac passed overhead within 1000ft still descending and was 500ft above his level when it disappeared from the TCAS display; no RA warning was received. He heard the other ac's pilot report to ATC his intention to file an Airprox.

ATSI reports that at the time of the Airprox, both ac were in communication with the TC Biggin Sector Controller who described both the workload and traffic loading as 'busy'. He was operating the Biggin and TIMBA sectors in a banded mode, and advised that sufficient staff were available to split this combination if required. However, this was not, in his opinion, necessary.

In the banded configuration, basically the Biggin SC's task was to climb outbound ac to the agreed levels and to descend inbounds so that they are at, or descending to, the agreed release levels at the BIG stack.

The B767 pilot established communications with the TC Biggin SC at 1740:40, and reported airborne from Heathrow following a Dover 4G SID. This requires ac to route via EPM and then DET, climbing to 6000ft, before turning R at DET for DVR. The Biggin SC instructed the crew to leave EPM heading 125°, which was correctly acknowledged. At 1743:25, the crew were instructed to climb to FL100 and shortly afterwards, at 1744:40, they were instructed to climb to FL120. At that time, the A321, although not yet on frequency, was in the 1 o'clock position at a range of 35nm from the B767. The A321 pilot reported on frequency at 1744:50, descending to the agreed level of FL150. The SC instructed the flight to route

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direct to BIG and to descend to FL140. At 1746:40, the A321 crew was instructed to descend to FL110. At that time, the two ac were head on at a range of 10.3nm. At 1747:30, the crew of the A321 reported that they “..had a very close cross.....with the traffic opposite direction” and then advised that they would be filing an Airprox.

The SC reported that his usual method of operating the sector was to devise a ‘procedural plan’ and then, by reference to the radar, decide on a trade off between levels of the outbound and inbound ac. Traffic following the DVR SID track routes out towards EPM and under the OCK stack before it turns left and routes towards DET. If it follows that track, it will also route under the Biggin hold. The SC’s usual plan was to instruct traffic to leave EPM on a heading of between 110° and 145°. This then permitted an opportunity to climb an outbound, subject to traffic established in the BIG hold and traffic routeing towards it. On this occasion, the SC assigned a heading from EPM and instructed the crew of the B767 to climb to FL120, which was underneath an inbound to Gatwick at FL130.

The SC instructed the A321 to descend to FL140, which would be on top of both the B767 and the previously mentioned Gatwick inbound. Once he judged that the projected track of the A321 was clear of the Gatwick inbound, he instructed it to descend to FL110. At that time, the A321 was head on to the B767, climbing to FL120, which the SC had momentarily overlooked, at a range of 10.3nm. The SC had a DET strip for the B767 and a BIG strip for the A321. These were located in different, but adjacent strip bays and were clearly and accurately marked with the clearances issued to both ac.

The SC explained that removing the strips on outbounds and placing them in the adjacent ‘BIG’ strip bay would assist in highlighting conflicts between such ac and inbounds to the BIG hold, but would then be of reduced value in detecting conflicts between outbounds and other traffic. Furthermore, space within the fps displays is always at a premium. Accordingly, it was his usual practice not to move individual strips between bays but to rely more on the radar for showing such conflicts. He advised that the strips were used more as ‘a reminder as to which ac were still on frequency’, rather than a system for identifying potential conflicts.

The SC advised that he had simply forgotten the presence of the B767 when he issued descent clearance to the A321. He recalled that he had concentrated on monitoring the radar and ensuring that the track of the A321 was clear of the traffic inbound to Gatwick. His first knowledge of a problem was when the pilot of the A321 reported that they had been involved in a loss of separation with the B767.

STCA did not activate during the occurrence and, as the SC was unaware of the Airprox until after it had taken place, neither TI nor avoiding action were passed.

UKAB Note: The CPA occurs between two radar sweeps. At 1747:28 the A321 crosses 0.6nm ahead of the B767 from R to L on a converging heading 1000ft above whilst 4sec later the ac have passed, the A321 indicating FL128 0.2nm N of the B767. The CPA is estimated to occur just before this last sweep, the A321 passing 0.15nm NE of the B767 900ft above.

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.

ATCO members explained that the ‘modus operandii’ at LTCC for fps data display is formulated within the TC MATS Part 2 to ensure uniformity in the standard operating procedures. The subject ac’s fpps were correctly annotated and displayed and these would have shown the potential conflict. The BIG SC had been concentrating on separating the B767 from a Gatwick inbound but had not taken the B767

into account when he descended the A321 into conflict. This had been an honest mistake which members agreed had caused the Airprox.

Members understood the A321 pilot's concern, whilst descending in IMC, when TCAS gave a TA alert on the B767 which appeared to be in potential conflict. The recommended action on receipt of a TA is to assimilate the information provided, commence a visual search for the potential threat and prepare to respond to an RA warning. As it was the A321 crew had reduced their ROD, in anticipation of an RA alert, which had, in all probability, negated its onset. However, manoeuvring during the TA phase is not recommended unless visual acquisition has occurred although, in this case, the crew had not departed from the ATC clearance.

The SC had been unaware of the incident until the A321 pilot had reported it on frequency - STCA and SMF had not activated. Meanwhile the B767 crew had received a TA alert on the approaching A321 which was 'seen' on TCAS to pass about 1000ft above, descending. Actions by the A321's crew had by that stage turned the whole incident into a benign event, which led the Board to conclude that any risk of collision had been very effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

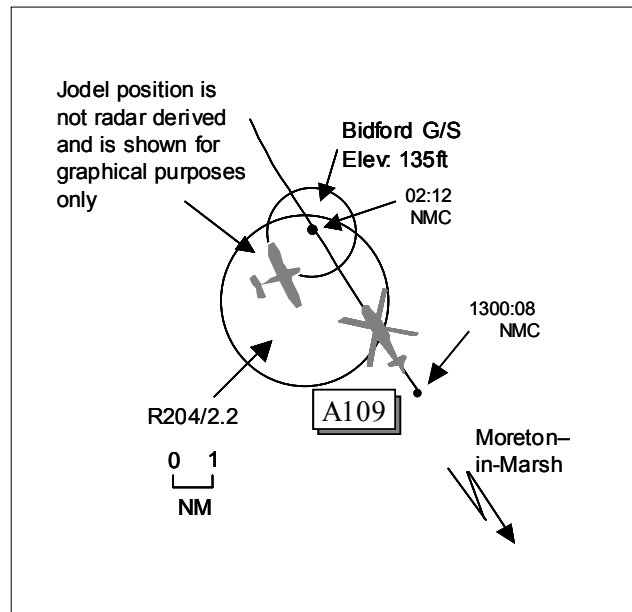
Cause: The TC BIG SC did not take the B767 into account when he descended the A321 into conflict.

Degree of Risk: C.

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AIRPROX REPORT NO 026/04

Date/Time: 21 Mar 1302 (Sunday)
Position: 5208N 0151W
(1nm SE Bidford G/S - elev 135ft)
Airspace: FIR (Class: G)
Reporting Ac Reported Ac
Type: Jodel1050 A109
Operator: Civ Pte Civ Pte
Alt/FL: 1500ft↓
(QFE 997mb)
Weather VMC CLBC
Visibility: >10km
Reported Separation:
just below V 200yd H
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JODEL1050 PILOT reports flying solo on a local sortie from Bidford Gliding Site, not in communication with any agency and squawking standby. The visibility was >10km below cloud in VMC and the ac was coloured red/white with nav lights switched on. Whilst descending through 1500ft QFE 997mb on the downwind leg heading 060° at 70kt, he was looking L (9-10 o'clock) towards the RW24 threshold prior to turning onto L base, he looked R and saw a large black/silver helicopter on a relative bearing of 45° to his track at about 400-600yd range heading towards him slightly below him. He immediately turned hard R 270° and watched the helicopter pass 200yd to his L just below his level and continue to track overhead Bidford airfield in level cruise. He believed that there had been a definite risk of collision if he had not taken avoiding action.

THE A109 PILOT declined to submit a report.

UKAB Note (1): The UK AIP at ENR 5-5-1-1 promulgates Bidford as a Glider Launching Site centred on 520803N 0015103W where aerotow launches may be encountered during daylight hours, site elevation 135ft.

UKAB Note (2): The Rules of the Air Regulations 1996 Rule 17 Rules for avoiding aerial collisions para (5) Flight within the vicinity of an aerodrome states *“Without prejudice to the provisions of rule 39, a flying machine, glider or airship while flying in the vicinity of what the commander knows or ought reasonably to know to be an aerodrome or moving on an aerodrome, shall unless, in the case of an aerodrome having an air traffic control unit otherwise authorises: (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.*

UKAB Note (3): Analysis of the Cleve Hill radar recording proved inconclusive as the Airprox is not seen. The A109 is identified from its Brize Radar 3706 squawk showing NMC which changes to a 7000 code at 1256:37 11nm SE of Bidford near Moreton-in-Marsh tracking 330°. The A109 pilot had reported to Brize to be cruising at 1500ft altitude whilst en route to Chester when under an ATS. The Jodel is not seen at all but the A109 continues on a steady track passing overhead Bidford Glider Site at 1302:12.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Jodel pilot and radar video recordings. Members were dismayed that the A109 pilot had declined to complete an Airprox form.

Bidford Glider Site is shown clearly on topographical charts so due regard should have been taken of aircraft/glider operations during the A109 pilot's flight planning stage. The recorded radar shows the A109's track passing through the Bidford overhead, which, on this occasion, had caused it to conflict with a Jodel in the cct, and this had caused the Airprox.

Without the benefit of the A109 pilot's viewpoint, the Board could only assess the incident on the limited information available. Fortunately, the Jodel pilot had visually acquired the helicopter, whilst descending downwind, in his 01.30 position about 400-600yd away, slightly below his ac and on a converging track. Quickly realising the potential confliction, the Jodel pilot had executed timely avoiding action by turning hard R through 270° whilst maintaining visual contact with the helicopter, watching it pass 200yd to his L just below. These actions taken by the Jodel pilot led the Board to conclude that any risk of collision had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A109 pilot flew into conflict with the Jodel in the Bidford cct.

Degree of Risk: C.

AIRPROX REPORT No 27/04

AIRPROX REPORT NO 27/04

Date/Time: 24 Mar 0829

Position: 5127N 0123W
(9NM SW of Compton)

Airspace: London TMA (Class: A)

Reporting Ac Reporting Ac

Type: HS125-700 A321

Operator: HQ STC CAT

Alt/FL: ↑FL120 ↓FL120

Weather VMC VMC

Visibility: >10km >12km

Reported Separation:

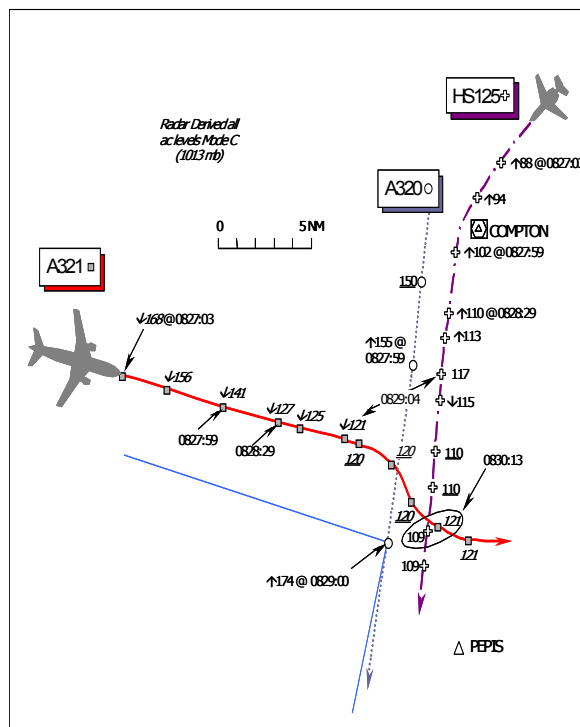
1nm H/300ft V 3nm H/300ft V

Recorded Separation:

400ft V - 6.04nm @ 0829:04

1000ft V @ 2.5nm

0.33nm H - 1200ft @ 0830:13



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HS125-700 PILOT reports his ac had a red/white & blue livery and the HISL was on whilst outbound through the LTMA, IFR under a RCS from LTCC on 134.125MHz. The allocated squawk was selected with Mode C and TCAS is fitted.

Approaching a position about 30nm N of SAM, southbound, climbing through FL115 for their cleared level of FL120, LONDON CONTROL instructed them to stop their climb at FL110. He acknowledged the instruction and replied that they would descend to FL110, which the controller asked them to expedite. The descent was initiated – having ascended to a maximum of FL117 – whereupon TCAS enunciated a TA with “TRAFFIC, TRAFFIC”. An A321 was spotted about 1nm away 400ft above his ac and the avoiding action descent appeared to resolve the conflict, he also heard the controller passing an avoiding action turn to the Airbus crew onto a heading of 170°. He reported level at FL110 and visual contact with the airliner, but an RA was not enunciated. At the closest point the A321 passed about 300ft above and about 1nm away through their 2 o'clock as it crossed ahead from R - L.

He reaffirmed that he had been alerted to the conflict by both the controller and TCAS. Although he assessed the risk as “high”, once avoiding action had been initiated “the danger of a collision was avoided”.

THE HS125-700 PILOT'S STATION comments that the crew responded speedily and correctly, such that a potential accident was avoided. There were no pertinent flight safety or human factor issues regarding the HS125 crew.

THE A321 PILOT reports that the ac's HISLs were on whilst inbound to London Heathrow heading 100°, some 35nm W of OCKHAM and in receipt of a RCS from London CONTROL on 134.125MHz. A squawk of A1414 was selected with Mode C and TCAS is fitted.

Flying at 300kt, level at FL120, he spotted a contact on TCAS at 11 o'clock less than 1000ft below and closing from 6nm away. As he keyed the transmitter to check with ATC, the controller issued an avoiding action R turn onto a heading of 170°, so he immediately disconnected the autopilot and complied. On TCAS the other ac's contact turned amber, and he thought an RA was imminent, but it was never actually enunciated. The HS125 passed 300ft below his ac and 3nm to port with a "high" risk of a collision. The flight then continued normally into Heathrow.

THE OCKHAM SECTOR CONTROLLER (SC) reports that a northbound SF34 was transiting the sector at FL130, with a southbound A320 climbing to FL120 initially outbound from Luton. The HS125 was on a COMPTON [CPT] departure from Northolt. Both the southbound A320 and the HS125 crew called at the same time heading 230°. He climbed the A320 to FL150 underneath traffic cruising at FL160 and then climbed the HS125 to FL120, before clearing the southbound A320 to FL210 as co-ordinated. In order to expedite the level change between the eastbound subject A321 and the southbound A320 he instructed the A321 crew to descend to FL120, forgetting that he had already climbed the HS125 to FL120. He noticed the HS125 passing FL112 at a range of 10nm from the A321. Realising his mistake, he immediately instructed the HS125 crew to stop climb at FL110, accepting that the ac would go higher, but considered that there was enough room to maintain separation. Seconds later as the HS125's Mode C indicated FL117, he perceived that this may not be the case and issued an avoiding action 70° R turn to the A321 crew. This transmission was stepped on so he repeated this instruction, but in the meantime the HS125 crew had started to descend and had reported the A321 in sight. No further action was necessary after the incident was resolved so he turned the A321 direct to OCK. The A321 pilot then asked what the other ac involved was and advised he was going to file an Airmiss [sic].

ATSI reports that at the time of the Airprox, both ac were under the control of the LTCC OCKHAM SC, who described his workload as being medium to high with a moderate traffic loading. The controller advised that he had had a disturbed night's sleep prior to his duty but, at the time of the Airprox, he was not aware of feeling unduly fatigued. He went on to say that during the months of January, February and March, he had been rostered on OCKHAM Sector for only two effective duties per month. In his opinion, operating on that Sector at weekends with reduced traffic loading, does not assist in maintaining a high standard of competency. His impression was that this shortfall of duties was due to staff shortages that had been caused by training requirements.

The A321 was inbound to Heathrow and the HS125 outbound from Northolt. The tracks of the two ac would cross in the vicinity of CPT. The HS125 was flying below and on a similar track to another southbound A320 and so his COORDINATOR agreed to accept the southbound A320 climbing to FL120, underneath a northbound SF34 at FL130, with the HS125 climbing to the standard FL70, as they entered the Ockham SC's airspace. This information was written on the Ockham SC's FPSs and the co-ordination was pointed out to him.

At 0825:00, the HS125 crew established communications with the Ockham SC and reported climbing to FL70 heading 230°, in a position about 12nm NNE of CPT passing FL61. The southbound A320 was 5nm NW of the HS125 and passing FL106. The Ockham SC instructed the HS125 crew to climb to FL100, which was correctly acknowledged. Soon afterwards, at 0826:10, the Ockham SC instructed the HS125 crew to climb to FL120. At 0826:55, the A321 crew reported on frequency descending to the agreed level of FL140 on a radar heading of 100°. At that time, the HS125 was passing FL86, about 4nm N of CPT with the A321 at 1 o'clock - 24nm.

The SC explained that his initial plan was to keep the southbound A320 climbing above the subject A321, whilst the HS125 was climbed to a level beneath the A321. However, at 0827, the SC transmitted "[C/S] *continue the heading descend flight level 120 high rate through 130*". The SC explained that he had a WOODLEY (WOD) FPS on the A321 and a NORRY FPS on both the A320 and the HS125. They would have been in the same flight strip bay and he normally kept them in level order. At 0826:15, the HS125 crew was instructed to resume their own navigation to SAM. At that time, the A321 was descending through FL163 whilst the HS125 was in its 10 o'clock - 21nm passing FL91. His next

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transmission was to the A320, giving it clearance for further climb, as it was now no longer a confliction with his traffic.

At 0828:30, having seen the confliction developing between the subject ac, the SC transmitted to the A321 crew, “[C/S] *stop descent flight level 120*”, which they subsequently did. This transmission was made when the A321 was passing FL127 with the HS125 in its 10 o'clock – 10.7nm, passing FL110. The SC then instructed the HS125 crew at 0828:40, to stop their climb at FL110; at this point the HS125 indicated FL113 Mode C and continued to ascend to a maximum of FL117 before descending. As it was passing FL115 still climbing, the SC transmitted to the HS125 crew “...*I'm sorry and just down fairly quickly please*”. [UKAB Note (1): Minimum vertical separation of 400ft occurred when the HS125 ascended to FL117 beneath the A321 at FL121 Mode C; the HS125 indicated FL117 for three sweeps of the Heathrow 10cm from 0828:56 till 0829:04, when the 2 ac were 6.04nm apart and converging.] The SC realised his plan was not working and so, at 0829:00, he instructed the A321 crew to “...*turn avoiding action turn right heading one seven zero degrees*”. He transmitted this twice as he later explained that he thought his first transmission had crossed with that from another flight. A few seconds later, STCA activated. [UKAB Note (2): The Mode C readout from the HS125 indicated it was descending through FL116 at 0829:08]. At 0829:20, the crew of the HS125 crew reported visual contact with the A321, which was in their 2 o'clock - 4.3nm – some 600ft above them. Horizontal separation continued to reduce as the two ac converged but vertical separation was slowly increasing. [UKAB Note (3): When the HS125 is first shown level at FL110 and the A321 had levelled at FL120 at 0829:37, with standard vertical separation of 1000ft assured, the Heathrow 10cm radar recording reveals horizontal separation was 2.5nm. The two ac continued to converge and the A321 crossed about 0.44nm ahead of the HS125 from R – L; minimum horizontal separation of about 0.33nm occurred at 0830:13, as the A321 opened to the E indicating some 1200ft Mode C above the HS125. Shortly afterwards the crew of the A321 advised they would be filing an Airprox report; after landing the HS125 pilot also indicated his intention to file.]

The SC advised that his normal procedure was to check both the strips and radar before issuing climb or descent clearances. He believed that on this occasion he might not have moved the FPS on the HS125 to the appropriate position, below that of the A321, when he instructed the crew of the HS125 to climb to FL120. This might account for the fact that he descended the A321 crew to the same level. He was also conscious of the status of the HS125's flight and, accordingly, he did not want to issue any instructions which would require severe manoeuvring. This is also why he did not pass any avoiding action to the HS125 crew, although he had anticipated that the crew would arrest their climb and descend more promptly to FL110, thereby preventing a loss of separation. When he issued avoiding action instructions to the A321 crew he used 'the old phraseology' as he was of the opinion that the new phrase is ineffective due to the long preamble before the executive instructions are passed. He considered there was little point in passing traffic information to the crew of the A321 as they were turning away from the other ac and probably would not see it.

The instruction to the A321 crew to stop descent at FL120 only confirmed their existing clearance, as this was the original cleared level for the flight. Instead, and with the benefit of hindsight, had the crew of the HS125 been instructed, at that time, to stop their climb at FL110, or been instructed to turn left, it is probable that the requisite vertical separation would have been provided sooner than it was. However, it is recognised that the requisite separation of either 3nm laterally or 1000 feet vertically was maintained throughout the incident.

HQ STC comments that the Ockham SC, HS125 crew and A321 pilots all recognised the potential confliction at a considerable distance. Whilst the extremities of the 3nm/1000ft separation bubble may have been 'tickled' during the resolution of the conflict, the likelihood of collision was always very low. It would also appear that both TCAS and STCA worked 'as advertised' proving that had the controller not spotted the earlier level clearance error then these systems would have enunciated an adequate warning.

THE A321 OPERATOR had nothing further to add to the report.

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 ATC and operating authorities.

Controller members noted that the OCKHAM SC had realised his mistake in descending the A321 to FL120 moments before STCA was triggered. However, the ATSI report had highlighted that the controller's initial reaction to the situation was to instruct the A321 crew to level at FL120, which merely restated the level that the flight had been erroneously assigned in the first instance and had no effect on resolving the situation. It was unfortunate that the SC choose to do this as his first immediate action because by the time he told the HS125 crew to stop their climb at FL110, the HS125 had already climbed through FL113 Mode C and it continued to ascend to a maximum of FL117. The Board was concerned that the SC made no attempt to prefix this transmission with the term 'avoiding action'. It might be that the SC thought that he could still maintain separation at this stage without these words as he later used them when turning the A321. Some also thought that the HS125 crew might have been somewhat slow in responding to this instruction possibly adding to the SC's problem, who might have thought that the crew would arrest their climb and descend more promptly to FL110. However, it was evident from the radar recording that the HS125 crew's response was not tardy and given the timing of the transmission and the lag of the indicated Mode C due to the radar data update rate, there was no indication to CAT pilot members of any hesitancy by the crew. Indeed, the HS125's ROC passing through COMPTON was in the order of 1500ft/min and as they passed FL113/114 the crew would have been preparing to level at their assigned level so a violent 'push-over' was not warranted without some other indication to them of the urgency required. The Board agreed that the SC's reluctance to issue "*avoiding action*" instructions to the HS125 crew, whilst perhaps understandable, possibly exacerbated the situation here. The prevailing view was that without the 'avoiding action' prowords to galvanise the HS125 crew into immediate action, there was nothing at that stage to indicate to them that anything was awry as the HS125 pilot reported that the TCAS TA occurred after the descent instruction had been issued. Notwithstanding any suggestion by the SC that he did not want to issue any avoiding action instructions to the HS125 crew that would require severe manoeuvring, controller members opined there was a fine line to be drawn between routine control instructions, or where the safety of flight might be in question and avoiding action warranted. Members were aware that the avoiding action phraseology had recently been reviewed, albeit after this particular incident; now, use of the 'revised' phraseology had been abandoned in favour of the former version – thereby vindicating the SC's views about the usefulness of that form of words. Nevertheless, in the Board's view, controllers must be prepared to act promptly and issue robust avoiding action manoeuvres using the words "*avoiding action*" if need be. From the comprehensive reports provided and taking all the respective views into account, it was evident that the OCKHAM SC had descended the A321 into conflict with the HS125 after clearing the Airbus to descend to the same level to which the HS125 had been cleared to climb without ensuring that the requisite horizontal separation would be afforded. Whilst it had been shown that the SC had a "medium – high" workload to deal with under this "moderate" traffic loading, it was not clear why he had made this error. The ATSI advisor had reported that the appropriate flight progress strips had been correctly marked but it is possible that they had not been placed in the optimum position to highlight the conflict. The Board concluded unanimously, therefore, that this Airprox had resulted because the OCKHAM SC descended the A321 into conflict with the HS125. With regard to the SC's concerns over Sector currency, a TC member advised that controllers are normally rostered for a minimum of 4 duties/month and individuals can always ask for more if they feel in need.

From the A321 pilot's perspective, he had already levelled at FL120 when he detected the HS125 approaching from below on TCAS. Thus he was prepared for the SC's avoiding action instructions and reacted quickly by de-selecting the autopilot and promptly turning R. In the other cockpit the HS125

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crew also had a TA, had descended as instructed and also reported sighting the A321. During all of this a TCAS RA was not generated in either cockpit and standard separation was barely eroded if at all. Some members questioned how ATSI could assert that the requisite horizontal separation of 3nm or 1000ft vertically was maintained throughout the incident. The ATSI advisor commented further that the applicable rules at MATS Part 1, Section 1, Chapter 5 page 10 para 9.3.1 a) state that “*An aircraft may be considered to be at an assigned level provided the Mode C readout indicates 200 feet or less from the level*”. Furthermore, the same section of MATS Part 1 at para d) states: “*An aircraft may be considered to have reached an assigned level when three successive Mode C readouts indicate 200 feet or less from that level*”. Given the applicable tolerances of Mode C [± 200 ft of the indicated level] and the 'lag' between the radar picture and the 'real life situation' due to the slow radar data update rate, in the advisor's opinion it was not possible to state here categorically whether separation was lost or not from the radar that the controller was actually using. In such circumstances, the ATSI view is that the benefit of any doubt should be given to the controller and therefore separation was considered to have been maintained. However, technicalities aside, it was stressed that the Board was concerned here with the separation insofar as it applied to the risk, not merely consideration of a technical erosion of separation minima. Nevertheless, it was clear that the controller's error had been identified early enough, corrective action taken and both ac crews' were aware of each other's ac. Thus with a minimum of 400ft between these ac at just over 6nm range and some 1200ft when they had closed to 0.33nm, with TCAS 'primed' to act if need be, the Board agreed unanimously that this, coupled with the action taken, had assured the safety of the ac involved.

[Post UKAB Meeting Note: It was acknowledged during discussions between ATSI and UKAB staffs that the precise separation figures shown by the various recorded radar sources available from NATS Ltd do vary from radar to radar. However, technical appreciations aside, the precise separation that pertained here did not effect the Board's determination of Cause and Risk. The Debden Radar recording showed that the HS125 was descending through FL112 at a range of 3.5nm from the A321, before leveling on the third successive sweep at FL110 at a range of 2.4nm. Whereas, the Heathrow 23cm radar, with a data update rate similar to the Heathrow 10cm, shows the HS125 at FL112 with lateral separation of 3.4nm, FL111 at 3.1nm before levelling at FL110 at a range of 2.7nm. Thus unfortunately neither of the foregoing recordings illustrate that there were 3 radar sweeps that showed the HS125 was within 200ft of its assigned level before the horizontal separation minima of 3nm was breached. As it was, the Heathrow 10cm that gave a shorter interval between updates had shown that the ac had closed to a range of 2.5nm before vertical separation had been assured and 1000ft vertical separation was shown to exist from the indicated Mode C data. Following these discussions, ATSI requested a further technical analysis from NATS in an effort to resolve this technical issue. From the simulation of the incident provided by NATS it was shown that: at a range of 3nm - 903ft existed; at 2.6nm - 985ft pertained and at 2.3nm - 1061ft was evident between the subject ac.]

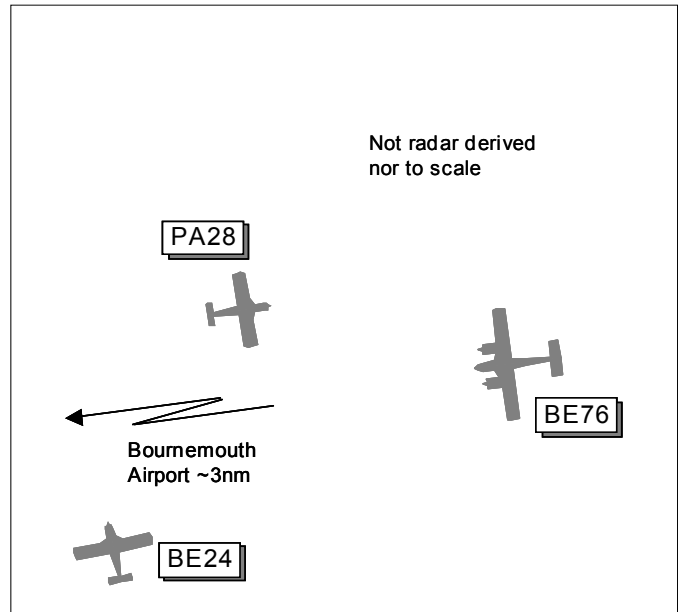
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC OCKHAM SC descended the A321 into conflict with the HS125.

Degree of Risk: C.

AIRPROX REPORT NO 028/04

Date/Time: 23 Mar 1238
Position: 5047N 0146W
 (3nm E Bournemouth - elev 38ft)
Airspace: Bournemouth CTR (Class: D)
Reporting Ac *Reported Ac*
Type: BE76 PA28
Operator: Civ Trg Civ Trg
Alt/FL: 1200ft↓ NR
 (QNH 1016mb)
Weather VMC CLBC NR
Visibility: NR
Reported Separation:
 nil V 500m H NR
Recorded Separation:
 not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE BE76 PILOT reports established on the ILS for RW26 at Bournemouth and in receipt of an ATS from Bournemouth TOWER on 125.6MHz, having just been transferred from APPROACH on 119.47MHZ, squawking an assigned code with Mode C. Descending through 1200ft QNH 1016mb and heading 265° at 105kt, both he, the Capt seated on the RHS, and an observing student seated behind saw a PA28 dead ahead range about 600m at the same altitude apparently heading directly towards them. The other ac made no sign of taking avoiding action so he took control from the other trainee pilot in the LH seat and carried out an emergency avoiding action sharp LH break which took his ac into clear air and clear of the other traffic, which passed 500m away to his R at the same level. He assessed the risk of collision as 'significant'. At no time had the APR nor the ADC advised him of the traffic. When he advised the ADC of the PA28, she had sounded surprised and apologised and he was subsequently instructed to re-contact APP. Later he was informed that the PA28 was being flown by a student on a solo navigation flight who had appeared to have become lost inside CAS and had drifted onto the ILS course. He opined that a larger, faster ac with a higher nose attitude on approach would probably not have seen the 'rogue' ac given its relative position.

THE PA28 PILOT was contacted within one week of the incident occurring and had agreed to complete a CA1094 report form. Numerous reminders by telephone and e-mail were acknowledged during the following months with promises received to submit a report. A completed report is still awaited.

THE BOURNEMOUTH ADC reports that a solo student pilot in the subject PA28 was inbound from the NW VFR and was asked to report ready to turn R base. Owing to a BE76 [not the Reporting ac] on an ILS approach, she changed her plan and asked the PA28 pilot to report final No2 to the ILS traffic. However, a BE24 then joined on L base so the PA28 pilot was asked to position behind it, No3 in the sequence. The subject BE76 was then inbound at 6.5nm on the ILS so she told the PA28 pilot to turn in behind the BE24 coming off L base but that a go-around was possible owing to the BE76 on the ILS behind him: she was unable to orbit the PA28 owing to further PA28 traffic inbound on R base. At 1238 the BE76 pilot reported breaking L off the approach as he had sighted a PA28 flying towards him in close proximity.

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ATSI reports that at the time of the Airprox, the subject ac were under the control of the Bournemouth ADC. However, until a short time before, the BE76 had been under the control of the Bournemouth APR. The primary radar was reported to have been unserviceable since early morning. Furthermore, there were ATC staff shortages on the day in question.

There was depletion in the number of qualified controllers at the unit and several of the ATSAs were released to attend a training course towards their Restricted Meteorological Observer's Certificate, as the traffic levels appeared manageable with the staff available. Owing to the shortage of controllers it was not possible to open both the Ground and Air positions so the ADC was performing both tasks on the one frequency.

The weather was also a factor in this Airprox as both a northerly wind and thunderstorm activity were affecting operations. This resulted in increased workload for the APR as ac deviated for weather avoidance. The Bournemouth METAR for 1150 was 02009KT 9999 VCSH SCT028CB BKN060 10/08 Q1016= and that for 1220 36016KT 9999 VCSH SCT028CB BKN060 08/07 Q1016=.

The PA28 was returning to Bournemouth, having made a local VFR flight to the NW, and was being flown by a student pilot. The ac had been transferred to the ADC frequency, by the APR, and established communications at 1234:00. The ADC's task was to integrate the PA28 with the instrument training traffic which was approaching RW26. The traffic situation became complicated and the ADC had to revise her plan. Instead of staying with the original plan, which directed the PA28 pilot to turn R base and position behind a BE24 on L base, ahead of the subject BE76 on a 5.5nm final, the pilot of the PA28 was instructed to continue downwind. It was shortly after this instruction that the pilot of the BE76 reported that a PA28 had just flown opposite direction to his ac and that avoiding action had been taken. Later, the pilot of the BE76 reported that he was filing an Airprox.

The primary radar had been released to Tels earlier that morning so that they could investigate a problem relating to MTI breakthrough. This resulted in a SSR only operation, which is permitted in the unit's MATS Part 2. However, the MATS Part 2, page 6:20 para 6.5.6 describes the use of the ATM in such circumstances and contains the following entry: *'Controllers may use the system with SSR information only, however they must ensure that all aircraft equipped with transponders, have them switched on with either 7000, or a suitable verified (sic – validated) Mode A squawk displayed. It should be noted that certain locally based operators do not have transponder equipped aircraft. The information gleaned from the ATM must be used with caution'*.

At 1229, the pilot of the PA28 contacted the APR and requested to rejoin from the W. The controller approved this and, at 1231:15, advised the ADC on the intercom that the ac was rejoining from the direction of Tarrant Rushton (a VRP to the NW of the aerodrome). The ADC acknowledged this and marked her fps accordingly, as well as moving it into the active part of her display. The strip clearly showed that a student pilot was flying the ac. Shortly afterwards, the pilot reported the airfield in sight and was instructed to contact Bournemouth Tower. Analysis of the Pease Pottage radar shows no SSR label for the PA28 and there is no evidence from the RT transcript that the pilot was instructed to squawk. Enquiries have established that the PA28 was equipped with a serviceable transponder.

When the PA28 pilot called on the Tower frequency, at 1234:00, the ADC instructed him to report ready for R base; there was no acknowledgement to this transmission. Another BE76, not the one involved in the Airprox, was on final approach and had been cleared to land. The pilot requested a 'go around' and this was approved. At 1234:30, the ADC transmitted "PA28 c/s report final number two number one a Duchess at two and a half miles". The pilot correctly acknowledged this. A BE24 pilot then reported on frequency joining from the SE and was instructed to join on L base for RW26. The ADC changed her plan and instructed the PA28 pilot to report before turning base as the ac was now likely to be number 3 in the sequence. Again, the pilot correctly acknowledged this.

At 1235:45, the BE76 pilot on final reported going around and then entered a LH cct. Some 10sec later, the BE24 pilot reported established on L base and was told that he was number one and to report final. The ADC transmitted: *“PA28 c/s extend slightly you’re now number two following a Beech twenty four coming off a two mile left base”*. The pilot acknowledged this. The ADC was asked what she meant by the expression ‘a two mile L base’ and she explained that the ac was on L base two miles SE of the aerodrome. She went on to state that, with hindsight, she could see that such a term might be interpreted in different ways and perhaps a student pilot may not have understood. It was around this time that the ADC could see an ac displayed on the ATM, which proved to be the subject BE76 that was involved in the Airprox. It was on long final but she had not received any notification from the APR. The APR explained that the usual co-ordination arrangements between tower and approach for inbound traffic are as follows: VFR inbounds are normally pre-noted when they request joining clearance and transferred when they report aerodrome in sight. IFR traffic is notified at 8nm. He could not recall why the subject BE76 was not coordinated with the tower. He suggested that perhaps it was owing, in part, to his workload and the fact that for most of the time he was operating without an assistant.

At 1236:40, the ADC transmitted *“...PA28 c/s turn in now and there’s a Duchess on a five and a half mile final I may have to send you around”*. The pilot replied *“Er PA28 c/s er turn in now please confirm”*. The ADC replied *“PA28 c/s er confirm turn in now and follow the Beech twenty four which is turning in on a one mile final do you have contact”*. The PA28 pilot advised that he did not have contact with the BE24 and so the ADC instructed him to continue downwind. The ADC reported that she was using a combination of looking out of the VCR and also using the ATM to monitor the positions of ac in the cct. She went on to say that, as she was aware of other VFR traffic joining from the N she wanted ‘to keep the traffic flowing’ as best she could. At 1237:05, the subject BE76 pilot contacted the ADC and reported established on the ILS for RW26 and was told to continue. The BE24 was then cleared for a touch and go on RW26 and immediately after this, at 1237:30, the other BE76 which had gone around into the cct, reported downwind. The ADC admitted that it was about that time she had started to lose the overall traffic picture. Shortly afterwards, the VFR traffic joining from the N, towards a R base for RW26, reported on her frequency and was instructed to make one RH orbit. At 1238:00, the ADC transmitted *“BE76 c/s you’re following a Cherokee he’s in the circuit if necessary I’ll send him around”*. The Cherokee referred to was the subject PA28 and, clearly, the ADC controller had forgotten that the pilot had earlier been instructed to continue downwind. The pilot of the BE76 responded by transmitting *“BE76 c/s negative er it’s avoiding action one ac a quarter mile same heading towards us”*.

As neither the Bournemouth radar nor ATM is recorded the only source available to ATSI was the Pease Pottage radar, and owing to the level of the ac involved and the fact that only one of the subject ac was transponding, the exact geometry of the Airprox has not been conclusively established. It is possible that the PA28 pilot, in compliance with ATC instructions to *“...turn in now”*, had turned R from downwind onto base leg. Given that the wind was northerly, the ground speed of the PA28 would have increased. When the ADC changed her plan and instructed the PA28 pilot to *“...continue downwind”* the pilot’s turn back onto a downwind heading might have permitted the ac to continue closing towards the FAT track for RW26. Whatever the case, the result was that it came into conflict with the BE76 established on the ILS.

Even though there was a shortage of controllers and the assistants were not available, no steps were taken to restrict traffic. MATS Part 2, 1:28 states *‘Supervisors are responsible for ensuring that overflow positions are manned to meet predicted traffic demands. In the event that insufficient staff are available to open GMC or the Approach support position then measures to control the flow of traffic must be taken. These include:*

- i) Restricting circuit traffic.
- ii) Reducing the number of training flights.
- iii) *Organising breaks to meet anticipated needs’.*

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On the morning of the Airprox the APR was the Supervisor, who confirmed that no traffic restrictions had been applied. It was, apparently, common practice to restrict cct training ac but not usually IFR training ac. The fact that GMC was not open certainly increased the workload of the ADC. Analysis of the RT recording shows that in the period 1233 – 1239, a total of 60 transmissions took place on the frequency and 32 of those took place between 1236:30 and 1239 (the Airprox being reported at 1238). The ADC reported that although feeling fit and rested at the commencement of her duty that day, she had begun to feel somewhat fatigued as the duty progressed. Furthermore, she questioned the suitability of the weather conditions for solo flight by students when so many ac were avoiding the CBs close to the aerodrome.

Owing to the layout of the aerodrome, a large number of RW crossings by vehicles take place. The fuel installation is on the S side whilst many operators are on the N side. There is no perimeter road and, according to the ADC, many of the refuelling vehicles are unable to use public roads. Such vehicles contact ATC on a UHF frequency, and the controller responds on the same frequency. Normally, such calls are not of concern to the APR but, as he explained, when there is no GMC position open you are unable to monitor such transmissions from the radar position and so you do not get a complete idea of how busy the ADC is. He went on to say that, owing in part to the ATM only displaying transponding ac, he was not assisting ADC with additional information, such as the relative positions of ac in the cct, as would have been done if the primary radar had been serviceable. Furthermore, as the ADC was very experienced he believed that she could handle the traffic situation without any difficulty. Had assistance been required he expected her to have requested it.

UKAB Note: The Airprox occurs below recorded radar coverage. The Pease Pottage radar at 1235:43 shows the subject BE76 established on the ILS LLZ for RW26 range 8nm indicating FL019 (2000ft QNH 1016mb). The BE76 at 1236:43 is seen descending through FL018 (1900ft QNH) approx 5.5nm from touchdown before fading from radar, its last radar return showing at 1237:49 about 3.5nm from touchdown indicating FL011 (1200ft QNH). The BE76 reappears on radar at 1239:01 4nm SE of Bournemouth airport tracking 180° indicating FL014 (1500ft QNH) climbing. The subject PA28 is not seen at all during this period.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the BE76 pilot, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

ATCO members agreed that at the time of the Airprox the ADC's workload had been high when she was operating the Air and GMC positions combined. However, no steps had been taken earlier by the ATC Supervisor, who was also the APR at the time, owing to staff shortages, to restrict either cct or training traffic. This was assessed as contributing to the Airprox. The difficulties of exercising sound judgement in the course of carrying out supervisory duties when working an operational position were well known to members. The Supervisor had not been able to assess the ADC's true workload, in part because the UHF frequency used by the GMC for vehicle control could not be monitored from the APR position. The APR had also, during a period of primary radar outage, not ensured that the PA28 was squawking either an assigned code or the conspicuity code of 7000 so that the ac would be displayed on the ATM during the period of SSR-only operation. This had also contributed to the incident. It was also noted that the APR had not given an 8nm range check, on the BE76, to the ADC although its presence had been detected by the ADC during a scan of the ATM.

After changing her original traffic sequence plan twice, the ADC had given an executive "...turn in now" instruction to the PA28 pilot to position it ahead of the BE76. When this was queried by the PA28 pilot, the ADC repeated the instruction, this time amended to follow the BE24 before she asked the PA28 pilot if the Beech was in sight. ATCO members agreed that it would have been better had the ADC asked

firstly if the traffic was in sight before issuing a turn instruction, thereby confirming that the PA28 pilot would be able to separate his ac from the other traffic. However, in this case, when the student replied that he could not see the traffic, the ADC forgot that she had then told the PA28 pilot to extend further downwind. This led members to agree that ADC did not ensure that the PA28 was integrated safely into the traffic pattern. This had caused the Airprox. In the absence of a report, it was unknown what actions had been taken/completed by the PA28 pilot in response to ATC's instructions. Ultimately, these had placed the student pilot in an unenviable position and pilot members sympathised. Having already extended downwind, he would have had few visual references to keep himself 'downwind' and clear of the FAT.

Turning to risk, the ADC had passed TI, albeit erroneous, to the BE76 pilot that he was following the PA28 in the cct, having forgotten that she had told its pilot to extend downwind. Fortunately, the BE76 Captain had seen the PA28, 600m ahead, and taken timely and robust avoiding action, watching it pass 500m clear to his R. 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 Bournemouth ADC did not ensure that the PA28 was integrated safely into the traffic pattern.

Degree of Risk: C.

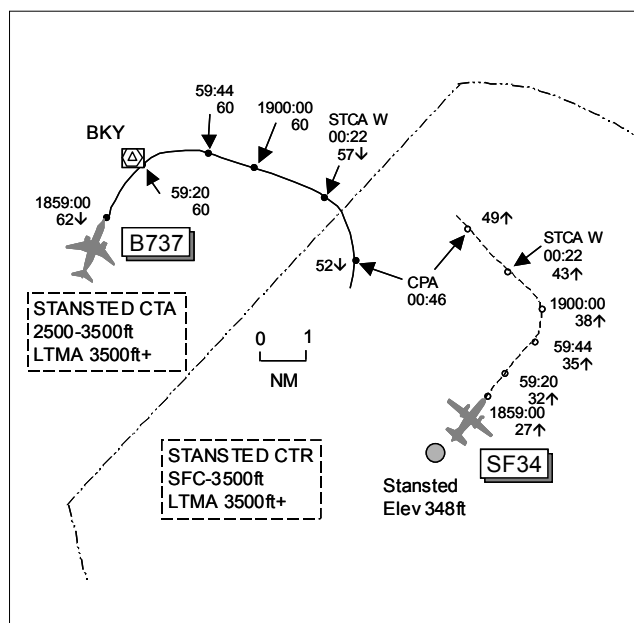
Contributory Factors: The ATC Supervisor/APR did not:

1. Restrict traffic in accordance with MATS Part 2.
 2. Ensure that the PA28 was squawking an SSR code.
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AIRPROX REPORT No 029/04

AIRPROX REPORT NO 029/04

Date/Time: 24 Mar 1901 NIGHT
Position: 5157N 0013E
(4nm N Stansted - elev 348ft)
Airspace: TMA (Class: A)
Reporting Ac Reported Ac
Type: SF34 B737-800
Operator: CAT CAT
Alt/FL: 5000ft ↓3000ft
(QNH 1025mb) (QNH)
Weather IMC KLWD NK NR
Visibility:
Reported Separation:
nil V 1.7nm H NR
Recorded Separation:
300ft V 2.5nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SF34 PILOT reports departing Stansted RW05 on a CPT2S SID and in receipt of a RCS from Stansted Director on 126.95MHz. After being turned at 2nm onto heading 310° and levelling at 5000ft QNH 1025mb at 180kt, TCAS gave a TA alert. He was given a turn onto 325° and he disconnected the A/P ready for an RA warning which did not happen. The other ac was not visually acquired but observed on the TCAS display passing 1.7-2nm down the LH side at the same altitude. ATC stated that 3nm was the required minima and that separation pertained at the time contrary to TCAS indications.

THE B737 PILOT reports inbound to Stansted and he had just been transferred from Essex Radar to Stansted Director using the standard phrase "B737 c/s contact 126.95MHz callsign only"; the previous ATC instruction from Essex was radar heading 110° and 6000ft altitude. After contacting Director he was cleared for descent to 3000ft and shortly afterwards given a radar heading 230°. Meanwhile, TCAS had given a TA alert but without altitude information, 2 or 3 aural warnings were received but he understood that some light ac pass through the airport area with NMC on the transponder. TCAS displayed an orange circle behind his track (B737's); the circle seemed to be flying in the opposite direction, and the aural warning stopped in a few seconds as the orange symbol turned to white. The flight continued without any problems and ATC did not inform him of any possible near miss.

LTCC INVESTIGATIONS reports that this event occurred 4nm to the N of Stansted during a period when traffic loading, sector workload and complexity were all reported as low.

The SF34 departed from RW05 at Stansted and its crew established contact with the Stansted Final Director (SS FIN) at 1859, reporting climbing to 5000ft in accordance with the CPT2S SID and passing 3000ft. This was acknowledged by SS FIN who, shortly after 1859:30, instructed the flight to fly a radar heading of 310°.

The B737 was inbound to land on RW05 at Stansted and its crew established contact with SS FIN at 1859:46. It had been placed on a radar heading of 110° by Essex radar and cleared to descend to 6000ft. SS FIN advised the B737 crew that the flight was 22nm from touchdown RW05, and at 1859:57 instructed the ac to descend to 3000ft, to be level in 9 miles.

(SRG ATS Investigations Note: The standard technique when dealing with inbound and outbound traffic is to descend the inbound to 6000ft whilst the outbound ac is climbed to 5000ft. Further descent for the inbound is issued when clear of any outbounds)

It was unclear why SS FIN chose to issue the descent clearance to the B737 before it had been turned on to a downwind heading and away from the SF34. The controller had been made aware that the B737 would be transferred on a heading of 110° for him to complete the turn on to the downwind heading. Also he believed that seeing the ac in a R turn may have triggered the perception that the ac was in fact turning on to a south westerly / downwind heading and thus it was safe to issue the descent clearance.

The SS FIN reported that his attention was drawn to the potential conflict by the Essex controller who had heard the descent clearance being issued without an associated change to the heading of the B737. This prompted the SS FIN to instruct the B737 crew to turn R on to 225° (at time 1900.04), followed, just after 1900:10, by an instruction to the SF34 crew to turn R on to a heading of 325°. The term 'avoiding action' was not used, as the SS FIN was confident that separation would be maintained through the heading changes.

The radar replay shows no discernible change to the track of the B737 for a period of about 15sec and the ac was indicating a ground speed of 235kt. The B737 crew had contacted Essex radar advising 'high speed' and reducing to 280kt and had subsequently been instructed, shortly after 1858:00, to reduce speed to 220kt before being transferred to the SS FIN. It is evident that the ac was still in the process of reducing speed as it called the SS FIN and in the circumstances it would appear to have been better practice had Essex radar issued the B737 with a turn on to a downwind heading.

STCA activated with a low severity alert 'white' at 1900:22 when the subject ac were 4.3nm apart. About 15sec later the SF34 crew contacted the SS FIN stating "*SF34 c/s he's descending on top of us here*". The SS FIN asked the station calling to say again and this time the SF34 crew transmitted "*I've got an ac at two miles at the same level*". The controller replied "*SF34 c/s roger, I don't make it as little as that*". During this exchange separation reached its minimum (1900:46) as the SF34 climbed through 4,900ft with the B737 diverging in its 10 o'clock at a range of 2.5nm, 300ft above and descending. Standard lateral separation was achieved almost immediately afterwards. Separation Monitoring Function (SMF) was not triggered during this event.

Subsequently the SF34 crew discussed the matter with the controller which ended with the Captain declaring that he would be filing an Airprox.

ATSI endorsed the LTCC report.

UKAB Note: Met Office archive data shows the Stansted METAR as EGSS 1850Z 36009KT 9999 VCSH FEW014 SCT050 04/02 Q1024=

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 aware of the airspace constraints in the Stansted area with limited space available for vectoring, particularly onto RW05. Consequently, speed control is necessary in the vectoring phase in order to position and separate ac accurately. Some members thought that the Essex controller could have given the B737 a R turn downwind prior to transfer, as the flight was still in the process of slowing down. However, the Stansted FIN was cognisant that the B737 had been transferred on a heading of 110° at 6000ft and had for reasons that remained undetermined immediately descended the flight to

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3000ft, into potential conflict with the outbound SF34 climbing to 5000ft. In doing so, it was clear that the Stansted FIN had dispensed with vertical separation without ensuring lateral separation existed which had caused the Airprox.

The Essex controller had immediately alerted the FIN to the developing situation, who had then given the B737 crew a R turn onto 220° and the SF34 a 15° R turn, apparently comfortable with the separation, although the turn executed by the B737 may have been wider/slower than he expected. STCA had activated after the turns had been issued. The B737 crew had received a TA alert, but only briefly, as the SF34 passed clear to their L and behind. Meanwhile, the SF34 crew had also received a TA alert. After being given a heading change onto 325°, they had disconnected the A/P in anticipation of an RA, which did not happen, and had watched the B737 on TCAS pass an estimated 1.7-2nm clear down their LHS. Inspection of the radar recording, timed shortly after 1900:22, showed the subject acs' turns begin to take effect, resulting in a slight loss of separation at the CPA. These combined elements were enough to persuade the Board that any collision risk had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

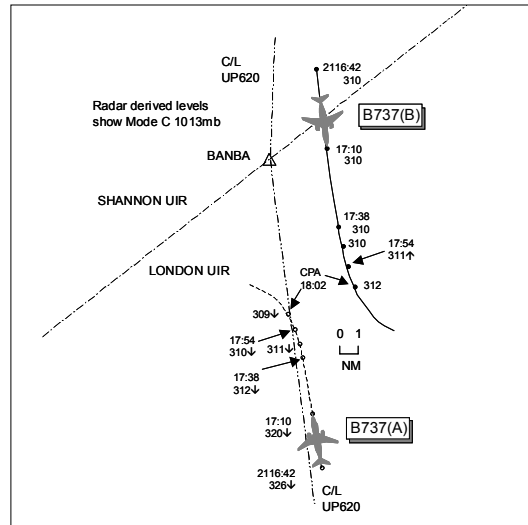
Cause: The Stansted FIN dispensed with vertical separation without ensuring lateral separation.

Degree of Risk: C.

AIRPROX REPORT NO 030/04

Date/Time: 25 Mar 2118 NIGHT
Position: 5150N 0608W (8nm S BANBA)
Airspace: UAR UP620 (Class: B)
Reporting Ac Reported Ac
Type: B737(A) B737(B)
Operator: CAT CAT
Alt/FL: FL310↓ FL310

Weather VMC CLAC VMC NR
Visibility: >10km NR
Reported Separation:
 nil V 5nm H NR
Recorded Separation:
 300ft V 3.9nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE B737(A) PILOT reports heading 360° at 420kt en route to Dublin and in receipt of an ATS from London. When descending through FL325, having been cleared to FL260 to be level at BANBA, a TCAS TA alert was received on traffic in his 12 o'clock position range 10nm 2000ft below but climbing, he thought. Simultaneously, ATC issued a 90° L turn to him and to the other flight and the 'intruder' ac's lights were sighted in his 1 o'clock range 7-8nm. The other ac was seen to pass about 5nm abeam to his R at the same level, FL310.

THE B737(B) PILOT provided a brief report in which he said that ATC gave him an unusually large heading change of about 90° but he was not aware of any loss of separation with another ac; TCAS had given a TA alert.

THE S8/5/23/6/9 TACTICAL CONTROLLER reports that he cleared B737(A), which was routeing LND-BANBA-DUB, to descend to FL260 to be level at BANBA. This was issued early owing to him being busy elsewhere in the Sector. Subsequently B737(B), an 'Irish Gap Flight', was offered to S8 by Shannon routeing DUB-BANBA-LND, the fps for which initially appears with a blank level box. Later, the level was coordinated with the Planner at FL310 who advised him accordingly. By now the Sector was busy and he thought he had resolved the confliction by giving an early descent to B737(A), believing that it would descend below B737(B). Whilst carrying out a radar scan, he noticed the subject ac were in confliction, with B737(A) descending through FL320, so he gave its crew 'avoiding action' and TI. This instruction was repeated and then STCA activated. He then gave 'avoiding action' and TI to B737(B) crew who told him that the other ac was in sight, he thought. Separation was estimated to be 4-4.5nm as the ac passed.

THE S8/5/23/6/9 PLANNER CONTROLLER reports the bandboxed Sector was quite busy owing to several pilots reporting turbulence near to BCN. He accepted a southbound flight, B737(B), from Shannon at FL310 having previously received a fps on this 'Irish Gap' flight, which was initially blank and later was offered electronically at FL330. He wrote FL330 in Box C on the fps and then amended it to FL310, after coordination with Shannon, and informed the Tactical controller. This situation appeared reasonable as the northbound B737(A) had to be level at FL260 at BANBA and he believed the Tactical controller had issued descent clearance early to its crew to ensure separation against B737(B). Later he became aware of a problem when the Tactical controller gave an 'avoiding action' turn to the B737(A) crew when it was descending through FL318 with B737(B) 10nm ahead flying in the

AIRPROX REPORT No 030/04

opposite direction. He advised the Tactical to turn B737(B) onto East, which he did immediately as well as passing TI to both crews, estimating that separation at the CPA was approximately 4nm.

ATSI reports that at the time of the Airprox, both ac were in communication with the S9 Tactical controller and the workload and traffic loading were described as 'moderate'. Both the Tactical and Planner explained that operating at that time of day with so many sectors (8/5/23/6/9) bandboxed onto one position was quite normal.

The B737(A) crew established communications with the Tactical controller at 2050:50, maintaining FL340 and routeing northbound to Lands End. The Tactical controller cleared the flight to route direct to BANBA, on the FIR/UIR boundary, and then Dublin. Some 30sec later an electronic offer was received by the Planner on B737(B) from Shannon. This generates a paper fps which is placed, usually by the ATSA, on the Tactical controller's flight progress board.

At 2105:00, the Tactical controller instructed B737(A) crew to "...descend when ready flight level two six zero level by BANBA". At that time, B737(A) was approximately 82nm S of BANBA. Very shortly afterwards, at 2106:15, an ACT message was received in respect of B737(B) reporting the level as FL330. The Planner marked this on the Tactical controller's strips. As part of the same message, a time revision amending the BANBA estimate from 2101 to 2118 was also received. The ATSA marked this on the strips but the Tactical controller had no recollections of this being pointed out to him at the time. At 2109:40, Shannon revised the level to FL310 when B737(B) was just S of Dublin and whilst B737(A), still maintaining FL340, was still some 50nm S of BANBA.

The B737(B) crew established communications with the Tactical controller at 2114:40, and were cleared to route direct to PATEL, a reporting point located on the Brest/Madrid UIR boundary, SW of Bordeaux. The two ac were now on reciprocal tracks, 50nm apart, B737(B) maintaining FL310 and B737(A) level at FL340 having been cleared to descend to FL260. Analysis of the radar recording shows B737(A) commencing descent from FL340 at 21:15:40, when the ac were 33nm apart. At 21:17:10, the Tactical controller transmitted "*B737(A) c/s stop descent immediately flight level three two zero turn left heading two seven zero degrees traffic twelve o'clock range ten miles opposite direction three one zero*". The Mode C of B737(A), when the controller started transmitting, indicated FL320, with the ac 14.5nm apart. As no reply was received the controller transmitted "*B737(A) c/s left heading two seven zero traffic in your one o'clock range about eight miles opposite three one zero*" and the crew requested the heading to be repeated. This was done and then an avoiding action turn was passed to B737(B). The STCA activated at 2117:40 as the two ac, both responding to their turn instructions, were 6.9nm apart.

[UKAB Note (1): Separation reduced to a minimum at 2118:02 as B737(B), indicating FL311, passed down the starboard side of B737(A) at FL309, 300ft above and laterally displaced by 3.9nm.]

Sufficient staff was available to split the sector combination if necessary. The Tactical controller reported that he had had a number of conflicts to resolve in the RADNO area and so that was where he was mainly concentrating. However, he was scanning the rest of the total sector airspace and monitoring the traffic. He had his strips arranged in time order and, when the strips for B737(B) were produced, he asked the Planner if he could see the ac on his display. The Planner could not and after checking his own radar, which displayed as far as Dublin to the N, the Tactical controller inserted the strip.

The Tactical controller commented that, in his opinion, strips on these flights were produced too early. Such flights, which depart from within the London FIR/Scottish FIR, transit Irish airspace and then re-enter the London FIR/Scottish FIR are termed 'Irish Gap' flights. [UKAB Note (2): B737(B) departed Belfast routeing to Spain.] A strip is produced, based on the departure time but does not have any active level information. In his view, it would be better if the strip was not available until the ACT message had been received and so Tactical controllers would have more complete data to work with. When the ACT message was received, the Planner wrote '330' in the level box and recalled drawing the Tactical controller's attention to this, however, when asked, the Tactical controller had no recollection of this.

When the level revision to FL310 was received, the Planner amended the strip and the Tactical controller recalled having had this pointed out to him.

The Tactical controller, having checked that B737(B) was still outside his displayed radar range passed descent instructions to B737(A); however, the crew were not requested to report commencing their descent nor did they report doing so. Shortly afterwards, B737(B) appeared at the edge of his display. He rechecked the situation to ensure it was safe and assessed that the ac would cross N of the UIR/FIR boundary, by which time B737(A) would be FL260 or even lower whilst B737(B) would be maintaining FL310. The Planner was also aware of the traffic situation and, as part of his normal duties, was monitoring the radar as well as the strips. Both controllers believed that the subject ac, which were the same type, would be of similar speed. However, later analysis has shown that the reported wind at FL300 was 040/110kt. This resulted in the groundspeed of the southbound B737(B) being some 150kt faster than the northbound B737(A).

When B737(B) reported on frequency, it was instructed to route direct to PATEL, which would result in it tracking slightly E of the Upper Air Route. Again, the Tactical controller remained of the opinion that there was not a problem between these two ac and so turned his attention to other parts of his sector airspace. By now it was apparent that the cross would take just to the S of the boundary, as B737(B) was 20nm N and B737(A) 28nm S of it.

Both controllers saw the problem at around the same time and the Tactical controller issued turn instructions. He was convinced that he had used the words “*avoiding action*” but analysis of the RT recordings shows that this was not the case.

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.

ATCO members empathised with the Tactical controller’s ‘mindset’ during this encounter. He had given the B737(A) crew descent clearance, to be level at FL260 by BAMBA, in the conviction that it would be ‘separated’ from the southbound B737(B) level at FL310. This was reinforced when he had rechecked the situation as B737(B) appeared on his radar display. However, the strong prevailing wind had caused the expected ac ‘crossing point’ to migrate further to the S than initially thought. Having dispensed with vertical separation without ensuring lateral separation would be assured, the onus was then on the Tactical controller to monitor the situation, with both ac being visible to him for several minutes before the CPA. Members agreed that the cause of the Airprox had been the S8/5/23/6/9 Tactical controller descending B737(A) into conflict with B737(B).

During a routine scan of his display the Tactical controller noticed the conflict, prior to STCA activating, and told the B737(A) crew to stop descent at FL320 and make a L turn onto 270°. As this instruction went unanswered, he had then repeated the L turn instruction and added TI which was acknowledged but with a request to repeat the heading. The crew had seen the B737(B)’s lights in their 1 o’clock range 7-8nm and watched it pass about 5nm clear on the R. The controller then gave an ‘immediate’ L turn instruction to the B737(B) crew and TI which was acknowledged. It appeared that B737(A) crew may have been slow to ‘cotton on’ to the situation but had reported that a TCAS TA alert had been received simultaneously with the ATC instruction so this may have led to the delayed reply. The geometry of the encounter shows that the route flown by B737(B) direct to PATEL had taken the flight to the E of the UAR C/L and put the subject ac on nearly parallel opposite direction tracks. All of these elements when combined led to the subject ac passing 3.9nm apart diverging and was enough to persuade the Board that safety had been assured during the encounter.

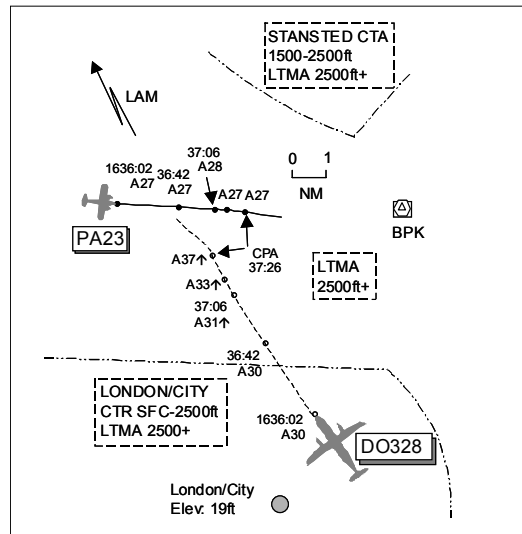
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The S8/5/23/6/9 Tactical controller descended B737(A) into conflict with B737(B).

Degree of Risk: C.

AIRPROX REPORT NO 031/04

Date/Time: 26 Mar 1637
Position: 5138N 00001E (5nm W LAM)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: DO328 PA23
Operator: CAT Civ Pte
Alt/FL: 3000ft 2400ft
 (QNH 1021mb) (QNH 1021mb)
Weather VMC CLOC VMC CLNC
Visibility: >10km >10km
Reported Separation:
 1000-1200ft V 0.5-1nm H not seen
Recorded Separation:
 300ft V 2.5nm H or 1000ft V 1.5nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE DO328 PILOT reports outbound from London City level at 3000ft QNH 1021mb and in receipt of a RCS from London on 118.82Mhz squawking 5056 with Mode C. The visibility was >10km clear of cloud and the anti-collision, nav and strobe lights were all switched on. About 10nm S of BPK heading 333° at 250kt an unknown ac was observed on the TCAS display in his 12 o'clock range 4nm heading towards him climbing slowly indicating -300ft. When the height separation indicated -200ft with the range showing 3nm and decreasing rapidly, a climb was initiated, initially to 4000ft. He informed ATC and at that time an amber TA caption illuminated and a "traffic" warning sounded. ATC gave an avoiding action turn onto 280° and climb to 5000ft and the other ac was seen on the display to pass down his RHS by about 0.5-1nm away and 1000-1200ft below their new height.

THE PA23 PILOT provided a comprehensive report but the Airprox was not observed during the course of the flight. Outbound from Elstree to France at 2400ft QNH 1021mb squawking 7000 with Mode C, he had been heading 100° at 170kt during his transit of the area. The visibility was >10km in sky clear VMC and the ac was coloured white/blue with anti-collision light switched on. He was carrying 3 passengers, of which 2 were pilots, and a CPL holder was occupying the front RH seat. No one onboard saw another ac other than those on VFR flights following TI being passed by Stapleford RADIO. He had changed frequency from Elstree to Stapleford when approaching the Lea Valley lakes about 7nm W of LAM and the QNH given was 1021mb, the same as that at Elstree. Both altimeters were set to 1021mb and both indicated the same altitude. He was aware of the base level of the LTMA, as his ac was based at Elstree, and he flew regularly to France. On this occasion he had climbed when abeam of Headcorn to cross the Channel and had changed frequency to London for a FIS after working Stapleford.

UKAB Note (1): After completing the CA1094 form, the PA23 pilot contacted the UKAB with further information. On the flight he had noted a smell in the cockpit after turning on the heater and had a maintenance organisation to investigate. Subsequently he was informed that both voltage regulators had burnt out and the smell had been the batteries boiling dry owing to overcharging. This had resulted in 1 generator circuit breaker 'popping' and the insulation of the other generator melting. Items like the heater, cigarette power supply and landing light were affected. He was unaware whether these electrical problems would have affected the encoding altimeter but his 44yr old ac had not given any indications within the cockpit of the aforementioned problems.

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ATSI reports that there are no apparent ATC causal factors in this Airprox. Following departure from London City, the pilot of the DO328 established communication with the TC NE SC at 1635:20 reporting climbing to 3000ft, following the BPK 3U SID. At 1637:00, the pilot reported "... *climbing for traffic*". The SC obtained confirmation that the crew had the conflicting traffic on TCAS, instructed it to continue climb to 5000ft and, a few seconds later, to turn L onto heading 280°. He advised that the traffic was "... *going down your right hand side ...*". The radar recording indicates that STCA activated with a low severity alert while the pilot was reporting the climb due traffic. At that point, timed at 1637:06, the unknown traffic, tracking E, had passed through the DO328's 12 o'clock into its 1 o'clock position at a range of 2.5nm, with its Mode C indicating 2800ft. (The base of the TMA in this area is 2500ft). The DO328 leaves 3000ft and, by 1637:27, with the unknown ac in its 2 o'clock position at 1.5nm, vertical separation, according to Mode C, was 1000ft and increasing.

The unknown ac had been squawking SSR code 7000 and the SC had not seen its apparent climb into the Class 'A' airspace of the TMA, prior to the conflict, because he had 7000 squawks filtered out, as is almost standard operating practice on the TMA sectors. While this clearly is not ideal in such circumstances, it is accepted that the alternative of having all 7000 squawks displayed might well clutter the radar screen to the detriment of the primary responsibility of providing a radar control service to ac in CAS. Even when SSR codes are filtered out, they will be 'forced through', as on this occasion, when the STCA detects a conflict.

The unknown ac was subsequently identified as a PA23 that had departed from Elstree, at 1632, en route for Le Touquet. The pilot established communication on the London FIS (East) frequency at 1641:50, after the Airprox had occurred. He requested a FIS and reported routeing via Stapleford and Lydd, maintaining "... *two thousand five hundred feet one zero two one ...*". Whilst attempting to identify the second ac involved in the Airprox, TC had contacted the FISO and the PA23 was later positively identified when it was assigned a discrete squawk. When advised that his ac had earlier been involved in an Airprox the pilot reported "... *we were two thousand four hundred feet all the way.*" At 1659:50, the pilot requested his Mode C readout. The FISO contacted one of the radar sectors and, at 1702:10, asked the pilot to advise his present altitude. He reported at 3200ft and the FISO replied "*I cannot actually give you a ... transponder check ... we're not able to do that but I suggest that isn't too far from what you're actually showing on radar ...*". The radar recording shows the ac's Mode C readout as 3300ft at that time.

The TC unit report indicates that the PA23 pilot telephoned the unit later on the day of the Airprox and includes the following "... *the pilot telephoned LTCC advising that he was in the vicinity of the alleged Airprox at the time, but at all times he had operated below the TMA at 2400ft. Four persons on board, three being pilots had agreed the altimeter had showed 2400ft. Additionally, the pilot explained that on a recent flight he had been asked to switch off its Mode C as it was giving a false reading. The pilot further explained that he was a regular user of the route and was well aware of the airspace restrictions.*" When the pilot reported at 2500ft, in his initial call, the Mode C readout had been 2700ft.

UKAB Note (2): Prior to the Airprox from 1634:12 onwards, the PA23's Mode C readout had indicated steady at 2700ft on the London QNH 1022mb.

THE DO328's FLIGHT SAFETY DEPARTMENT comments the Capt has received further training in the simulator as he had departed from his ATC cleared level during the receipt of a TCAS TA, contrary to company policy.

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 were fully aware of the restrictions placed on GA traffic when flying below the LTMA. Ac flying just below 2500ft in the area of the Airprox are deemed separated from IFR traffic flying at 3000ft, 500ft above the LTMA's base level. The PA23 pilot was familiar with the airspace constraints and had reported flying at 2400ft QNH at the time, although the ac's unverified height readout had shown 2700-2800ft during its transit towards BPK. It was unlikely that the pilot would have inadvertently climbed into CAS and one explanation offered was that if the PA23 pilot had climbed to 2400ft on the Elstree QFE then he would have been at 2732ft altitude. The Board agreed that this was a possibility but on balance accepted the pilot's report. Another suggestion was that there was a malfunction in the PA23's transponder system which resulted in false indications to both ATC and the Dornier crew. The DO328 crew had not visually acquired the PA23 so there had been no confirmation of the ac's actual altitude at the time. Without any other information available to members as to whether the encounter had been real or perceived, it was agreed that the most likely cause of the Airprox was the PA23's unverified Mode C readout indicating that the ac had entered CAS bringing it into conflict with the DO328.

The DO328 crew had seen the potential conflict on TCAS and had manoeuvred their ac clear of the PA23 by commencing a climb and informing ATC. Members were surprised that the Dornier crew had departed from their ATC clearance without either visually acquiring the 'threat ac' and prior to any TCAS alerts. The crew should have asked ATC for assistance to supplement the information received from TCAS to help them decide whether a change of flight path should be made. A TA alert had been received, as the climb was commenced, by which time the PA23 was in the Dornier's 1 o'clock range 2.5nm and diverging on an easterly track: TCAS had indicated the PA23 passed 0.5-1nm to their R and 1000-1200ft below. Also, STCA had activated at about the same time and the controller had issued further climb clearance and a L turn away from the PA23. These elements, when combined with the geometry of the encounter shown on recorded radar, led the Board to conclude that any risk of collision, whether real or perceived, had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA23's unverified Mode C readout indicated that the ac had entered CAS and was in conflict with the DO328.

Degree of Risk: C.

AIRPROX REPORT No 32/04

AIRPROX REPORT NO 32/04

Date/Time: 29 Mar 0900

Position: 5343N 00030W
(9½nm NW of Humberside)

Airspace: London FIR (Class: G)

Reporting Ac Reported Ac

Type: Jetstream 41 Hawk

Operator: CAT HQ STC

Alt/FL: FL55 8000ft

(alt)

Weather VMC NR VMC CLOC

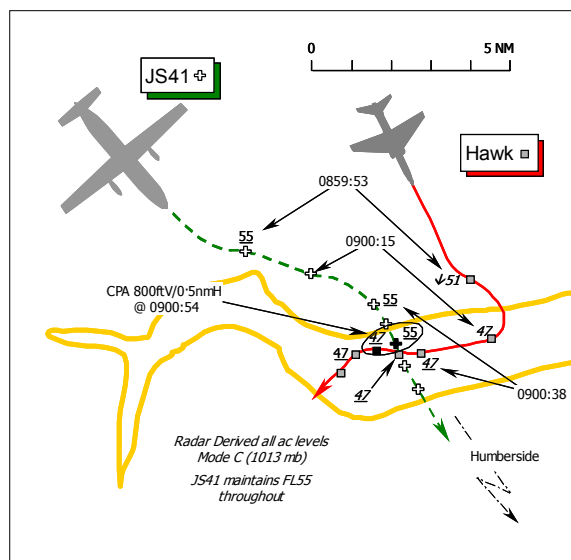
Visibility: NR 30km+

Reported Separation:

100m H/500ft V 2nm H/500ft V

Recorded Separation:

800ft V/0.5 nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports his ac has a white colour scheme with blue & red stripes and that the HISL was on. TCAS is not, as yet, fitted. He was flying on a scheduled CAT flight from Teesside to Humberside under IFR, in level cruise at FL55. Whilst in receipt of a RAS from Linton RADAR, “knowing the area and the fact that there is a lot of military traffic”, he suggested to the controller that they might be routed “...at the coast down to Humberside as the fighter jets keep off the coast”. However, the controller said that there was no traffic to affect their flight. Approaching the Humber Bridge at 250kt, they were given an avoiding action turn onto a heading of 200° against an ac approaching from their 9 o’clock position, which maintained heading and altitude as they closed on each other. The other ac – a black or dark grey Hawk – was spotted about 5nm away and he was “expecting standard avoiding action” from the other aircraft’s pilot but nothing happened. To avoid the jet he turned hard left himself as the Hawk crossed 100m ahead of his ac from L – R some 500ft below his Jetstream, adding that he could see the Hawk pilot under the canopy. He tried to query Linton as to what had happened but the controller then instructed them to ‘free-call’ Humberside Radar on 119.12MHz, as Linton said they could not get a reply from Humberside ATC. He assessed the risk as “very high” and added that they were getting ready for the Approach phase into Humberside, to whom he reported the Airprox on RT.

THE HAWK PILOT, a qualified pilot navigator instructor (QPNI) reports he was flying with a student, holding to the S of the Vale of York Training Area in an area clear of cloud with an in-flight visibility of 30km+. He was operating under an ADIS [RIS] from CRC Neatishead and squawking A2471 with Mode C, but neither TCAS nor any other form of CWS is fitted. The ac has a black colour-scheme and the HISL was on. Flying in the vicinity of the Humber Bridge heading 270° at 250kt, he had just completed a gentle 180° right turn through S, when he saw what he thought was a light civil ac [the Jetstream] southbound, in his 2-3 o’clock about 2nm away and slightly high. To avoid the other ac a gentle descent was initiated to increase the vertical separation and it passed 1 - 2nm astern and some 500ft above his jet with a “small” risk of a collision. He added that no traffic information had been passed by the CRC controller about the other ac.

THE HUMBERSIDE APPROACH RADAR CONTROLLER (APR) reports that the JS41 crew freecalled whilst inbound to Humberside some 10nm N of the Airport, squawking A7000 at FL55. The pilot reported visual with the airport and then advised that he had just taken avoiding action against an ac manoeuvring in his vicinity, which he later reported as a black Hawk jet. Following this report the flight

was vectored for a visual approach and landing to RW21. He added that all Air Traffic Operational Telephone Network (ATOTN) lines and Aeronautical Fixed Teleprinter network (AFTN) lines were out of service; consequently the proper procedure for tracing action could not be effected.

The 0852UTC Humberside weather was given as: s/w 280/02kt; vis 7000m; cloud SCT 4000ft; +9/+7; QNH 1023mb.

THE HAWK PILOT'S STATION comments that despite the fact that the pilot was receiving a RIS from CRC Neatishead, this contact – the Jetstream - was not called. This is not unusual in the Vale of York AIAA, [this Airprox occurred just to the S of the southern boundary of the AIAA] where there are frequently 'pop-up contacts' from military ac performing aerobatic manoeuvres, 'possible contacts' from gliding activity and also 'weather breakthrough' or other 'clutter'. Although it is Class G airspace, because of the density of air traffic it is an area in which they would not choose to operate without a radar service - ADIS. In this case, however, that service has not provided a warning, and it is down to the good airmanship and lookout of a very experienced pilot that this civilian ac was seen and clearly avoided. This serves as a timely reminder that even when receiving a radar service, crews must maintain a good lookout at all times.

MIL ATC OPS reports that the JS41, was routeing from Teesside to Humberside under a LARS and had been handed to Linton ZONE from Teesside ATC under a RAS at FL55. Simultaneously, 2 fast moving tracks were operating in the Vale of York carrying out high energy manoeuvres, between the E Coast, S of Bridlington, and about 10-15nm inland at various levels [the Hawk pair]. The JS41 crew was given the first of 3 instances of avoiding action against the Hawk at 0850:18, "*...avoiding action, turn right heading 200, traffic was SE 7 nm NW bound indicating 1000ft below descending, fast mover*". The JS41 crew acknowledged and took the turn at 0850:30. Later, at 0851:10, the JS41 pilot inquired if "*it would be better for us to route over the coast?*" ZONE responded that "*it looks like there's...2 fast jets working the air defence unit operating between 3000ft and FL45...I can co-ordinate all the traffic in your 12 o'clock and south of you but this traffic...now NE 5 miles NW bound at FL45 is the only conflictor*". At 0851:39 ZONE informed the JS41 crew that they were clear of traffic and released them under their own navigation, reporting at 0852:29, steady on heading 170°. ZONE then requested some administrative details for the recovery at Humberside and then instigated avoiding action again at 0855:53, "*avoiding action turn right heading 200, traffic was left 10 o'clock, 7 miles crossing left right indicating 2000ft below - it's a fast moving aircraft looks like he's on an intercept course with an aircraft 6nm to the north of you*". The JS41 pilot reported being in IMC and that he was taking the turn. At 0858:53, ZONE advised that the conflicting traffic had now turned away and once again, the JS41 was released own navigation. At 0859:43, the JS41 crew reported steady heading 109°. The final avoiding action call was passed to the JS41 crew by ZONE at 0900:12, "*...avoiding action turn right heading 200°, traffic was left 6 miles manoeuvring indicating FL50 descending and I am unable to arrange a handover to Humberside....are you happy to freecall?*" At 0900:30, the JS41 declared "*Affirm we are happy to freecall and we are visual with traffic in our 12 o'clock slightly lower*". Whereupon the JS41 was given his position and at 0900:34, instructed to freecall Humberside.

[UKAB Note: Analysis of the Claxby Radar recording shows the JS41 6.5nm WNW of Leconsfield tracking 200°, indicating FL55 Mode C (1013mb) throughout. The Hawk is shown descending through FL51 at 0859:53, and passing through the JS41 crew's 12 o'clock some 5nm away, when the Hawk pilot commenced a R turn onto W, back onto a conflicting track with the JS41. Just before 0900:15, the JS41 crew's reponse to ZONE's last avoiding action R turn is apparent and at 0900:38, the Hawk passes through the airliner's 12 o'clock westbound once again. At 0900:47, the Hawk passed 0.8nm directly ahead of the Jetstream from L - R indicating FL47 – some 800ft below the JS41, which maintains FL55. Minimum horizontal separation occurred at 0900:54, as the Jetstream passed 0.5nm directly astern of the Hawk with 800ft vertical separation indicated on Mode C between them, heading toward Humberside Airport.]

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When the JS41 transferred to Humberside, at 0900:30, the horizontal separation between the 2 ac is 2.2nm, with 800ft indicated on Mode C.

The weather in the Vale of York at the time of the Airprox was generally good, with a mixture of IFR and VFR flights in the local area. Following a handover from Teesside, the JS41 was given a RAS with ZONE at FL55. Also operating in the Vale of York were 2 fast moving contacts squawking 2471/72 – the Hawk pair - carrying out high energy manoeuvres. Shortly after handover the JS41 was given the first of 3 avoiding action turns against the Hawks. Incorrectly, ZONE believed these ac squawking A2471/72 were operating with Boulmer and attempted to co-ordinate these tracks against the JS41. He was subsequently informed that the Hawks were under the control of CRC Neatishead and during a lengthy process valiantly endeavoured to contact the appropriate controller but with no success. After the first avoiding action turn, the pilot of the JS41 suggested a routeing via the East Coast would be better given the traffic situation. ZONE's own assessment based on the previous track history of the Hawks was that a re-routing would not relieve the problem. Prior to the 3rd avoiding action turn, ZONE attempted to contact Humberside Radar but was unable to do so due to technical problems. During the process of passing the 3rd avoiding action turn the pilot of the JS41 was advised by ZONE that he was unable to arrange a handover and asked if a freecall was acceptable. The pilot reported that she was visual with the previously reported traffic and agreed to freecall. When the JS41 left ZONE's frequency, the separation between the 2 ac was 900ft Mode C and 2.2nm. Although relatively inexperienced, ZONE demonstrated sound awareness, division of attention and scan, in an attempt to adhere to the conditions of RAS against conflicting tracks which were performing high energy, unpredictable manoeuvres. His decision not to reroute the JS41 was well founded and with the ac fast approaching its destination airfield, with which no landline communication was available, the freecall in this situation was reasonable.

ATSI reports that there are no apparent contributory civil ATC implications. The Hawk remains on a Neatishead squawk - A2471 - before, during and after the encounter while the Jetstream is on a Linton squawk - A4531 - until just before the Airprox. The latter displays a Mode C readout of FL55 throughout. Just after the Jetstream crosses the south bank of the River Humber, with the Hawk 4nm distant and heading away to the W, the Jetstream changes to a Humberside squawk A4271.

ASACS SSU comments that unfortunately the initial Airprox signal was not addressed to the ASACS SSU at Bentley Priory: initial notification was thus some 6 weeks after the incident and the data tapes at Neatishead were not available. The WC and FA involved reviewed the radar replay but did not recollect the incident. The Hawk was one of a pair programmed to work with Neatishead to carryout 1v1 practice intercepts in the Vale of York AIAA under an ADIS. Without the RT tape transcript from Neatishead it is difficult to ascertain the reason why the Hawk did not receive traffic information on the JS41 whilst under an ADIS. However, the Hawk pilot reports he saw the JS41 in time to effect what he considered appropriate safe separation, for which he was responsible, whilst in Class G airspace.

HQ STC comments that there was little risk of collision with this conflict in the open FIR where both pilots saw each other. The recorded separation was in excess of what could have been achieved if flying IFR quadrantals (just 500ft on the headings flown).

However, there are several issues to consider in that the Hawk's ADIS would have defaulted to a FIS below 5000ft, and at best would be a Limited RIS between 5-7000ft. Therefore, the Hawk pilot placed too much emphasis on what the ADIS would provide him at the altitude he was flying at. Secondly, the Hawk should have realised that the chosen marshalling position and altitude could generate conflicting traffic; being some 9nm from Humberside's overhead where most instrument traffic joins at 2700ft for their respective procedures. However, the Hawk crew did spot the JS41 and avoided it by a sufficient margin.

It is suggested that the JS41's acceptance for the request to freecall Humberside, once he was visual with the Hawk some 4 miles to the W, suggests that he was happy to use 'see and avoid'. It would

appear that in doing so the JS41 crew had taken responsibility to monitor and avoid the Hawk, which they could have done by routing behind it and then heading towards Humberside. The fact that the Hawk had not taken “standard avoiding action” would indicate that the Hawk had not seen the JS41 at that point, and therefore, it would be reasonable to expect the JS41 to avoid the Hawk under the Rules of the Air. Later on, when the Hawk sights the JS41, he correctly identifies the JS41’s right of way and alters his height to avoid the civil aircraft in accordance with the Rules of the Air.

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, AD and ac operating authorities.

It was evident from the MIL ATC Ops report that the Linton ZONE controller had been working hard to steer the JS41 around the Hawk pair as the airliner headed toward its destination through the southern portion of the Vale of York AIAA. It was clear to the Board that the controller had conscientiously done his best to provide the JS41 with an effective RAS through this busy airspace and it was unfortunate that ZONE had mistaken the identity of the unit providing the Air Defence Service (ADS) to the Hawk. If ZONE had been able to contact the controller at CRC Neatishead earlier, then co-ordination might have been feasible. However, the ASACS advisor explained to the Board that the ATOTN malfunction that had apparently prevented the Linton ZONE controller from contacting Humberside ATC had also impacted on Neatishead, so it would also have hindered ZONE from contacting the CRC controller. Thus ZONE could only provide vectors around the conflicting traffic that he had detected and whereas the JS41 pilot might have supposed that a routing off the coast would have been beneficial, here that would not appear to have been the case. The Humberside APR controller’s report had laid bare the communication problems that had affected his unit. Therefore, without landline contact that effectively prevented a radar hand-over with the Humberside APR there was nothing else that the Linton ZONE controller could do other than instruct the JS41 crew to free-call their destination airport. This instruction occurred just after the critical third transmission of avoiding action, whereupon the JS41 pilot reports he sighted the Hawk at a range of 5nm. Clearly ZONE was endeavouring to achieve standard separation of 5nm against the ‘unknown’ ac and had managed to achieve this successfully up until the point that the Hawk unexpectedly turned R toward the JS41. However, by then the airliner crew had spotted the Hawk themselves. In this situation best practise would suggest that a controller should confirm that a pilot has visual contact with the other ac before instructing them to switch off his frequency and free-call the next ATSU, but the Board understood why ZONE was anxious for the JS41 crew to contact the Humberside ATC with only some 10nm to run to their destination.

The JS41 pilot had spotted the small black jet some 5nm away and seemed somewhat surprised that its pilot was not taking “standard avoiding action” against his airliner. The Board took this to mean in accordance with the ‘Rules of the Air’, but these ‘Rules’ can only be complied with if the other pilot has seen your ac and clearly there was a duty on both crews to ‘see and avoid’ each others’ ac in the Open FIR environment of Class G airspace. Here the JS41 pilot was wise to turn L when he did and this Airprox illustrates well the adage that pilots should ‘never assume’ that their ac has been spotted by the pilots of conflicting ac. As it was the airliner had been seen but not until a little later than the JS41 crew, so better to take a small turn yourself at range to ensure separation, rather than ‘stand-on’ in the hope that you have been spotted and have to take aggressive avoiding action yourself at close quarters. Nevertheless, there was a duty on the part of the Hawk crew to remain clear of the JS41 when they turned towards it, but without the benefit of any traffic information from the CRC controller they did not do so until the Hawk instructor saw it himself in his 2-3 o’clock some 2nm away. This accords generally both with the radar recording, which shows that the Hawk descended about 400ft after the westerly turn, and in line with the pilot’s report where he states he initiated a gentle descent to increase the vertical separation. As it was he achieved some 800ft vertical separation, but crossed a lot closer than he assessed, at 0.8nm ahead of the JS41 with the latter then passing 0.5nm behind the Hawk. (Not 1 -

AIRPROX REPORT No 32/04

2nm as the Hawk QPNI thought and greater than the JS41 pilots perceived minimum separation of 100m ahead of his ac and some 500ft below it). In the Board's view the RAS provided here had been effective until this final encounter and the JS41 pilot had been wise to heed the advice in the AIP and avail himself of this radar service. Whilst in transit ZONE had managed to afford appropriate separation against the Hawk until it unexpectedly turned toward the JS41, whereupon the slightly abbreviated traffic information had allowed them to sight the jet. As it was, both pilots had then taken positive and appropriate action, leading the Board to conclude unanimously that this Airprox was a sighting report of traffic in Class G airspace proceeding about its legitimate occasions, where ultimately no risk of a collision had existed.

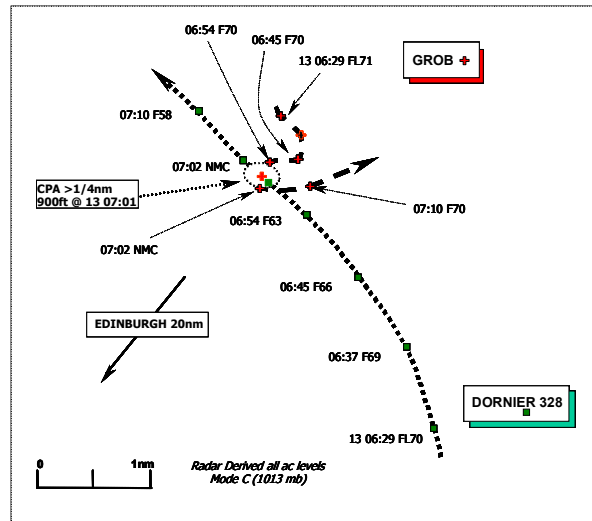
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 033/04

Date/Time: 30 Mar 1305
Position: 5616N 00248W
 (8nm S Leuchars)
Airspace: Scottish FIR (Class: G)
Reporting Ac Reported Ac
Type: Dornier Do328 Grob Tutor
Operator: CAT HQ PTC
Alt/FL: FL70 FL70
Weather VMC HAZE VMC CAVOK
Visibility: 10km <10km
Reported Separation:
 300ft H 200ft V 0.5nm H 500ft V
Recorded Separation:
 < ¼nm H 900ft V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE DORNIER Do328 PILOT reports flying a scheduled passenger flight from London City to Dundee squawking as directed with mode C and receiving a Radar Control service (he thought) from Edinburgh Radar. While turning L through 350° at 250kt and FL70 they saw a contact on TCAS at 8nm display as “Other” then “Proximate” so he asked Edinburgh for information on the traffic. The contact then changed to a TA then an RA; he became visual and identified it as a Grob Tutor co-incident with RA activation. They made an immediate avoiding action descent and the traffic then went into an aerobatic manoeuvre (a L roll through 90°) at this point it went out of visual contact in the overhead. He assessed the risk as being high.

THE GROB TUTOR PILOT reports flying an instructional sortie in a white ac with HISLs selected on with a student on a local sortie from RAF Leuchars and in receipt of a FIS from them. They were conducting a spinning exercise and on reaching the end of a pre spin lookout turn the ac was rolled wings level and a Dornier was seen approx 2nm to the SSW. At the same time Leuchars radar passed him TI on the ac. A further turn was commenced to maintain visual contact and it passed 500-1000ft below on a northerly track.

THE GROB STATION COMMENTS reports that this incident serves to highlight the essential nature of good lookout checks prior to aerobatic or spinning manoeuvres. In this case visual acquisition of the Dornier meant that the risk of collision was low.

THE EDINBURGH CONTROLLER reports the Dornier was Northbound flying into conflict with unknown traffic over Fife and it was placed on a Radar heading of 015° in order to transit E of Edinburgh and Northbound for Dundee. The pilot was asked for a report approaching FL70 in the descent. Following a fairly complex traffic situation he relaxed and became distracted during the following lull in traffic. His attention was then returned to the situation when the pilot requested ‘own navigation’ to Dundee. At this point he realised that he was outside CAS with unknown traffic some 5 miles ahead of him indicating a similar level with an apparent Easterly track. He turned the Dornier L onto a heading of 270° and immediately called Leuchars ATC on the landline in an attempt to co-ordinate the traffic. The unknown traffic was then observed to make a right turn back towards the Dornier at which stage he immediately descended it to 5000ft on the QNH. The pilot reported a TCAS TA and then that he had the traffic in sight. Further co-ordination with Leuchars was fruitless and he suggested the Dornier transfer direct to Dundee ATC.

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ATSI reports that the incident occurred just after the controller's workload had decreased from moderate to light and he had been at position for approximately 20min. In that time he had been busy vectoring five Edinburgh inbounds and working two VFR ac. Another controller was available if it was necessary to split the Approach position.

Prior to the Dornier pilot establishing communication with Edinburgh Approach (APR), the controller had requested that the Aerodrome Controller check all N and S departures. The request was in respect of the expected arrival of the Dornier from the S, which might conflict. When the ac made its initial call the pilot reported heading 005° and descending to FL70. In accordance with the APR Controller's plan, to route the flight to the E of Edinburgh, clear of the outbound tracks, he instructed the flight to turn R heading 025° and to *"report approaching flight level seven zero in descent"*. The pilot read back the heading instruction correctly and also the request for the level information, although no such call was ever received (the ac reached FL70 at 1303:51). At 1300, the Dornier pilot was instructed to turn L heading 015°, a tactical adjustment towards Dundee.

The next call received from the Dornier pilot was timed at 1305:45, about 5min after it was instructed to turn L heading 015°. The pilot requested a routeing direct to the Dundee NDB (DND). The APR Controller admitted that, in the meantime, he had not been monitoring the progress of the flight as he had intended, this despite cancelling the appropriate departure check with the ADC Controller some 3min minutes earlier. When the pilot requested its direct routeing to the DND, the radar recording reveals that it was outside CAS by approximately 8nm. MATS Part 1, Section 1, Chapter 5, Page 2, states that: *"Pilots must be advised if a radar service commences, terminates or changes when: a) they are operating outside controlled airspace; or b) they cross the boundary of controlled airspace."* The controller said that his intention had been to provide the pilot with a RAS, once it had left CAS. He stated that as soon as the pilot made the request to route to DND, he noticed that there was an ac, displaying a Leuchars allocated squawk, also at FL70, in his 12 o'clock about 6nm away, tracking E. He instructed the Dornier pilot to turn L heading 270°, judging that this would route him away from the other traffic. He telephoned Leuchars to inform them of his traffic and was advised the ac was operating under a FIS from that unit. Realising that a horizontal solution would not resolve the conflict, as the other traffic was now manoeuvring and no longer tracking E, he instructed the Dornier pilot to descend to an altitude of 5000ft to which he responded that he was descending and visual with the traffic. Radar recordings show that, at 1306:27, the subject ac were 3.4nm apart, with the Dornier having started its L turn. The ac commenced a descent and was passing FL66 at 1306:45. Subsequently, the radar returns of the ac merge, at which point the Dornier was passing FL63, with the Grob still at FL70. The controller agreed that, with hindsight, he should have used the term 'avoiding action' when issuing avoidance instructions to the Dornier. In the first instance he believed that the situation would be resolved without the need for the term as the Grob was tracking E and the Dornier pilot was given a turn onto W. It was only when the Grob manoeuvred that he realised that the turn would not be sufficient to resolve the conflict. Further telephone calls were made to Leuchars, whereupon it was reported that their ac was on a GH handling flight and subsequently, it was agreed that, as the flights were no longer in conflict, the Dornier would be transferred direct to Dundee ATC.

The Edinburgh APR Controller explained that he had allowed himself to be distracted following a period of moderate workload. As the position had become quieter he had entered into conversation with colleagues seated alongside him, to the detriment of monitoring the progress of the Dornier. He could not explain why he had allowed himself to be distracted in this way, or why, on cancelling the departure check with the ADC Controller, he had not been reminded of the Dornier's presence and the necessity to monitor its progress and to pass details of the flight to Leuchars. The Edinburgh MATS Part 2, Page 4-26, states the procedures for co-ordination with Leuchars. For Dundee arrivals via TALLA (the Dornier), *"APC will co-ordinate a clearance limit and level including present SSR code. A radar handover will be given when outside CAS and clear of Edinburgh traffic, change SSR code if requested"*. The APR Controller commented that, rather than making one telephone call to Leuchars to pass the details of a Dundee inbound and another to arrange a radar handover, he usually combined them. He reasoned that not only would that reduce workload for both units but also the flight details would be more

up to date as radar derived information would be used rather than estimates. He added that, had he made the initial call on this occasion, it is possible that it would have alerted him to the need to monitor the Dornier's progress to comply with any level allocated by Leuchars. Since this incident, he now makes two separate telephone calls.

The Edinburgh APR Controller allowed himself to be distracted from the task of monitoring the flight path of the Dornier that was en route to Dundee. Consequently, no co-ordination took place with Leuchars, as required in MATS Part 2, and the ac left CAS without being informed. Notwithstanding that the incident took place in Class G airspace, given it was the intention to provide a RAS, it is considered that it was incumbent on the APR Controller to monitor the flight's progress and to take early action to resolve the conflict between the subject ac.

UKAB Note (1): The recording of the Great Dun Fell Radar shows the incident. The CPA occurs between radar sweeps with the tracks crossing at right angles about 8nm to the S of Leuchars. The horizontal separation between the ac cannot be determined accurately but extrapolation of the tracks would indicate that it is probably just under ¼nm. On the sweep before (~5sec) the CPA the ac were separated by 700ft vertically and this was increasing at about 200ft per sweep (8sec). However the Mode C drops out for both ac on the sweep after the CPA so, although again it cannot be determined accurately, a simple calculation would indicate that it is likely that it was of the order of 900ft.

HQ PTC comments that it seems that the Tutor pilots' pre-spin clearing turn did exactly what it was intended to achieve and that they were able to see the Dornier in sufficient time to deem that no avoiding action was necessary.

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.

Specialist ATC members considered that this had been a serious lapse of attention by the APR controller. It had been his intention to provide a RAS when the Dornier left CAS and he should have given avoiding action allowing it to pass clear of the Grob. It was not possible from the information available to ascertain why the controller allowed himself to be come distracted to the extent that he overlooked the Dornier for a period of several minutes during a period of light workload. Fortunately the other safety nets were sufficient to prevent this from being a more serious incident.

Members considered this to be an excellent example of why a meticulous clearing turn is essential prior to any ac engaging in rapid and or unpredictable manoeuvring. During this turn the Grob pilot saw the approaching Dornier and afforded it reasonable separation considering that both ac were operating 'see and avoid' in Class G airspace.

The Dornier's TCAS also performed as intended, the pilot following the command and informing the controller of his avoiding action in accordance with published guidance. In addition, he was visual with the Grob soon after the TA activated. The Board considered that in many respects, despite the lack of positive control by Edinburgh APR, these other safeguards ensured good separation between the ac, well over the minimum that is prescribed even for ac flying in IFR/IMC in the open FIR.

PART C: ASSESSMENT OF CAUSE AND RISK

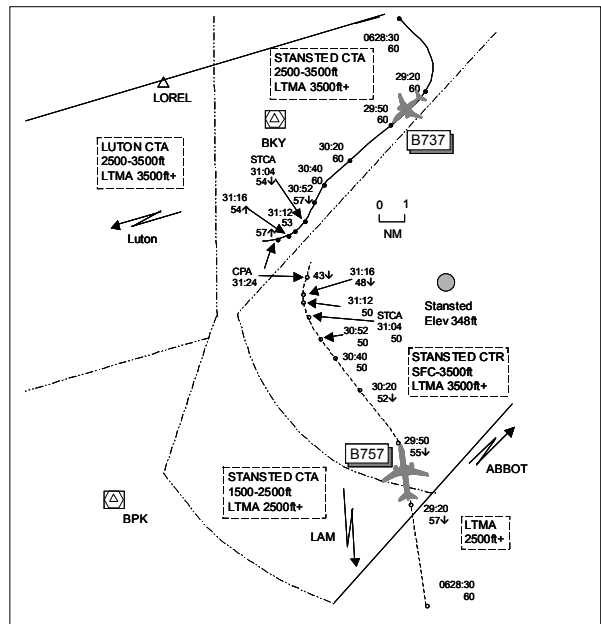
Cause: The Edinburgh APR Controller allowed the Dornier to leave CAS on an assigned heading, which took it into conflict with the Grob.

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Degree of Risk: C.

AIRPROX REPORT NO 034/04

Date/Time: 31 Mar 0631
Position: 5153N 0005E
 (6nm W Stansted - elev 348ft)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: B757 B737-300
Operator: CAT CAT
Alt/FL: 5000ft ↓3000ft
 (QNH 1008mb) (QNH)
Weather VMC CLNC VMC CLOC
Visibility: 20nm NR
Reported Separation:
 NR 700ft V 1.5nm H
Recorded Separation:
 600ft V 2.25nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports inbound to Luton at 250kt and 5000ft QNH 1008mb heading 330° following radar vectors from Essex RADAR; the FO was the PF. After ATC told him to turn on to heading 030° (away from Luton), TCAS gave a TA alert on crossing traffic (R to L), which appeared in front (he was unsure of the range) indicating 600ft above but descending. ATC then told him to “turn right 070° avoiding action” which co-incided with TCAS giving an RA ‘descend’ and the FO briefly seeing the other ac. The Capt took control, disengaged the A/P and followed the RA guidance, descending to 4200ft; ATC were informed of the TCAS manoeuvre, who later advised that they would be filing a report. At no time had the crew heard the other ac on the frequency.

THE B737 PILOT reports inbound to Stansted at 220kt heading 210° descending from 6000ft to 3000ft following radar vectors to RW05 from London on 126.95MHz. On descending through 3700ft, he thought, TCAS gave a TA alert on traffic showing in his 10 o’clock position. Very quickly TCAS gave an RA ‘climb’ simultaneously as ATC told him to “turn right heading 270°” followed by an urgent instruction to “turn hard right to avoid”, eventually being given heading 310°. The TCAS guidance was followed until ‘clear of conflict’ was received and ATC were informed of the TCAS manoeuvre. The other ac was not seen visually but TCAS indicated that it passed 1.5nm clear to his L 700ft below.

THE STANSTED FINAL DIRECTOR (FIN DIR) reports that the Intermediate Director (INT DIR) advised him that the B757 was routing to BKY from the S at 6000ft. He told the INT DIR that “6000ft is not a good place to be” so the INT DIR said that he would try and organise something else instead. The B737 crew called him at 6000ft LH downwind for RW05 by which time the B757 was at 5000ft heading 330° just to the S of airway R123. He instructed the TOWER controller to check before releasing westbound departures owing to the B757’s altitude. After overhearing coordination between the INT DIR and Luton concerning the B757 RH downwind for Luton RW08, he descended the B737 to 3000ft and turned it L heading 210°, planning to route it behind the B757 on the assumption that it was turning further L. However, he quickly realised that standard separation would not be achieved so he alerted the INT DIR and gave avoiding action instructions to the B737 crew.

UKAB Note (1): The Stansted METAR shows EGSS 0620Z 08008KT 2800 BR FEW230 05/04 Q1008=

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ATSI reports that at the time of the incident, the B757 was under the control of the Essex Radar Controller and the B737 was working the Stansted FIN DIR. The Essex Radar Controller described his workload level as medium-high, with the associated traffic loading as low-medium. The FIN DIR reported his workload/traffic loading as low-medium. The latter also commented that, in his opinion, a contributory factor to this Airprox was his lack of recent time performing Stansted duties. He stated that he had been rostered for Luton Approach increasingly often and, consequently, had not performed the Stansted task as much and felt he was 'losing the edge'.

The Essex Radar Controller received a telephone call from the TC NE position, at 0626, offering an inbound release on the B757, which was on a positioning flight from Gatwick to Luton. The ac was identified to Essex Radar, S of LAM, together with information that it was: *"Cruising at six thousand feet we're gonna give to you on a heading towards LOREL at six thousand feet and you can do what you want with him"*. The Essex Radar Controller commented that he had never experienced such flights on that routeing at 6000ft. The LTCC MATS Part 2, Page NEA-10, states, relative to Stansted, Cambridge and Luton positioning flights from Gatwick, that: *'This traffic will follow the ABBOT 1E arrival, routeing: DET – ABBOT'*. (The position of ABBOT is approximately 16nm NE of Stansted i.e. almost due N of Detling.) He said that he realised straight away that 6000ft was not an acceptable altitude at LOREL. He explained that, as Stansted's RW in use was 05, this would have created an immediate confliction with Stansted inbounds descending to 6000ft in that area, on a LH downwind track for that RW. The Essex Radar Controller said that he reluctantly accepted the B757 routeing to LOREL at 5000ft as this, at least initially, provided vertical separation from the Stansted inbounds. He immediately passed information on the release to the Stansted FIN DIR, who, in turn, requested the ADC to check before releasing any westbound departures.

The B757 established communication with Essex Radar, at 0629:20, reporting passing 5700ft descending to 5000ft on a radar heading of 360°. The flight was instructed to turn L heading 330°. Shortly afterwards, the B737, which was inbound to Stansted from the W, under the control of Essex Radar, was transferred to the Stansted FIN DIR, in accordance with the relevant procedures for ac inbound RW05 i.e. by silent handover, descending to 6000ft, to the N of the airport. The Essex Radar Controller explained that his plan was, following co-ordination with Luton Approach, to position the B757 downwind RH for RW08 at 5000ft. He reasoned that this would ensure separation from Stansted inbounds, which would be expected to be level at 3000ft to the W of Stansted, i.e. clear of the planned track of the B757. Accordingly, he turned to the Luton APR, who was situated to his right, to co-ordinate this plan. However, the Luton APR was unable to accept this routeing due to a departure, just airborne, turning R on a Compton SID climbing to 5000ft.

The Stansted FIN DIR said that he had overheard his colleague initiate the co-ordination with Luton, adding that he would probably have taken the same course of action had he been in a similar position. Admitting that he was never informed that co-ordination had been agreed, he made the erroneous assumption that it had been carried out successfully. Accordingly, at 0630:20, he instructed the B737 to turn L heading 210°, planning to route behind the B757, and to descend to 3000ft. Meanwhile, the Essex Radar Controller, realising that he was running out of options, devised another plan, which was to route the B757 behind the B737. He instructed the B757 to turn R heading 030°, at 0630:40, but at the time did not realise that the FIN DIR had just turned and descended the B737. Before he could communicate the new plan to his colleague, it became apparent to both controllers that the subject ac were turning towards each other. Virtually simultaneously, both controllers issued avoiding action to their respective flights, although not using the 'correct phraseology'. The B757 was instructed to turn R heading 070° and information was passed on traffic to the N, descending to 5000ft. The pilot acknowledged the turn but because the controller believed that the transmission had been interrupted by the pilot, the TI was repeated. The pilot reported visual with the traffic and descending in reaction to a TCAS alert. The B737 was instructed to turn R heading 270°, without use of the term avoiding action. The controller believed that if the pilot reacted straight away the term was not necessary. However, once the pilot responded with an incorrect heading i.e. 230°, the term was added to the instruction to turn

“hard right”. This was updated with a further instruction to turn R heading 310°, whereupon the pilot reported a TCAS climb.

[UKAB Note (2): The radar recording shows that, at the time that the avoiding action turns were issued just after 0630:50, the B757 at 5000ft was 5.3nm S of the B737, which was descending through 5700ft].

It is not apparent that the B757 has commenced its turn from heading 330° onto 030°. STCA activated at 0631:04, showing a high severity alert. Minimum vertical separation was recorded as 2.7nm horizontal and 300ft vertical, at 0631:12. Thereafter, the turns issued to the two ac, together with their respective TCAS resolutions, begin to take effect.

[UKAB Note (3): By 0631:16, the B757 is seen descending through 4800ft 2.25nm S of the B737 climbing through 5400ft. By the time the ac reached the CPA of 1.8nm, at 0631:24, vertical separation had increased to 1400ft].

The Essex Radar Controller mentioned that just prior to the incident, he was in the process of handing the position over to a trainee and mentor. He could not recollect when the oncoming controllers plugged in but he did remember being concerned as to how he would be able to hand over a rather complex traffic situation. It is not certain whether this affected the handling of the incident but it was certainly an extra complication at a busy 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 authorities.

ATCO members informed their colleagues on the Board that although this appeared to be a complex situation, non-standard arrivals, such as the B757 on a positioning flight, was not unusual. This tactical routing was used to expedite the traffic flow and when the B757 was offered by TC NE to the Essex controller, there would have been an expectancy by all parties that the flight into Luton would be positioned successfully, particularly at that time of day. The Essex controller had reluctantly accepted the B757 at 5000ft and had then told the Stansted FIN DIR of its presence before transferring the B737 to him at 6000ft. Crucially, the ensuing coordination between the Essex controller and the Luton APR, to position the B757 downwind RH for RW08 at Luton, was unsuccessful, owing to a conflicting Luton departure. The Stansted FIN DIR, after overhearing this ‘third party’ discussion, had erroneously assumed that coordination had been agreed and descended the B737 into conflict which had caused the Airprox. A salutary lesson for all to be learnt from this incident is the old adage ‘never assume, check’.

The Essex controller had then revised his plan by turning the B757 R onto 030°. Shortly thereafter, both the Essex and FIN DIR controllers realised the deteriorating situation and gave avoiding action turns to their respective flights, prior to STCA activating. Meanwhile, after being instructed to turn onto 030°, the B757 crew had received a TA alert on the crossing B737 which was followed simultaneously with a further ‘avoiding action’ ATC turn onto 070° and an RA ‘descend’ command. The B757 FO had briefly seen the B737 whilst the Capt flew the ac, following the TCAS guidance. Similarly, the B737 crew had been given the ‘heads-up’ by a TA alert which quickly became an RA ‘climb’ at the same time as the FIN DIR gave an avoiding action R turn onto 270°. Although singularly untidy, each of these ‘recovery’ elements when combined had very quickly taken the ‘sting’ out of the conflict, with the radar recording revealing a rapid positive resolution. This outcome 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: The Stansted FIN DIR erroneously assumed that the B757 would be positioned RH downwind for Luton and descended the B737 into conflict.

Degree of Risk: C.

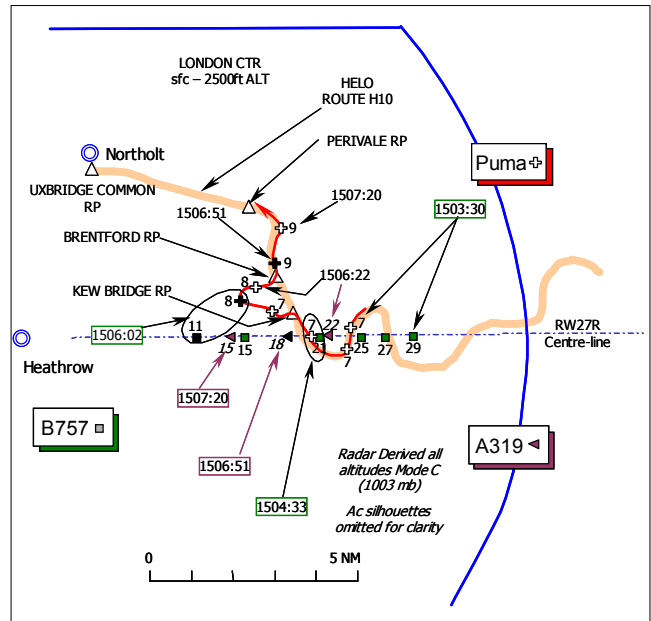
AIRPROX REPORT NO 035/04**Date/Time:** 21 Mar 1506 (Sunday)**Position:** 5128N 00017W (6½nm Final App
Heathrow RW27R - TDZE 78ft)**Airspace:** Heathrow (Class: A)
CTR**Reporter:** London Heathrow TOWER**First Ac** **Second Ac** **Third Ac****Type:** B757-200 A319 Puma**Operator:** CAT CAT HQ JHC**Alt/FL:** NR NR 1200ft
(NR) (NR) (1003mb)**Weather** NR NR VMC NR**Visibility:** NR NR NR**Reported Separation:**

Not seen Not seen Not seen

Recorded Separation:

B757: 1.4nm H/300ft V at 1506:02

A319: 2.1nm H/900ft V at 1506:51

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE LONDON HEATHROW TOWER RW27R ARRIVALS CONTROLLER reports that the SUPERVISOR informed him of a helicopter that had deviated from his route. Looking back to the Aerodrome Traffic Monitor (ATM) he observed an A7037 Squawk – the Puma helicopter and passed traffic information to the A319, which was on the approach. At this point the Puma was about 2nm N of the A319: no avoiding action was given. He had not received a telephone call from the Heathrow SPECIAL VFR (SVFR) CONTROLLER about this helicopter, but when SVFR was called, he was told that the PUMA crew had misrouted, but it was now back on the London Helicopter route H10.

THE LTCC THAMES RADAR CONTROLLER reports that the Puma was inbound to Northolt via Helicopter Route H10, but the helicopter appeared to deviate 'off route' after passing KEW BRIDGE Reporting Point (RP). As soon as he saw this he instructed the crew to make an immediate R turn to rejoin the route at BRENTFORD RP. Heathrow were landing on RW27R, so separation was lost as soon as the Puma left the route astern of the B757 that was landing at Heathrow.

[UKAB Note (1): The B757 Fleet manager mentioned that the B757-200 crew had seen "some traffic on TCAS" but without any height indication. The same company's Airbus A319 crew could not recall any detail of the occurrence to assist with the investigation of this Airprox. Neither crew reported sighting the helicopter visually, consequently neither the B757 crew, nor the A319 crew filed reports.]

THE PUMA HC1 crew reports that the helicopter has a green camouflage scheme, but the HISL was on whilst inbound to Northolt [Special VFR] at 90kt, in receipt of a RCS from Thames RADAR on 132.7MHz. The assigned squawk was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

Flying at 1200ft ALT, he thought, London QNH (1003mb), he was in a level R turn through 315° at the BRENTFORD RP when the Airprox was reported to have occurred. However, the other ac were not seen, consequently, he was unable to assess the minimum separation that pertained or the risk.

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ATSI reports that the Puma crew had been cleared to follow Helicopter Routes H4 and H10 westbound toward their destination of Northolt, flying at Standard Operating Altitudes. The route appears to have been accurately flown until the Puma crew reached KEW BRIDGE RP, where, instead of following H10 northwards towards BRENTFORD RP, the helicopter left the route, taking up a westerly track. Traffic following H10 and complying with Standard Operating Altitudes is separated from Heathrow traffic, but the deviation resulted in the Puma paralleling the final approach track (FAT) to Heathrow's RW27R, about 0.7nm to the N of the FAT, resulting in a loss of separation with 2 flights - firstly the B757 - then the A319 - both inbound in turn on the ILS to RW27R. However, there was never any actual risk of collision and, within a minute of the Puma deviating from H10, the controller became aware of it and instructed the flight to turn R, immediately, back to Brentford to regain the route.

The B757 had passed overhead the Puma, vertically separated by 1400ft, as the latter passed through the RW27R centreline, approaching KEW BRIDGE at 1504:33. The B757 quickly pulled ahead of the helicopter but, as it descended on the ILS, vertical separation was eroded. Minimum separation against the B757 of 1.4nm and 300ft, occurred at 1506:02, just before the Puma crew turned sharp R indicating 800ft ALT (1003mb) in response to the controller's instruction. However, by that stage, the helicopter was in the B757's 4:30 position, with the latter indicating 1100ft ALT.

Meanwhile, the A319 was descending on the ILS, approximately 4nm behind the B757. As the Puma crew regained H10, just N of BRENTFORD, and took up a northerly track: the A319 passed astern through the helicopter's 6 o'clock at a range of 2.1nm with 900ft separation at 1506:51. (At that point, the A319's Mode C indicated 1800ft and the Puma's 900ft. Helicopters flying along H10 are required to fly at 750ft between KEW BRIDGE and PERIVALE GOLF COURSE in order to ensure adequate terrain clearance and separation from traffic approaching RW27R at Heathrow, in accordance with the UK AIP at AD 2-EGLL-1-25, para. 15 b iii.

In the Heathrow VCR, the SUPERVISOR noted the traffic deviating from H10 and alerted the ARRIVALS controller to the situation. By that stage, the B757 had already passed the Puma and was pulling ahead, so there was little that could be done in respect of that loss of separation, however, traffic information was issued to the crew of the A319, "*... a helicopter in your two o'clock approximately two miles at nine hundred feet*". The A319 pilot acknowledged the traffic information but did not sound unduly concerned and no further reference was made to the incident on RT.

There are no ATC causal factors readily apparent within this Airprox.

THE PUMA HC1 PILOT'S STATION comments that the crew report was submitted by the Station Flight Safety Officer based on the Puma navigator's verbal account as the pilot involved in this Airprox was deployed on Operations. At no stage did the Puma crew see another ac in the vicinity of the BRENTFORD RP.

HQ JHC comments that this Airprox occurred in an area of intense traffic density, where there are strict rules regarding helicopter operations. Pilots are required to comply with these rules meticulously. This Airprox appears to have been caused by the Puma crew's temporary deviation from the required track, although the Puma crew did not see the other ac, which, at the closest, came within 1.4nm of the Puma. Following this incident, all JHC aircrew were reminded of the importance of strictly adhering to the proscribed London Helicopter Routes.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report only from the Puma crew, 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 JHC member explained that military helicopters used these routes regularly and deviations from the prescribed routing were clearly unacceptable. It was plain that here a navigational error had resulted in this erosion of separation against the two airliners, which had not been seen by the helicopter crew. The Board was briefed that the Command had used this Airprox to highlight to their crews the difficulties associated with flight on these routes, which require exacting navigation, a flight safety poster had been produced and circulated widely that emphasised the necessity of strict adherence to the promulgated routings. A civilian ATCO member also emphasised the importance of accurate navigation here as separation from traffic inbound to Heathrow can only be maintained by crews' strict observance with the promulgated routes and stipulated altitudes. Whereas navigation may be relatively straightforward when following the line of the River Thames or a motorway, it is all too easy to go astray if significant turning points are missed by the unwary against the dense urban backdrop. A civilian helicopter pilot member familiar with these routes endorsed this view and others emphasised the difficulty of establishing the exact route just where the Puma crew had apparently gone astray at KEW BRIDGE and had set off westbound in error. Fortunately, it was evident from the radar recording that the deviation was short and did not encroach significantly S toward the RW27R centreline, as the helicopter remained to the N of the FAT. Nevertheless, it was fortunate that both the B757 and the A319 were flying the approach very accurately. Whilst the Puma crew's recollection was clearly wrong when reporting that they had been flying at 1200ft ALT at the time, it was apparent that they had flown about 150ft above the route altitude of 750ft in places and ATCO members emphasised the dangers of exceeding specified altitudes, adding that wake vortices from passing inbound traffic on the FAT above the route brings another invisible danger. The closest the helicopter approached to the first of the two other ac – the B757 – was some 1.4nm NE of the airliner and 300ft below it after it had passed and was continuing its westerly approach. By that stage the helicopter crew had apparently realised their mistake as they were already turning R back toward their route. Similarly the second jet – the A319 – was well astern as it passed 2.1nm to the S and 900ft above the Puma some 50sec later. The members understood why both airliners' crews would not have paid much attention to the helicopter during the approach – even if they had spotted it which was unlikely – and clearly the helicopter crew would have been unlikely to spot either of the jets when they were well astern. Moreover, neither of the airliners were unlikely to have strayed off the FAT at anywhere near the Puma's maximum altitude of 900ft. Whilst not intending to diminish in any way the seriousness of this occurrence, in the event members agreed this was not a risk bearing, close quarters situation. The Board concluded unanimously that the fundamental cause of this Airprox was a loss of separation resulting from the Puma crew deviating from Helicopter Route H10, but in these circumstances no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

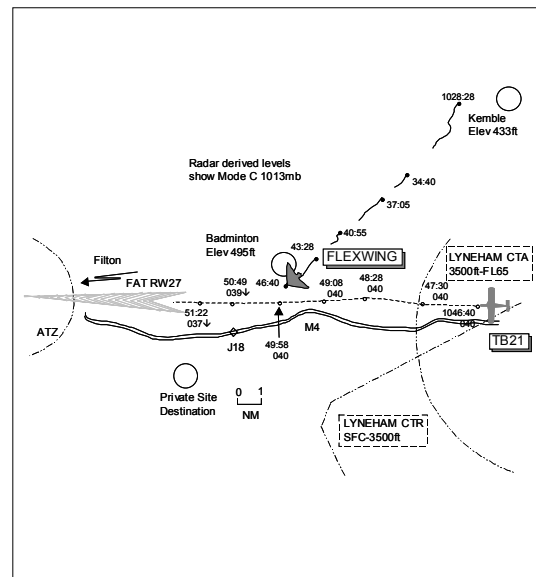
Cause: Loss of separation resulting from the Puma crew deviating from Helicopter Route H10.

Degree of Risk: C.

AIRPROX REPORT No 036/04

AIRPROX REPORT NO 036/04

Date/Time: 2 Apr 1050
Position: 5132N 00217W (9nm E of Filton)
Airspace: FIR (Class: G)
Reporting Ac Reported Ac
Type: TB21 Pegasus Quantum
Flexwing M/Light
Operator: Civ Trg Civ Pte
Alt/FL: 3500ft↓ 4000ft
(QNH) (RPS)
Weather IMC IICL VMC CLAC
Visibility: >10nm
Reported Separation:
100ft V 400yd H not seen
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TB21 PILOT reports heading about 250° at 170kt and FL40, inbound to Filton, IFR on a dual training flight and squawking an assigned code with Mode C. During handover from Lyneham to Filton for an ILS approach under a RIS, he was both advised by Lyneham ATC and alerted by TCAS of traffic ahead 'height unknown' which, although intermittently IMC between cumulus clouds, he spotted below (not the reported ac), through a break in the clouds, and which was no problem. After handover and descending through 3500ft QNH, he thought, he momentarily popped out from the side of a cloud to see a Flexwing Microlight, possibly a Pegasus Quantum type, with a yellow coloured pod and yellow/white wing, in his 1130 position 0.5nm ahead crossing R to L about 100ft above and in level flight: owing to his speed, it appeared to remain stationary. With the shock of seeing it after exiting cloud, his avoiding action taken - shutting the throttle and pitching down - was made too late to make any real difference, apart from slightly increasing his ROD. Seconds later he re-entered cloud as he passed 400yd behind and still about 100ft below the M/light. When he exited cloud once more, he looked over his L shoulder and caught a further glimpse of the Flexwing which by now was way behind and at least 1000ft higher owing to his continued descent. He told the Filton APR who advised him that nothing was showing on radar and he assessed the risk of collision as 'real'. He opined that pilots should be made aware of the consequences of not talking to the appropriate ATSU when crossing a promulgated approach path.

THE PEGASUS QUANTUM FLEXWING M/LIGHT PILOT reports that he was unaware of any Airprox involvement until being contacted by AIS (Mil) following tracing action over 5 weeks post incident. During the flight he did not recall seeing any other ac. The M/light's 'pod' was coloured yellow and the wing was white/yellow with a blue leading edge. He had departed Kemble at 1024 for a private site 8nm SE Filton and had initially been in receipt of a FIS from Kemble INFORMATION on 118.9MHz. After leaving the ATZ he had changed frequency and had either listened out with Lyneham or on the BMAA discrete frequency. Conditions at the time were slightly thermic so he had climbed through well broken fair weather cumulus into smooth air at 4000ft on the Cotswold RPS, he thought, where the visibility was >10nm, 500ft above cloud. After tracking SW over the Badminton estate at 50kt he had turned S just W of Junction 18 on the M4 towards his destination. Owing to his unfamiliarity with the destination landing strip, he had been concentrating on spotting it at this point which was where he had been told the Airprox occurred ie crossing the extended FAT of Filton RW27. With his high wing configuration, he was aware of this ac's blind spots above the wing but thought he should have seen another ac if he had got as close as reported by the other pilot. He had been told the other ac had a low wing configuration

and it had been descending which could have meant each ac had been in each other's blind spots. Retrospectively, he thought he should have spoken to Filton as he was within 10nm of the aerodrome. In summary, he had learnt a) to keep a good lookout and not concentrate too much on ground features and b) to use the radio more especially when flying towards aerodrome final approaches.

UKAB Note (1): The Airprox was reported by the TB21 pilot to the UKAB within 1hr of the incident occurring but the completed CA1094 was not received however until over 4 months later. Mil ATC Ops were only informed of Lyneham ATC involvement after AIS (Mil) tracing action 6 weeks post incident.

UKAB Note (2): Met Office archive data shows the Cotswold RPS 1000-1100Z as 1001mb and the Filton METAR as EGTG 1120Z 17015KT 9999 SCT025 13/04 Q1005=

UKAB Note (3): Analysis of the Cleve Hill radar recording proved inconclusive, as the Airprox is not seen. An intermittent primary only response, believed to be the Pegasus Quantum M/light, is seen leaving the Kemble area at 1028 on a nominal track of 225° before fading completely from radar 1nm S of Badminton at 1046:40. Fifty seconds later (1047:30), the TB21 leaves the Lyneham CTA 6nm WNW of Lyneham tracking 275° squawking 4522 (Lyneham code) at FL40. At 1048:28 the TB21 turns onto a track of 270° followed 40sec later with the squawk code changing to 4251 (Filton code) indicating FL40. On this track the TB21 passes 2nm S of Badminton on the extended FAT to Filton RW27 before commencing descent 1nm N of J18 on the M4. The TB21 descends through 3500ft QNH 1005mb, approx FL37, the level reported by its pilot when the Airprox occurred, at 1052:23 7.5nm E of Filton.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

Members discussed the 'crossing' of the Filton FAT by the Flexwing pilot, which had been about 9nm to the E of Filton. Some thought that flying at 4000ft, the M/light had been well above the instrument approach profile and clear of the procedural approach pattern; the TB21 had effectively joined from a long straight-in approach. Although advisable and good airmanship, there is no requirement for pilots to call the appropriate ATSU when crossing a promulgated approach path, such paths being afforded no protection in Class G airspace. Although the Flexwing was not showing on radar at the time, an RT call from its pilot would have alerted the APR to his presence. Ultimately this had been an encounter in the FIR where 'see and avoid' pertained with an equal onus on both pilots. The Flexwing pilot had not seen the TB21, although the opportunity had been there, but it was made more difficult as it had approached from his rear L quarter and passed behind and below. However, this non-sighting element had been a part cause of the Airprox. The TB21 pilot had seen the M/light at the earliest possible opportunity, albeit late, after he had exited cloud. This had been the second part cause of the Airprox.

With only the TB21 pilot observing the incident, the Board could only assess the risk on this limited information. Undoubtedly the TB21 pilot had been surprised to see the subject M/light, as he exited cloud, in his 1130 position range 0.5nm crossing R to L 100ft above, their flight paths having already crossed with the M/light slowly diverging away to the L. He had instinctively tried to increase the separation distance but thought that his actions had had little effect, passing 400yd behind and still about 100ft below it, just before he re-entered cloud. This led the Board to agree that there had been no actual risk of collision but the safety of both ac had been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Flexwing pilot and a late sighting by the TB21 pilot.

Degree of Risk: B.

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Date/Time: 2 Apr 0858

Position: 5110N 00143W (2 nm final RW23
Boscombe - elev 407 ft)

Airspace: Boscombe MATZ (Class: G)

Reporting Ac Reported Ac

Type: Lynx MK7 Harrier

Operator: DPA DPA

Alt/FL: 450ft NR

(QFE 991 mb)

Weather VMC VMC

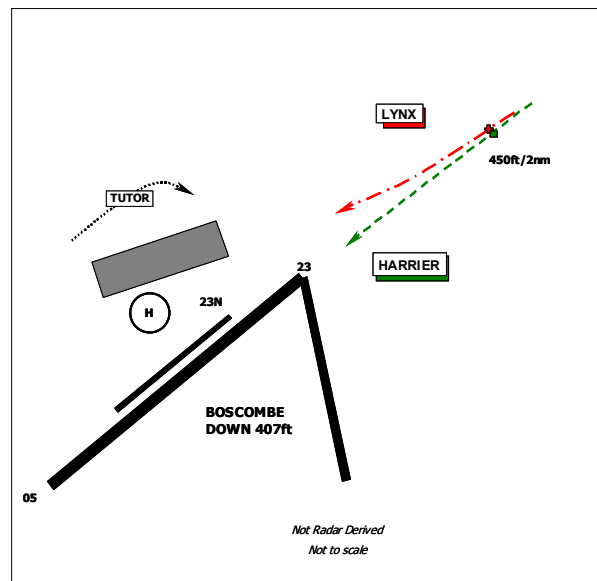
Visibility: >10km >10km

Reported Separation:

150ft H 0V NR

Recorded Separation:

NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LYNX MK7 PILOT reports flying a Grey/Green Lynx ac on a Test Pilot instructional sortie. While heading 228° at 120kt and passing 450ft (about 2nm) on a PAR approach to Boscombe Down he was instructed to *'break off the approach if visual'*. This call was unexpected, non standard and offered no instruction as to what to do. He therefore instructed the student (an experienced trainee test pilot) to revert to visual flight and they had a brief discussion as to whether they were being overshot, or asked to continue visually (the weather was good). During this discussion and a few seconds after the first call they were instructed to *'break off the approach and continue with tower stud 3, one ahead'*. They assumed that they were expected to continue visually with tower and both looked for the ac ahead. They thought they had sighted it as they saw a Tutor in the northern circuit just turning final, for which surface they did not know since Boscombe operates parallel runways. They allowed the ac to drift right to position behind the one ahead and approach the HLS to the N side of the runways and their attention was focused in the 12 to 2 o'clock position. At this point the student said *'shadow'* and the pilot became aware of the VAAC Harrier in his 9 o'clock descending through their level about 150ft away heading for the main runway (which operates a S circuit). As it had an overtake of 30-40kt and was already abeam when spotted, dramatic avoidance was not required but they simply decelerated and slowed further. Although he assessed the risk as medium/high, once he sighted the other ac there was little risk of collision; had they not interpreted ATC calls as they did, they would have stayed on the centre-line thus reducing the already small gap. Equally had they overshot, as arguably they should have done in the absence of directions, they would have biased this to the S side of the main runway to stay in the safety lane between the ATC building and the runway to give good separation on the N circuit. This would have resulted in their flying straight into the path of the Harrier. In this case the risk of collision would have been high. He opined that it should be restated that radar traffic must have priority over circuit traffic and circuit traffic must assume responsibility for avoiding the radar traffic. He accepts that at Boscombe some circuit traffic does require priority for trials and may be less able to manoeuvre, but on these occasions radar recoveries should not be allowed as, being on a separate frequency, they can have no awareness of visual circuit traffic.

THE HARRIER PILOT provided a very brief report stating that he was flying a trials sortie in the VAAC Harrier using a trials callsign, from the rear experimental cockpit with a safety pilot in the front seat. He was informed by ATC that an Airprox had been filed against him while he was on final approach in the visual circuit. He was told by ATC that after he had called downwind and was informed of radar traffic

at 4nm and that he had priority and was cleared to fly through at 500ft. Neither pilot saw any other ac during the event.

[UKAB Note (1): The incident is not recorded on radar].

SATCO reports that after landing, the pilot of a Lynx helicopter contacted the ATC Supervisor to report that while he was on a PAR approach, an incident had occurred with another ac in the visual circuit. The ADC mentor, ADC trainee, Talkdown controller and the Supervisor, who arrived in the VCR as the incident was occurring, all provided reports. Tape transcripts of the Tower position and frequency, and the Talkdown position and frequency covering the period of the incident were also provided as were extracts from the Boscombe Down Flying Order Book and the ATC Order Book referring to the clearances available for use by the ADC.

The VAAC Harrier is a unique ac that operates from Boscombe Down on trials sorties. The trainee ADC was told by Sqn Ldr Ops that VAAC sorties for the day would have priority over normal radar and circuit traffic. It is not uncommon for ac and sortie priorities to alter on a daily basis dependant on trials requirements. Although the trainee ADC passed this information to the mentor controller, he did not pass it to the morning Supervisor. A fax was received by ATC detailing the VAAC's sortie times, but this did not state that any priority was required. This notification system has since been revised to ensure that priorities are clearly detailed. The first few VAAC circuits were uneventful with the ac conducting standard circuit profiles to fly through at 500ft. Unbeknown to the ADC trainee or screen, the circuit on which the incident occurred required an early deceleration from a slightly wider circuit profile, which meant the ac would be on the approach for a longer period.

The Lynx helicopter, was warned in at 7nm by Director and a brief conversation about VAAC priority ensued and subsequently a standard broadcast was made on the Tower frequency (stud 3), although a different range was passed, believed to be derived from the DFTI. The VAAC called downwind for a fly through just before the Lynx reached the 4nm clearance point. The ADC trainee issued a delayed clearance to the Lynx, put out a broadcast on stud 3 and then informed the VAAC that he was '*number one*', as in his opinion, (reinforced by previous circuits) there was sufficient lateral separation to get the VAAC through and then issue a clearance to the Lynx at 2¼nm. Furthermore, armed with the Boscombe Down specific 'if visual' clearance, both he and his screen were confident there was no need to break off the Lynx. However, this was the first time that the trainee would have made use of the clearance. The VAAC called finals and was cleared for his fly through without a check to confirm that he was visual with the Lynx. At that point the Supervisor arrived in the VCR. At 2¼nm the 'if visual' clearance was used but in the wrong format and before it could be rectified it was passed to the pilot, again using an incorrect format. The incident is believed to have occurred around this time, as the Supervisor was drawing attention to the close proximity of the tracks on the DFTI. The Lynx was transferred to the Tower frequency and was cleared to position for a landing at North Point. After questioning the intentions of the VAAC, the Lynx was cleared to land at North Point from where he contacted Ground for taxi back to dispersal. On returning to the Sqn the Lynx pilot contacted the Supervisor to discuss the incident and inform him that an Airprox was being filed. The Supervisor carried out the necessary actions including informing the VAAC pilot of the incident, who was unaware of a problem until that point.

Guidance has been issued to controllers following this incident to clarify the priority that is to be afforded to the VAAC when operating engaged.

STATION COMMENTS that this was a totally unnecessary incident, and a worrying one, given that neither ac was aware of the location of the other. The VAAC Harrier pilot was working hard and did not expect any conflict, given the information passed to him however, it would be expected that he would have recalled a Lynx within 150ft of his ac (assuming the distance reported by the Lynx pilot was accurate). There was a weakness of information flow within the ops/ATC network regarding the priority of the VAAC over other traffic, compounded by the exceptionally positive and proactive approach taken by Boscombe ATC, resulting from an honest desire to deliver as much value as possible to all

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'customers'. As a result, the Lynx was not held clear until sequencing with circuit traffic could be controlled, and assumptions were made regarding the circuit profile being flown by the Harrier which were based on invalid historical data, and took no account of varying speeds during multiple approaches. Concern was expressed at the lack of information passed to the Harrier despite ATC personnel being aware that the 2 ac were close to each other and the potential for a conflict existed. Flexibility can only be based on robust processes overlaid with sufficient information; these processes exist and Boscombe is well used to trials constraints occasionally mandating non-standard procedures. However, on this occasion, communications were inadequate to ensure that all parties were aware of each other and that caution was needed. Ops and trials aircrew have been rebriefed on the need to ensure that priorities are clearly expressed and understood during sortie planning and are communicated to all airfield users. The Stn Cdr regarded this as a wake-up call to all involved that operator communication must be appropriate and that ATC flexibility must be tempered by positive control and adequate information provision, both internally and externally.

MIL ATC OPS concurred SATCO's report and had nothing to add.

DPA comments that this Airprox raised a number of questions about the processes and procedures active at the time of the incident. There was a lack of, effective TI, compounded by a lack of control, being exercised by the Boscombe visual controller and mentor. While many factors contributed to the traffic situation, trials priority and circuit priority to highlight but two; however the fundamental fact is that it is the function of ATC to resolve conflictions regardless of how they are caused. That said, the fact that neither pilot in the VAAC Harrier saw a Lynx that was being overtaken on final approach was of concern.

As a result of this, and other recent similar incidents, a review has been undertaken to look at the issues emerging from this incident. This review addressed the process for allocating trials and circuit priorities, the potential need for a supervisor within the visual control room, the recent increase in the numbers of inexperienced controllers at Boscombe and the implementation of circuit restrictions for trials activity.

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.

The Board expressed concern that the revised ATC arrangements at Boscombe Down may have led to a reduction in experience levels of the controllers at this unique airfield with its own peculiar flying control requirements. The integration of ac testing, Test Pilot instruction and a diverse variety of other flying activity are not new challenges they but are nonetheless very demanding.

Although sympathising with the situation that the ADCs faced, with inadequate information on the requirements of the VAAC Harrier, specialist members endorsed the comment made by DPA "the fundamental fact is that it is the function of ATC to resolve conflictions regardless of how they are caused": for whatever reason, they did not accomplish this. In mitigation, they accepted that the actual confliction took place some distance away from the Tower and that the controllers' view may have been restricted: however members thought that it should have been apparent, at the time the Harrier called downwind with the Lynx at 4nm that there was potential for a confliction. Although the trainee may have lacked experience, both a mentor and the supervisor were present during the evolution, both of whom were in a position to initiate action to take control and resolve the rapidly deteriorating situation. This incident provides another example of why it is most important for controllers to use standard phraseology and to understand thoroughly the less frequently used, but nonetheless, standard operating procedures. Often time does not permit lengthy discussion or instruction when ac are converging.

Members considered why the ADCs were unaware of the intentions and priority required by the trials ac. The Harrier pilots believed correctly that their trial status afforded them priority over other traffic; since this is one of the prime functions of Boscombe Down it is surprising that robust procedures were not in place to ensure that this information was made equally available to others who would be affected as a consequence. Further, good airmanship would dictate that all pilots keep ATC informed of their intentions, particularly when they differ from the norm or are changed. In this situation the Harrier crew had not informed ATC that their downwind leg would be extended.

The Board also considered the part played by the pilots involved. The actions of the Lynx crew were considered reasonable. Although they were aware of the presence of the VAAC Harrier they understandably thought that it would be behind them, that normal priorities would apply, and that it (visual traffic) would avoid them (instrument traffic). Further, they had not been in a position to see the Harrier nor take avoidance. When faced with an unexpected and non-standard instruction from ATC, they adopted an understandable course of action and therefore had not contributed to the cause of the incident. The Harrier pilots also believed that they had priority and that ATC were aware of that. This may have led them to be less punctilious in their lookout when both of them would have been in a very high workload situation, perhaps locked into a testing mode of flying. Nonetheless, one of the prime responsibilities of the safety pilot was lookout whenever the handling pilot was so busy that this function became degraded. Members, including a test pilot, were therefore surprised that the, albeit small, tail-on aspect and camouflaged Lynx, was not seen by either Harrier pilot and avoided.

Since the Harrier pilots did not see the Lynx and the Lynx pilots were not in a position to see the Harrier until after it had passed them, this was judged to be a most serious incident. Only good fortune had separated the ac; members therefore considered that there had been an actual risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

1. A lack of positive control by Boscombe Down Tower.
2. A non-sighting by the Harrier pilots of the Lynx which they overtook on the final approach.

Degree of Risk: A.

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Date/Time: 26 Mar 1319

Position: 5146N 0001E
(4nm ENE BPK)

Airspace: LTMA (Class: A)

Reporting Ac Reported Ac

Type: B737(A) B737(B)

Operator: CAT CAT

Alt/FL: 4000ft↓ NR

(QNH) (QNH)

Weather IMC KLWD IMC KLWD

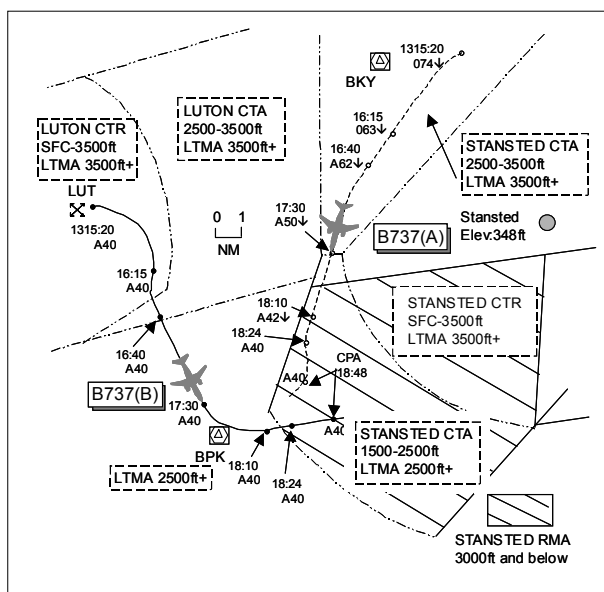
Visibility:

Reported Separation:

nil V 2.5nm H nil V 3nm H

Recorded Separation:

nil V 1.85nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737(A) PILOT reports inbound to Stansted at 220kt and in receipt of a RCS from Essex RADAR on 120.62MHz squawking an assigned code with Mode C. Turning L from heading 235°, he thought, onto L base leg RW05 and descending through 4000ft QNH in IMC, ATC gave an avoiding action 50° R turn onto heading 270°. TCAS gave a TA alert on traffic in his 1 o'clock range 4nm crossing R to L at the same level which was seen on the TCAS display to pass 2.5nm to his L during the turn. He assessed the risk of collision as high.

THE B737(B) PILOT reports flying a Clacton departure from Luton on a training flight. The crew complement was two training Capts and a trainee FO on the jump seat. The crew considered it noteworthy that they were late being handed-over to London, to the point where they were about to query this with ATC, as they were at an unusually low altitude. As the crew were discussing this on the flight deck, a TCAS TA alert was received which looked as if it might become an RA, but in the end did not. Another ac was 'seen' on the display to pass in the opposite direction down their LHS at the same altitude and about 3nm away. Shortly after this, ATC called asking if he was still on frequency and he was then handed over with nothing more being said. Initially he did not file an ASR as he considered that a TA alert is not particularly unusual in the LTMA although on reflection a same level TA is – they are normally climbing or descending encounters. This report was completed from memory about 1 month post incident, after being asked to complete a form by the UKAB.

ATSI reports that at the time of the Airprox, the B737(B) crew were in communication with the Luton INT Director whilst the B737(A) crew were in contact with the Stansted INT/FIN Director. The controllers described both the workload and traffic loading as 'moderate', although the Luton Director added that the situation was complex. The Stansted Director's position was being operated by a Trainee under supervision who had received approximately 150hr training. A typical trainee would require some 300hr to reach an acceptable level of competency. The position was being operated in a banded mode, carrying out the duties of both FIN and INT.

The B737(A) crew established communications with the Stansted Director at 1310:25, and reported descending to FL100 routeing direct to Barkway, the ac being 10nm W of Stansted and passing FL113. The Director instructed the crew to continue on their present (northerly) heading and reduce speed to

220kt. The landing RW at Stansted was 05 and so ac were being vectored to a position NW of the airport and then turned R to position downwind LH. When the B737(A) crew called, there were 2 other ac ahead of it being positioned as described. Clearance to descend to FL90 and then FL80 was given and, at 1313:20, when the B737 was approximately 10nm NW of the airport, the crew was instructed to turn R heading 235°.

During the execution of this turn, B737(B) departed from RW08 at Luton, and the crew contacted the Luton INT Director at 1314:50 and were cleared on a CLN6C SID. This requires flights to climb straight ahead to the LUT NDB, turn R to BPK, a track of 157°M, before turning L and tracking 085° direct to CLN. The initial level for such departures is 4000ft and, having passed BPK, cross 7 DME from BPK at 5000ft. Due to a slow climbing departure ahead, the Luton INT Director had restricted B737(B) to 3000ft altitude. On initial contact, the controller instructed the crew to squawk Ident and continue climb to 4000ft. Meanwhile, B737(A) was completing the R turn and the Stansted Director issued descent clearance to 6000ft. Shortly afterwards, a track adjustment turn onto 220°, together with further descent to 3000ft, was issued. At that time (1315:20), B737(B) was just levelling at 4000ft and about to turn R as it crossed the LUT NDB with B737(A) in its 11 o'clock position at 15nm and passing FL74.

At 1316:15, the Luton INT Director received a telephone call from TC North advising that a C550, which had departed Luton for Amsterdam, had declared a 'PAN' due to vibration and required a return to Luton. The C550 was 10nm E of Stansted descending to FL100. The Luton controller advised that the ac should be positioned downwind RH for RW08 and descended to 5000ft. He then advised Luton Tower to check all departures with him. During this telephone coordination, the Stansted Director had instructed B737(A) to turn further L onto 200° as it was positioned downwind LH. At that time (1316:40), it was passing 6200ft for 3000ft and B737(B) was maintaining 4000ft virtually half way between the LUT NDB and BPK. B737(A) was in its 9 o'clock position at a range of 10nm.

At 1318:10, the Stansted Director instructed B737(A) to turn L heading 130° for a base leg onto RW05 at Stansted. The ac was passing 4200ft whilst B737(B) had reached BPK and turned L for CLN, still maintaining 4000ft with B737(A) in its 10 o'clock at 4.5nm. Ten seconds later the Stansted Director transmitted "*B737(A) c/s avoiding action turn right I say again a right turn heading two seven zero degrees*", which the crew acknowledged. TI was passed as "*....traffic was in your 12 o'clock same level right to left*". The instruction was complied with but slow to become effective because the flight had already been in the L turn onto 130°. B737(B) was steady on an easterly track towards CLN as B737(A) was closing from its 9 o'clock position. Separation reduced to a minimum, at 1318:48, when B737(A) was turning R in the 8 o'clock position of B737(B) at a range of 1.85 miles with both ac at 4000ft. STCA activated on 'high severity' at 1318:50, ceasing 10sec later as the R turn onto 270° being executed by B737(A) took effect. Very shortly afterwards standard lateral separation was restored.

The Luton Director reported that he had become preoccupied with the returning C550 as the conflict was developing. It was unusual, in his experience, to work BPK departures from Luton, although it does happen on occasions such as this when a slow ac departs ahead. His plan had been to climb B737(B) to 4000ft and then transfer it to the TC NE Deps controller. (*Note: As referred to earlier, the vertical profile of this SID is as follows: Cross BPK D5 3000 feet or above, BPK D3 at 4000 feet, BPK VOR at 4000 feet and CLN D40 (BPK D7) at 5000 feet*). He added that it was extremely rare for Luton to still be working such departures when they had reached BPK as, under normal circumstances, they would have been transferred, and climbed further by TC, much earlier. He recalled that he had inadvertently crossed through the strip on B737(B) and, probably had moved it to the 'dead bay' on his strip display. Thus, to all intents and purposes, his strip display indicated that B737(B) was no longer on his frequency and accordingly, he was no longer specifically monitoring the flight. It was only when he received a telephone call from TC North asking whether he still had the flight that he called B737(B) and discovered it was still on the Luton frequency.

The Stansted Mentor explained that the standard procedure for handling such situations when RW05 was in use was to descend inbound traffic to 6000ft initially, thus permitting departures to the NW to get

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airborne climbing to 5000ft. It is generally considered that this technique is the best compromise given the restrictions on airspace in the area. (To the NW of Stansted, the base of the London TMA is 4500ft and so 5000ft is the minimum level that can be allocated). Inbound traffic is taken to the NW and typically turned onto 230°. Once it has crossed the outbound track, further descent is given to 3000ft. The Mentor had noted that his trainee was turning traffic slightly early, which resulted in it being higher than the ideal as it tracked downwind LH for RW05.

The Stansted Intermediate and Final Procedures, as described in the MATS Part 2, require ac entering the Radar Manoeuvring Area (RMA) to the SW of Stansted, to be 3000ft or below. If this is not achieved then coordination is required with TC. This assists, but does not ensure, separation from Luton and London City departures routeing on SIDs via BPK. MATS Part 2 STN 5.2 requires that Stansted Directors ensure ac under their control remain separated from ac on the SID track between Luton and BPK by radar monitoring and vectoring if necessary. Furthermore, TC Stansted will ensure that ac in the SW segment of the Stansted RMA are separated from London City departures via BPK or LAM. An examination of radar recordings showed that in the period 1313 – 1325 on the day of the Airprox, none of the four ac that were inbound to Stansted complied with the requirement to be 3000ft or below on entering the RMA. The Stansted INT/DIR Mentor explained that he had conducted a small survey and found that 58% of traffic did not comply with this restriction. B737(A) was passing 4500ft as it crossed the boundary of the RMA, 1500ft above the approved level. Accordingly, the following recommendations have been made:

ATSI RECOMMENDATIONS:

- 1) Given the evident frequency of ac failing to meet the level requirement on entering the SW segment of the RMA, NATS should review the procedure in order to establish whether it is feasible to achieve it on a reasonably consistent basis, and, if not, modify it as necessary.
- 2) Given the increasing traffic levels in the NE portion of the London TMA, NATS should review the procedures in place for ensuring separation between traffic being positioned for RW05 at Stansted and traffic outbound on SIDs, from Luton and London City which route via BPK, to assess whether they are sufficiently robust.

The Mentor explained that he had seen the C550, which had declared the PAN, to the E of Stansted. The Group Supervisor had come over and provided him with some details. The Mentor then started talking directly with the Luton Director, as he was sat alongside him, to establish the intentions of the ac as well as the Luton controller's plan. It was at that time the trainee had directed B737(A) to turn L onto 130°, however, this heading was not written on the strip. When the Mentor looked back at the radar, he saw B737(B) having made its turn onto an easterly track, just east of BPK, and in direct conflict with B737(A). He then directed the trainee to pass an avoiding action turn onto 270°, but without the knowledge that the ac was already in a L turn from 200° to 130°. When this avoiding action was passed, the radar did not clearly indicate that B737(A) had already commenced its L turn onto 130°. Although there was a delay in changing from the L to a R turn, the avoiding action was effective as B737(A) manoeuvred N of the steady easterly track that B737(B) followed.

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 confirmed that the 2 recommendations had been sent to NATS and that they were being addressed. ATCO members were familiar with the 'tight airspace' available at Stansted during RW05 operations and the limited options open to controllers. It was clear from the ATSI investigation

and report that the Stansted mentor had allowed his trainee to descend B737(A) to 3000ft but its flight path had not complied with the requirements for entering the Stansted RMA. This had been a part cause of the Airprox. RMA level requirements are catered for on the published STAR charts but crews under radar vectoring would be used to Continuous Descent Approach (CDA) profiles so would need to be told to adjust their flight paths to conform. Furthermore, during vectoring to RW05, the onus was on the Stansted mentor/trainee to monitor the flight path and avoid Luton SID traffic - B737(B) - as detailed in MATS Pt 2. This was not done and had been a second part cause of the Airprox. Unfortunately, the Luton Director had become preoccupied with returning 'PAN' traffic and had forgotten that he had step-climbed B737(B) and restricted it to 4000ft. Although it had been in accordance with the SID until BPK, it should have climbed to be level at 5000ft by D7 but subject to ATC approval. Also, he had then forgotten to transfer B737(B) to the TC N SC who would normally climb Luton outbound traffic much earlier than the published procedure. This had been a contributory factor to the incident.

During coordination with the Luton controller, the Stansted mentor had missed the turn issued by his trainee to B737(A) crew onto L base leg. Having then noticed B737(B) at BPK in conflict, he had told his trainee to give an avoiding action R turn to B737(A) unaware that it had started a L turn. However, the turn reversal soon took effect as B737(B) passed quickly through B737(A)'s 12 o'clock with the CPA occurring as B737(A) passed behind. After ATC had given avoiding action, B737(A) crew had received a TCAS TA alert which indicated B737(B) in their 1 o'clock range 4nm crossing R to L before it eventually passed 2.5nm to their L as the turn took effect. B737(B) crew had noticed the potential for conflict on TCAS but after the TA alert saw the traffic on the display pass to their L about 3nm away. The prompt actions taken by the Stansted mentor/trainee and reactions of B737(A) crew had quickly resolved the deteriorating situation and led the Board to conclude that any collision risk had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Stansted mentor did not ensure that his trainee complied with the requirements for entering the Stansted RMA and did not monitor and avoid Luton SID traffic as required in MATS Pt 2.

Degree of Risk: C.

Contributory Factors: The Luton Director did not transfer B737(B) to LTCC.

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Date/Time: 22 Mar 1235

Position: 5150N 0400W (AMMAN)

Airspace: UAR - UL9 (Class: B)

Reporting Ac Reported Ac

Type: B747-400 Hawk T1

Operator: CAT HQ PTC

Alt/FL: FL286↑ FL290

Weather VMC VMC NR

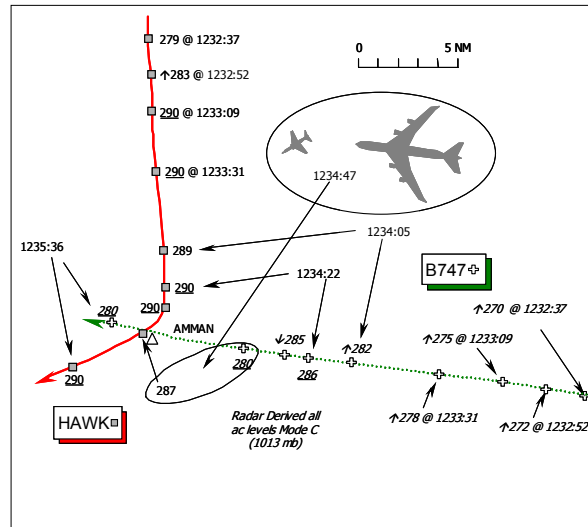
Visibility: 10km 30km+

Reported Separation:

400ft V/8nm H 600ft V

Recorded Separation:

3-65nm H/700ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B747-400 PILOT reports that he was outbound from London Heathrow to Toronto in receipt of an ATC service from LONDON CONTROL [LACC] on 129.37MHz, the allocated squawk of A7601 was selected with Mode C.

Outbound on UPPER LIMA 9 approaching the vicinity of AMMAN, heading 295° at 310kt LONDON cleared them to climb from FL260 to FL340. When passing FL286 in the climb, the controller instructed them to stop climb at FL280, before asking them to expedite descent down to FL280 because of uncoordinated military traffic in their 12 o'clock that had "entered controlled airspace". After initiating an expeditious descent to FL280 with autopilot selected, TCAS "picked up" a contact at 12 o'clock, but once they had levelled at FL280 TCAS lost the return. Neither an RA nor TA was enunciated, but ATC then advised that the pilot of the other ac had been advised to remain clear of them - he assumed, erroneously, visually. The ATC instructions issued did not include the phrase "avoiding action". He assessed the risk was "medium" and reported the minimum separation as 400ft vertically and 8nm horizontally.

UKAB Note (1): The B747-400 pilot did not state whether the Hawk was sighted.

THE HAWK T1 PILOT, a QFI, reports his ac has a black colour-scheme and the HISLs were on whilst in transit southbound at high-level into sun some 15000ft clear above cloud with an inflight visibility of 30km. He was in receipt of a RCS from LATCC (Mil) and squawking the assigned codes with Mode C; neither TCAS nor any other form of CWS is fitted.

Flying south toward AMMAN in level cruise at FL280, the controller instructed him to expedite a climb to FL290 to deconflict with civil traffic. Whilst flying straight and level at FL290, in accordance with air traffic instructions, he was given traffic information about the civil ac – a B747-400 – which was spotted 10nm away. "The other ac was not a threat" and passed 5nm away about 600ft below his jet at what appeared to be standard ATC separation [although his report did not recount the avoiding action issued by MIL32]. He assessed the risk as "none".

LATCC MIL CONTROLLER 32 (MIL32) reports that the Hawk needed to cross UL9 7nm W of AMMAN and so he spoke to S8 to coordinate the B747, which was climbing through FL240 slightly E of BRECON. S8 informed him that the B747 was climbing to FL280. At this point the Hawk was N of AMMAN by 15nm

at FL280 so he said that the Hawk would avoid the B747 until it was “not below FL290”. He then instructed the Hawk crew to expedite a climb to FL290, which they complied with and reported level when the ac were still approximately 12nm apart. However, the B747 continued the climb through FL280; when it indicated FL282 Mode C, under instruction from his SUPERVISOR he initiated avoiding action of a R turn onto a heading of 250°. He estimated this achieved a separation between the ac of 2nm and 600ft. S8 then called back to tell him that the B747 was actually climbing to FL300.

LATCC MIL TACTICAL SUPERVISOR WEST (MIL SUP) became aware that MIL32 had conflicting traffic westbound on UL9. Upon hearing that co-ordination was being effected, he waited for the landline call to finish before asking controller 32 the details of the co-ordination. MIL32 confirmed that the GAT was climbing to FL280 and that controller 32 would avoid the GAT until the Hawk was “not below FL290”. He continued to monitor the situation and watched the Hawk level at FL290, whereupon he saw the B747 climb through FL281 so he approached Console 32. On the next radar sweep, the B747 indicated FL283 Mode C and MIL32 was instructed to provide an avoiding action turn of 30° to prevent returns from merging. An avoiding action R turn onto a heading of 250° was given by MIL32. Simultaneously, the S5 line rang; MIL32 picked up the call and it became apparent that MIL32 and the LACC S5 PLANNER disagreed over the exact details of the co-ordination agreement.

THE LACC SECTOR 5/8 PLANNER CONTROLLER reports that LONDON MIL called when the traffic loading was relatively high. The controller wanted to cross the Hawk at AMMAN against the B747 - slow climbing out of the LTMA to FL280 – and MIL32 said they were climbing to FL290 but would miss the B747. Subsequently, the Hawk did not avoid the B747 as he believed MIL32 was going to do. Standard separation was not lost, he thought, but the B747 pilot elected to file an Airprox.

THE LACC SECTOR 5/8 TACTICAL CONTROLLER (TAC) reports that the PLANNER pointed out the Hawk and said that MIL32 would avoid the B747 and cross the UAR at FL290. Traffic levels were busy and she was training a UT controller, but then the PLANNER pointed out the Hawk was not avoiding our traffic so we stopped the B747 from climbing and descended the ac to FL280 – expediting the descent. Traffic information was given to the B747 crew and the two ac passed abeam by about 5nm.

THE HAWK T1 PILOT'S STATION comments that the ac Captain, an experienced QFI, was occupying the rear seat with a trainee pilot in the front seat. The Hawk ac commander was informed that an Airprox had been filed approximately 3 weeks after the event [after it had been confirmed that the B747 pilot was filing an Airprox.]

MIL ATC OPS reports that MIL32 was providing an ATS to the Hawk crew, in transit from Valley to enter the UKDLFS at Hartland Point, crossing UL9 in the vicinity of AMMAN and thereby in potential conflict with the westbound B747. At 1232:18, MIL32 called PLANNER and said “...request co-ordination please, your traffic [B747 C/S]”. PLANNER responded that the B747 was climbing at the moment up to FL280. MIL32 then indicated the Hawk, “...can you see my traffic north of AMMAN, fifteen miles, [C/S]?” which PLANNER could, therefore, MIL32 stated “I'll avoid you until not below FL290.” PLANNER responded “okay, ta.” The military controller then closed the landline conversation at 1232:35, by reiterating his control position. Immediately afterwards at 1232:38, MIL32 instructed the Hawk crew to “...expedite climb FL290 for crossing controlled airspace” and at 1233:06, the Hawk pilot reported “...level FL290.” At 1233:14, MIL32 informed the Hawk crew, “...leaving the MTA [North Wales Military Training Area] Radar Control” whereupon the crew acknowledged the change of radar service. At 1233:31, MIL32 passed traffic information to the Hawk crew “... traffic left, 10 o'clock, 12 miles, crossing left right, co-ordinated not above FL280” which was acknowledged. However, at 1234:16, MIL32 instructed the Hawk crew “...avoiding action, turn right heading 250, traffic was left 11 o'clock, 5 miles, crossing left right, indicating FL285 climbing” whereupon the Hawk crew immediately replied “...coming right 250.”

Examination of the Clee Hill Radar recording at 1231:11 shows the Hawk 17nm N of UL9 heading S indicating FL280 Mode C. At the same time the B747 is shown 6.5nm NE of BRECON heading W and

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climbing through FL260. At 1233:08, the Hawk is shown level at FL290 whilst the B747 is passing FL275 climbing. At 1234:11, when the Hawk and the B747 are 9.3nm apart, the B747 is passing FL282 and at 1234:28, the ac are 8.2nm apart and the B747 indicates FL286. At 1234:35, the ac are 6.3nm apart and the B747 has reversed its climb and is indicating FL285 descending. At 1234:43, the Hawk's track indicates the commencement of a R turn and at 1234:47, when the ac are 4.3nm apart the B747 indicates FL280 and the Hawk indicates FL287 for one sweep before indicating FL289 again. At 1235:06, the HAWK is in the R turn indicating FL290, the B747 indicates FL282 and the ac are 4nm apart. Thereafter both ac continue to diverge and the Hawk has passed through the B747's 12 o'clock position.

When MIL32 recognised that there would be a conflict between the two ac he called S8 PLANNER in order to arrange co-ordination in accordance with JSP 552 230.105. MIL32 correctly requested co-ordination in line with the regulation at JSP 552 230.115.2a and identified both ac appropriately as required by JSP 552 230.115.2b, before offering a workable course of action based upon the information available to him and obtaining agreement from PLANNER as per JSP 552 230.115.2c. Shortly afterwards the MIL SUP spoke to MIL32 and confirmed that appropriate co-ordination was in place. When the MIL SUP saw the B747 indicating passing through FL280 he instructed MIL32 to issue appropriate avoiding action to the Hawk crew, which MIL32 then did.

MIL32 acted in accordance with the extant regulations for co-ordination. Furthermore, MIL SUP behaved in a pro-active manner when he checked that co-ordination had taken place and subsequently instructed MIL32 to give avoiding action.

ATSI reports that at the time of the incident, the LACC BRECON (Sector 5) and STRUMBLE (Sector 8) sectors were bandboxed together and both the PLANNER and TAC described their respective workload as moderate to high. TAC was also monitoring a relatively inexperienced trainee but she had discussed, with her PLANNER and the LACC LOCAL AREA SUPERVISOR, whether to split the Sector. However, it was assessed that the traffic had peaked and it would be good experience for the trainee SC to continue operating in a bandboxed configuration, so she agreed to continue without splitting the Sector. However, she said that, with hindsight, it might have been appropriate to split the Sector, as this would have allowed her more time to monitor the developing situation between the subject ac.

The B747 crew established communication with the bandboxed Sector 5/8 at 1226. In accordance with the standing agreement between S23 and S8, the flight had been transferred climbing to FL260, positioned on the N side of LIMA 9 heading 285°. At 1231, the trainee SC cleared the B747 crew to climb to FL280, underneath other crossing traffic, which was passing FL290.

At 1232:20, the S5/8 PLANNER received a telephone call from MIL32 requesting co-ordination against the B747. PLANNER replied that it *"is climbing at the moment up to Flight Level 280"*. The conversation continued with MIL32 saying: *"...roger can you see my traffic north of AMMAN...15 miles [Hawk C/S as displayed by CCDS]"*. When the PLANNER replied, *"yes"* MIL32 responded, *"I'll avoid you until not below flight level two nine zero."* *"Okay Ta"* was the reply, whereupon MIL32 ended the call saying *"Thanks London Mil Controller Thirty Two."* As a result of this telephone call, the PLANNER's understanding was that MIL32 would provide horizontal separation between the B747 and the Hawk by ensuring 5nm radar separation. This belief was based on MIL32 saying *"I'll avoid you"*. PLANNER admitted that, having heard this phrase, he had not registered the rest of the sentence but could not readily explain why he had missed hearing the whole message. He reasoned that, possibly, he was listening to an RTF exchange, as he had been monitoring the frequency, or maybe he was talking to an ATSA, who, he recollected, had approached him about that time. He thought that, if the Military Controller had just requested to cross at FL290, any ambiguity would have been resolved.

Following the conversation with MIL32, the Planner pointed out the Hawk to the TACTICAL mentor, saying that the Military would avoid their traffic – the B747. The radar recording, timed at 1232:20, shows the B747 passing FL267, 30.6nm SE of the Hawk - the latter 17nm N of AMMAN tracking S,

maintaining FL280 with a ground speed of 390kt. Shortly after the end of the co-ordination telephone call, the B747 crew was cleared to climb to FL340. The Planner confirmed that he heard this instruction but, as he believed, erroneously, that the Military Controller was going to provide horizontal separation from the B747 he did not consider that this would create a problem.

The TAC mentor said that having been told that separation was being provided by MIL32 she had allowed the trainee to instruct the B747 crew to climb to FL340 at 1232:50. Both then turned their attention to the traffic situation elsewhere in the Sector. TAC mentor first became aware of the developing conflict, between the subject ac, when the PLANNER pointed out that the Hawk was not avoiding the B747. She commented that, had the Sector been split notwithstanding that she understood that MIL32 was responsible for maintaining separation against the B747, she would probably have been monitoring the Hawk's progress relative to the airliner. Acting on the PLANNER's warning, the trainee SC at 1234:08, instructed the B747 crew to "...descend now Flight Level 280", which the B747 crew readback immediately. The radar recording shows that the B747 was passing FL282, at the time, 700ft beneath the Hawk at 1 o'clock – 10.8nm indicating FL289. Because of the trainee's lack of experience, the mentor took over the RTF and passed traffic information to the B747 crew at 1234:20, "[C/S] traffic...military traffic hasn't been given a clearance its at...290 crossing you now...in your 12 o'clock will you expedite down". TAC agreed subsequently that it would have been appropriate to use the term 'avoiding action' at the time. As the pilot was not visual, further traffic information was issued 10 sec later, "he's just coming into your twelve o'clock now and got about four or five miles". The radar recordings of the event show that the B747 crew ascended to a maximum of FL286 Mode C before descending back to FL280 at 1234:47. By this time, the Hawk, in a R turn onto a south-westerly track, had descended to FL287 Mode C – the point of minimum vertical separation of 700ft - as it passed through the B747's 12 o'clock at 4.9nm. Thereafter, the Hawk climbed back to FL290, whereas the B747 crew climbed to FL282.

Minimum horizontal separation was of 3.65nm at 1235:36, but by this time the respective tracks had been diverging for nearly 1min.

The LACC MATS Part 2, GEN Section, states that: "*Military or civil aircraft operating as OAT which have a requirement to cross controlled airspace or UAR's will proceed after coordination with the Planner of the appropriate sector on a cleared flight path. The procedure for granting a crossing clearance will normally be as follows: On receipt of a crossing request, the Tactical and Planners will agree a course of action and the Planner will issue the crossing clearance to the appropriate authority requesting the clearance; the Planner must ensure that the PFS (Paper Flight Strip) is displayed on the PFSB and that any clearance conditions are annotated on the strip; the Tactical will acknowledge the crossing clearance by ticking the level in Box B of the PFS; an electronic blocking strip may be raised if considered necessary by the Planner*". On this occasion, because of the relatively late request for co-ordination, the Planner said that there was no time to prepare a PFS. However, this omission is not considered to be a contributory factor because both controllers were aware of the Hawk's presence and the PFS would only have reflected the perceived co-ordination.

The MATS Part 1, Appendix E, states that: "*Controllers shall read back any operationally significant information contained in telephone (and intercom) co-ordination messages*". Additionally, "*controllers must ensure they obtain a readback of any operationally significant information contained in telephone and intercom co-ordination messages*". It is believed that a similar requirement is not stipulated in the equivalent military publication (JSP552). The Planner admitted that, on this occasion, if he had read back what he believed was the agreed co-ordination, although he was never challenged to do so, the error would have been realised and the incident prevented. He thought that the use of the phrase "*I'll avoid you*" at the beginning of a sentence was inappropriate, directly leading him to believe that the situation was resolved, meaning he could turn his attention to other matters. Arguably, had the term Cleared Flight Path, together with a request for a specific crossing level i.e. FL290, been used, it would have removed any ambiguity.

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Here a breakdown in the co-ordination process occurred between the S5/8 PLANNER and MIL32. The Planner should not have allowed himself to be distracted before the co-ordination procedure had been completed, thereby missing a vital part of the message. Additionally, in accordance with the requirements stated in MATS Part 1, he should have read back the co-ordination. Nevertheless, if both controllers had ensured that a readback of the agreed co-ordination was done, the misunderstanding would have been apparent. In the event, the Planner did well to monitor the situation and provide early warning to the Tactical Controller, allowing remedial action to be taken.

HQ PTC had nothing further to add.

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 comprehensive analysis provided by both Mil ATC Ops and ATSI had made it plain that the crux of this Airprox was one of communication and the differing perceptions of the co-ordination agreement initiated by MIL32 with the LACC S5/8 PLANNER. Members agreed that the key here was the interpretation of the MIL32 controller's response to the PLANNER's comment that the B747 "*...is climbing at the moment up to flight level 280*", thereby inducing a belief that the airliner would level at FL280. Hence, with MIL32 saying that he would "*...avoid you...*" (the B747), PLANNER believed that MIL32 had accepted responsibility for ensuring standard separation, by altering the flight path of the Hawk should that be required. But having heard this phrase, the PLANNER had not registered the rest of the sentence "*...until not below flight level 290*", thereby erroneously grasping the impression that MIL32 would maintain horizontal radar separation against the B747 when, as PLANNER intended, the airliner was further cleared to continue its climb through the Hawk's level. This intention was not communicated by PLANNER to MIL32 at the time of the co-ordination discussion. A controller member opined that the military controller should have expected the B747 to fly above the stipulated FL280: whilst PLANNER had certainly not stated it would climb further, conceivably there was an inference that it might do so in the words "*...at the moment...*", but others thought it was stretching the point outwith the bounds of reason. Whilst the Board agreed that the controllers involved here were not communicating effectively between themselves, civilian ATCO members opined that the form of words used by MIL32 was, in their view, confusing. The Mil ATC Ops advisor and other members disputed this opinion and contended that this expression was commonly used when effecting co-ordination agreements. Moreover, the co-ordination was carried out according to the applicable military regulations. Mention had been made of a "Cleared Flight Path", which a military controller pointed out was only stipulated for use when conflicts were apparent with multiple GAT tracks. Nonetheless, after a lengthy discussion the balance of opinion was that it was not plain enough and had evidently induced confusion here as the PLANNER had not fully absorbed MIL32's intent. As to whether a readback of the agreement would have highlighted the misunderstanding by PLANNER also engendered considerable debate. The act of co-ordination between military and civilian controllers within which an agreement was reached regarding who would be responsible for effecting separation between ac was clearly operationally significant information and warranted a readback, which the ATSI advisor stressed was required by existing procedures in MATS Pt 1, but evidently not given by the PLANNER here. After weighing all the aspects carefully the Board concluded unanimously that this Airprox had resulted because the LACC S5/8 PLANNER had misunderstood the co-ordination he had agreed but not read back to MIL32.

Continuing the discussion further some members were surprised that the requirement for a readback stipulated for civilian controllers was not replicated in military regulations. Military controllers - be they air traffic controllers or air defence controllers - were effecting co-ordination agreements with their civilian counterparts as an operational necessity on a routine basis. Logically, a common system and pattern had evolved for this purpose between civilian and military controllers, but it would appear that

the applicable procedures were not entirely the same for both as MIL32 was not charged with giving or obtaining a readback in these circumstances. Similarly, if the S5/8 PLANNER had expected a readback of the agreement or asked for one there was no apparent necessity for MIL32 to give one. This seemed to some members to be counter to best practice: it was reasoned that there should be a unified joint procedure for use by all controllers - either air traffic or air defence, civilian or military alike - whosoever the service provider. Some thought lengthy discussions on the landline very unwieldy and impractical in busy traffic scenarios, but arguably the more complex the situation the greater potential for confusion and hence the necessity for a readback to eradicate any misconceptions about the intent in the mind of either controller. Some members thought that this was being too prescriptive, whereas others argued it would be sensible if all controllers were following the same rules and it was the latter view that prevailed by a narrow majority. Therefore, it was with the essentially joint and integrated nature of military/civil ATC services in mind that the Board recommended that the MOD review the applicable instructions and procedures for military ATC and ASACS controllers, when effecting co-ordination, to establish whether a requirement to give/obtain a 'readback' is warranted at the conclusion of such agreements, with the aim of ensuring compatibility with promulgated civilian procedures and a unified joint procedure for use by all controllers who interact with one another in UK airspace.

Turning to risk: from the Hawk QFI's perspective there was little of significance to the event. He followed the ATC instructions issued to climb to FL290 under the RCS, which was adeptly applied. Even without the benefit of TCAS the B747 had been spotted from 10nm away, so the Hawk pilot was always in a position to react accordingly in his nimble jet if the situation altered further. The avoiding action ordered by the MIL SUP and assiduously applied by MIL32 ensured a swift reaction from the Hawk pilot who complied promptly. The Board noted that the alert PLANNER had pointed out himself that the Hawk was not turning away from the B747 which resulted in the S5/8 mentor taking over the RT from her student after the latter had passed the initial descent instruction. However, a CAT pilot member opined it was disappointing to see that yet again a boxed sector figured in an Airprox. One member stressed the importance of using appropriate "avoiding action" phraseology, which had also been commented on by the B747 pilot. The addition of this significant phrase should galvanise pilots into an immediate reaction. However, it was also clear that the B747 crew had reacted swiftly to the descent instruction from the S5/8 student anyway - although the continued use of autopilot in this situation was questioned. This descent instruction was transmitted as the airliner was passing about FL282 Mode C, so the B747 crew did well to arrest the climb by FL286 some 300ft clear below the Hawk, which was momentarily indicating FL289 at that point more than 6nm away. The B747 crew achieved FL280 some 4.3nm away from the Hawk as the latter crossed ahead some 700ft above the airliner – and it was noted that TCAS was not called upon to act. The action taken by the controllers and the swift reaction of the pilots concerned ensured that standard separation was only marginally eroded, convincing the Board that any risk of a collision had been removed entirely in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LACC S5/8 PLANNER misunderstood the co-ordination he had agreed but not read back to MIL 32.

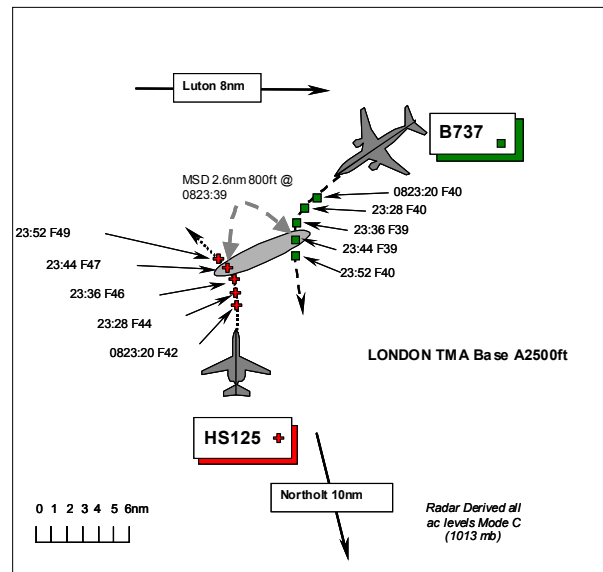
Degree of Risk: C.

Recommendation: The MOD review the applicable instructions and procedures for military ATC and ASACS controllers, when effecting co-ordination, to establish whether a requirement to give/obtain a 'readback' is warranted at the conclusion of such agreements with the aim of ensuring compatibility with promulgated civilian procedures and a unified joint procedure for use by all controllers who interact with one another in UK airspace.

AIRPROX REPORT No 040/04

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Date/Time: 29 Mar 0824
Position: 5144N 00038W (3nm W of BNN)
Airspace: London TMA (Class:A)
Type: B737 HS125-700
Operator: CAT HQ STC
Alt/FL: 3700ft 4000ft
(QNH 1032) (QNH)
Weather VMC CLBL IMC
Visibility: 5km 5km
Reported Separation:
3nm TCAS H 0 V 1000ft H
- 1000ft V
Recorded Separation:
2.6nm H 800ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports that in the climb out from Luton RW26 on a CPT 3B SID with London Control, he was cleared to climb to 5000ft and to assume a hdg of 255° after passing alt 4000ft. When he was passing 3700ft in the climb, ATC passed avoiding action "Stop climb at 4000ft, turn left hdg 180°". As he started to turn, TCAS gave a "TA" warning but the other ac was not seen visually. He banked to 35° for 2sec to help the turn. The other ac was also given avoiding action and indicated the same alt and 3nm on TCAS. He assessed the risk of collision as medium.

THE HS125-700 PILOT reports that he was in the climb out from Northolt on a BUZAD SID with London Control. He was given a radar heading of 345° and was at 250kt passing 4000ft when he was given an avoiding action L turn onto a heading that he was unable to recall. TCAS was fitted to his ac and a TA warning with respect to the other ac was displayed and monitored. At the time his workload was high, flying the cleared SID. He assessed that the collision risk was low.

THE LTCC CONTROLLER reported that having taken over a comparatively busy NW Departures Sector, he did not take into account the conflicting SID routes when he was asked by the co-ordinator for departure release on the ac. He that he gave avoiding action to both ac; "stop climb left heading 180°" to the B737 and "climb 5000ft, L hdg 295°" to the HS125. He passed TI to both as soon as he was able. In his opinion, standard separation was maintained throughout and the B737 pilot reported visual with other traffic.

ATSI reports that the controller, who had been in position for about 10min, reported that he was operating the TC NW DEPS/BNN Sectors in banded mode at the time of the incident. He described his workload as moderate and confirmed that another controller was available if it had been considered necessary to split the sector.

While he had been in position, Northolt and Luton, in accordance with agreed procedures, requested releases on their respective departing ac. Northolt telephoned the North Co-ordinator (trainee), at 0816, to request a release on the HS125, outbound on a BUZAD 1Y SID. The SC remembered agreeing to release the ac, following a request from the trainee co-ordinator. The appropriate fps was placed in the right-hand fps display bay under the HEMEL designator. Approximately 2min later, Luton telephoned the co-ordinator to request a release on the B737 on a COMPTON (CPT) 3B SID. This flight was also

released but, subsequently, the SC said that he could not recollect receiving, or agreeing to, this release request from the trainee co-ordinator. It was only after listening to a recording of the telephone conversation between the co-ordinator and Luton, where the former could be heard, off-telephone, asking him for the 737's release, that he realised that he had indeed approved it. Additionally, he had also been informed that the 737's fps confirmed that the SC had agreed the co-ordination (annotated in blue ink). The SC explained that the BUZAD 1Y and CPT 3B SID profiles conflict. The BUZAD 1Y SID routes via BNN, climbing initially to 3000ft, with further climb, on passing BNN D6, to 6000ft. The CPT3B SID routes to HENTON, passing N of BNN, climbing to 5000ft. The SC added that, having released the HS125, he should not have released the B737 until separation could be established.

The HS125 pilot established communication with the NW DEPS/BNN sector, at 0820, reporting levelling at 3000ft on a BUZAD 1Y SID. The SC removed the speed restriction but left the ac following the SID. The B737 pilot made his initial call on the frequency some 2min later, reporting passing 2000ft climbing to 5000ft on a CPT 3B SID. Once again, the SC removed the speed restriction and left the ac following the SID. Shortly afterwards, the B737 pilot was instructed, once it had passed 4000ft i.e. after noise abatement, to turn R heading 255°. The SC explained that this heading was to ensure lateral separation from a slower ac on a parallel track, thereby allowing the B737 to be climbed to the same level (FL70). In accordance with the Standing Agreement with TC OCK, the B737 had to be at Minimum Stack Level (FL70) by 11nm NE CPT. The SC commented that he was still not aware of the potential conflict between the subject ac. He added that the HS125 had not been clearly visible on his radar display as its label was overlapping with those of other ac holding at BNN. The fps display would have provided information to show the conflict, although the fps would not have been positioned in the same bay. The B737's fps would have been in position in the left-hand of the three-bay fps display i.e. farthest from the HS125's.

The SC said that he first became aware of the conflict shortly after he issued the turn instruction to the B737. Whilst scanning the radar display, he noticed the HS125's SSR label which appeared just clearing the BNN traffic. He reacted immediately by issuing the B737 pilot with an 'avoiding action' L turn heading 180° together with an instruction to maintain 4000ft. After receiving a correct read back, the HS125 pilot was given an 'avoiding action' turn heading 295° and instructed to climb to 5000ft. TI was then passed to the B737 pilot: *"traffic twelve o'clock range three miles indicating four thousand four hundred feet verified"*. The pilot reported that the traffic was showing on TCAS and, additionally, he was visual with it. The pilot of the HS125 reported later that he had sighted the B737 and had also received a TCAS TA. Radar recordings of the incident show that when the avoiding action instruction was passed to the B737 pilot, at 0823:00, the ac was passing 3400ft. The SSR label of the HS125 was just appearing clear of BNN holding traffic, at 3900ft. This corresponds with the SC's recollection of the event. The 2 ac were now on conflicting tracks, 6.5nm apart. When STCA activated at 0823:19, the B737 had levelled at 4000ft and the HS125 was passing 4200ft, 4.5nm away. Minimum separation occurred at 0823:39 when the ac were passing 2.6nm apart, separated vertically by 800ft.

The Airprox occurred because the NW DEPS/BNN SC released the B737 into conflict with the HS125. It has not been possible to determine why, having already released the HS125, the SC agreed the release for the B737 on a conflicting SID nor why he could not recollect having carried out this task. However, as soon as he spotted the conflict, the SC took timely and positive action to rectify the situation and almost achieved standard separation.

RAF NORTHOLT comments that in order to deconflict with other routes, significantly those serving Luton airport, the published BUZAD 1Y departure mandates a stepped-climb profile. This requires the ac to be level at 3000ft QNH 6 DME before BNN VOR, after which it is required to climb in order to achieve 5000ft 3 DME from BNN and 6000ft 6 DME from BNN. The clearance under which the HS125 was operating appeared to conform to this profile, as did the ac itself, and from the report submitted there appears to have been no procedural failure by the crew that might have contributed to the incident. Therefore, notwithstanding that this is busy airspace, there should be no reason why a conflict arose unless a failure occurred in the co-ordination with other routes or the other crew made a mistake.

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Although there seems to have been no real risk of collision in this case, it serves to emphasise the density of traffic in the London area, the significant safety benefits of TCAS and the continuing wisdom of maintaining an effective lookout even in Class A airspace.

HQ STC comments that the controller appears to have made an initial error and then taken positive action to correct this. Following this action there was little chance of a collision as verified by the large miss distance.

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.

Members concurred the findings of the thorough ATSI investigation and their determination that the primary cause of this Airprox was a straightforward mistake by the SC. Some ATC experts additionally considered that the ATC teamwork had been lacking: they thought that the Co-ordinator, albeit a trainee, who had been involved actively in accepting the respective ac releases, should also have seen the confliction and informed the SC, allowing him to take earlier avoiding action. After the ac were airborne and the confliction was spotted, however, the action taken by the SC was correct, as timely as it could have been and resulted in only a small erosion of standard separation.

Pilot members considered that the early release from speed control by ATC, if enacted by crews, resulted in reduced time being available for the implementation of any ATC instructions. This was particularly pertinent in busy terminal airspace.

PART C: ASSESSMENT OF CAUSE AND RISK

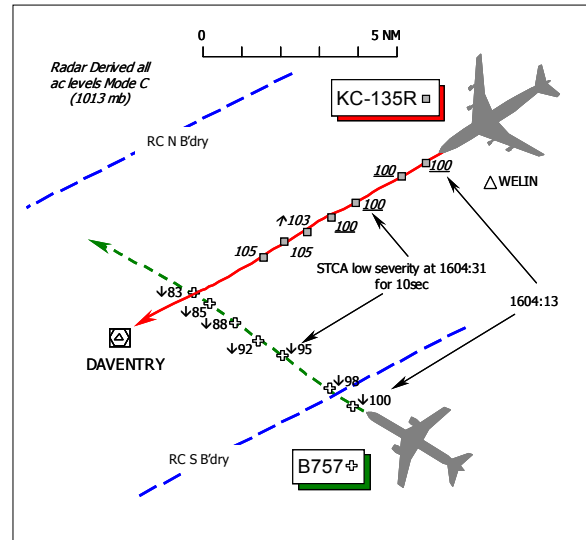
Cause: The LTCC NW DEPS/BNN Sector Controller released the B737 into conflict with the HS125.

Degree of Risk: C.

AIRPROX REPORT NO 041/04

Date/Time: 29 Mar 1604
Position: 5211N 0102W (3nm E of DAV)
Airspace: DAVENTRY CTA (Class: A)
Reporting Ac Reported Ac
Type: B757-200 KC-135R
Operator: CAT Foreign Mil
Alt/FL: ↓FL90 FL100

Weather VMC CLBL VMC CLAC
Visibility: 50nm Unlimited
Reported Separation:
 700ft V/2.5nm H Not seen
Recorded Separation:
 4.3nm H - 500ft V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE B757-200 PILOT reports that his ac has a blue & white livery and the HISL was on whilst inbound to Birmingham, IFR, in receipt of a RCS from LTCC on 130.92MHz and squawking the allocated code with Mode C.

Heading 310° (M) direct to the HON VOR at 250kt, the controller instructed them to descend to FL90 through the level of the Daventry Radar Corridor (RC) [FL100]. Descending about 2000ft above cloud with a flight visibility of 50nm, apparently there was a military ac in transit through the corridor, but no traffic information warning nor avoiding action advice was issued before they spotted the other ac – a KC-135 – about 4nm away and closing from the R. TCAS indicated a TA but an RA was not enunciated. To avoid the KC-135 and increase separation he increased the rate of descent by selecting the speedbrake and they passed 700ft below and 2½nm away from the other ac. The Airprox occurred during the frequency change from London CONTROL to Birmingham APPROACH on 118.06MHz; the Birmingham controller queried whether they had sighted the KC-135 and the separation with the first call. He added that the risk was “slight” but cited controller workload as a possible relevant factor.

THE KC-135R PILOT reports he was inbound to Fairford IFR and in receipt of a Radar Information Service [sic – it was actually a RCS] from London Military heading 268° at 300kt. He was squawking the assigned code with Mode C; TCAS is fitted. Flying in level cruise at FL100, in VMC some 4000ft above cloud with unlimited visibility he was not aware of any other ac that had flown “within an unsafe proximity” to his ac. He had not sighted the B757 and added that the risk was “none”.

THE LTCC MIDLANDS SECTOR CONTROLLER (TC MID) reports that he was controlling the TC MIDLANDS Sector with COWLY & WELIN banded together, hence he was “reasonably busy” but was in the process of trying to get the Sector split at the time of the Airprox.

The B757 was inbound to Birmingham and he had co-ordinated the crossing traffic through the Daventry RC himself at FL100. The B757 had initially been descended to FL170 and upon reaching this level the crew “was pushing him” for further descent, so he descended the flight to FL130; once they had levelled the crew “pushed him” for further descent again. At this point he issued a descent instruction to FL80, [it was initially FL90 then to FL80 about 1min later], thereby descending the B757 through the level of the crossing traffic at FL100 in the RC. The first he knew about the incident was when the direct access telephone line from LJAO started ringing; when he looked up he saw the two ac’s SSR returns flashing

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– the B757 at FL95 and the RC traffic at FL100 about 3.5 miles apart. He did not pass avoiding action nor traffic information to the B757 crew, but the Swanwick (Mil) LJAO CENTRAL controller climbed the KC-135 about 500ft. Both ac continued on their respective flight paths without the B757 pilot mentioning anything about the incident on RT.

THE SWANWICK (Mil) LJAO CENTRAL CONTROLLER (CEN) reports that he was controlling the KC-135, under a RCS through the Daventry RC at FL100, which had been booked with TC MID. When the KC-135 was in the corridor he observed the B757 in his ac's L 10 o'clock at about 20nm descending inbound to Birmingham and he passed traffic information on the airliner to the KC-135 crew as "descending, co-ordinated above". The KC-135 pilot reported visual contact with the B757, which he then saw had descended through FL110 Mode C, but he thought the TC controller must be expediting the B757's descent to pass beneath the KC-135, so re-called the traffic to the KC-135 crew as "descending now co-ordinated beneath". Whilst following the B757's Mode C indications he realised the ac was not descending fast enough and separation would be eroded. So to avoid the B757 he initiated an avoiding action climb instruction to the KC-135 crew to climb to FL110, which they acknowledged. He assessed that the minimum separation between the ac was 3nm horizontally and 1000ft vertically. Subsequently, TC MID informed him that the B757 pilot was reporting an Airprox, as he had to increase his ac's rate of descent to avoid a TCAS RA going off.

MIL ATC OPS reports that LJAO CEN had obtained a Cleared Flight Path (CFP) for the KC-135 to transit the RC at FL100, as per HQ 3 Gp ATC SOPs - 0309 & LTCC MATS Pt 2 - 4.3, from TC MID who was controlling the B757, descending into Birmingham from the S. At 1603:00, the KC-135 crew was established under their own navigation through the DTY RC, level at FL100 under a RCS. At 1603:42, CEN called the B757 traffic to the KC-135 as "*..traffic left 10 o'clock 12 miles crossing left to right in the descent, co-ordinated 1000ft above.*" The KC-135 crew reported "*..traffic in sight*" at 1603:47, but CEN continued to monitor the B757, which had maintained its descent and the controller presumed that the TC MID controller was now descending the B757 below the KC-135. Therefore, CEN recalled the traffic inferring that the B757 was now co-ordinated below at 1604:06. However, as the situation developed it became apparent to CEN that separation between the 2 ac was going to be eroded, therefore at 1604:35, CEN passed avoiding action to the KC-135, "*...avoiding action, climb FL110, that traffic left 10 o'clock, 5 miles crossing left right, descending slowly*". This instruction was acknowledged by the KC-135 crew at 1604:41. Simultaneously, CEN contacted TC MID to confirm their intentions with the B757. CEN advised that he was climbing the KC-135 to FL110 but after TC Midlands stated "*..I think he's through you now*" CEN declared "*...Okay I'll level off*". As the B757 descended through FL90 Mode C, CEN instructed the KC-135 crew to "*..maintain FL100 now , the traffic left 10 o'clock, 3 miles left to right, 1000ft beneath*", which was acknowledged at 1604:57.

[UKAB Note: The Clee Hill Radar recording shows the KC-135 routeing through the RC indicating level at FL100 Mode C. At 1604:13, the B757 is shown just before it crosses the southern boundary of the DAVENTRY RC tracking 310° and descending through the level of the KC-135 indicating FL100. STCA activated at 1604:31, when the horizontal separation reduced to 4.3nm and Mode C indicated a separation of 500ft as the B757 descended through FL95. Standard minima of 1000ft was restored quickly at 1604:55, by a combination of the B757's descent and the KC-135 climbing through FL103 in response to the avoiding action issued, ascending to a maximum of FL105. This level was maintained until after the B757 had crossed ahead, still descending with vertical separation steadily increasing.]

Prior to the Airprox, the transit of the KC-135 through the DTY RC had been routine. When the controller spotted the potential confliction at 1603:42, CEN passed prompt and accurate traffic information to the KC-135 about the B757. As GAT had to be separated from the KC-135 - which was on a CFP - CEN's assumption that the conflicting traffic would stop above his traffic was understandable given the B757's rate of descent, which CEN had been monitoring. As the B757 passed through FL110 in the descent, CEN assumed that TC MID was now descending their traffic below the KC-135. However, as the horizontal separation between the 2 ac approached separation minima, CEN assessed that the B757's rate of descent was not sufficient to achieve vertical separation minima and CEN initiated an avoiding

action climb to FL110. CEN immediately contacted TC Midlands to ascertain the intentions of the B757 and a somewhat confused conversation ensued as to what had just occurred and further actions. By the end of this conversation the B757 had descended below FL90 and it was agreed that the KC-135 could maintain FL100 for the remainder of the crossing of the DTY CTA.

CEN acted in accordance with SOPs and Swanwick (Mil) has taken appropriate action to highlight to their controllers the need for vigilance against this form of incident.

ATSI reports that the Airprox took place in Class A CAS approximately 3nm E of the DTY VOR at 1604 UTC, as the KC-135R crossed westbound through the Daventry RC. The corridor, which is 8nm wide with a centreline aligned on DTY VOR 246°/066° radials enables co-ordinated OAT to cross the airways system at specific levels [normally FL100] in the vicinity of the DTY VOR. The B757-200, was inbound to Birmingham from Las Palmas. It was receiving an Area Control Service from the TC MID SC who was operating both COWLY and WELIN Sectors banded together, as well as performing the TC MIDLAND CO-ORDINATOR role. The controller reported that he had been comfortable with this configuration, which he had inherited from his predecessor some 50min earlier. It was only in the period immediately preceding the Airprox, during which both workload and traffic loading reached a level of 'medium to high', that he considered the position should be split and was taking steps to achieve this when the incident occurred.

At 1557:20, the B757 crew made their first call on the TC MID frequency, reporting passing FL240 descending to FL220 and tracking N towards BUZAD for the commencement of the relevant STAR into Birmingham. TC MID acknowledged the report and then immediately answered a telephone call from the LACC LJAO controller who requested co-ordination for the KC-135 to cross westbound through the RC at FL100. TC MID advised that he could see the track and issued a RC crossing clearance at FL100. At this stage the subject flights were some distance apart, the KC-135 being about 20nm to the N of the corridor's eastern extremity while the B757 had about 40nm to run to the southern edge of the corridor. Requests to TC MID for corridor transits are relatively common occurrences, three in one hour on some occasions the SC opined. In accordance with the applicable procedures TC MID then prepared 3 'pink' crossing fpps, each with the KC-135's flight details. One was provided for TC NW while the other two were placed on the SC's fpps display board, one on the 'west' side and one on the 'east'. Their purpose is to act as a reminder of the presence of the crossing traffic as it transits through the corridor and thus the airway complex.

Approaching FL220, about a minute after his first call, the B757 pilot requested further descent "[C/S] *standing by for further descent*". At the time, the SC was on the telephone to another TC sector and missed the call. After other exchanges had taken place the pilot's request was repeated at 1558:50, "[C/S] *requesting further descent*", whereupon the SC issued a descent clearance to FL170. A similar scenario occurred as the flight reported "...*approaching flight level 170*". However, on this occasion the request was quickly identified, the flight cleared to FL160 and instructed to turn L onto a radar heading of 310°. Some 30 sec later, after instructions were issued to other flights, further descent clearance to FL130 was transmitted. At this stage, the two ac were about 20nm apart with the B757 in the L turn onto the assigned heading and the KC-135 about to enter the eastern end of the corridor westbound. At 1602:45, as the B757 was passing FL135, the pilot asked once more "[C/S] *requesting further descent*". The SC immediately responded at 1602:50, with a clearance to descend to FL90, through the level of the KC-135 at FL100 that was at 2 o'clock - 16nm on a converging track. The controller acknowledged that when he issued this clearance he had not taken into account the presence of the crossing KC-135 despite having done so earlier when issuing climb and descent instructions to other traffic. Though he could not recall specifically, he had little doubt that the relevant pink crossing fpps had been correctly positioned in his fpps display to provide the necessary reminder. It would appear that on this occasion he had acceded to the pilot's request (the fourth by this crew in less than 5min) a little too hastily and before he had first made the appropriate checks to ascertain a safe level. In the controller's written report he refers twice to the flight "...*pushing me for further descent*", which he considered placed unnecessary demands upon him when the flight's descent profile was not unreasonable for a normal

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arrival into Birmingham. After dealing with two telephone calls from other sectors, TC MID then issued the B757 crew with further descent clearance to FL80 at 1603:40, again overlooking the presence of the crossing KC-135, though at this point the radar recording shows that the KC-135's label is obscured by the label of other traffic. The two ac were then 9nm apart - with the B757 descending through FL112 and from Mode C data maintaining a rate of descent of at least 2000ft/min. Forty five seconds later the SC instructed the B757 crew to route direct to HONILEY [requiring about a 10° L turn] and to contact Birmingham APPROACH. At this point the B757 was descending through FL98 with the KC-135 in its 2:30 position at a range of 6nm. Almost immediately STCA activated and then, co-incident with the pilot's read back of the frequency change, TC MID received a telephoned call from the LJAO controller. Now recognising his error, TC MID spoke first and apologised. LJAO CEN sought confirmation that the B757 was descending and then advised that the crossing KC-135 was now climbing to FL110 to avoid the airliner. Fortuitously, separation was eroded only briefly and reached a minimum when the B757 was descending through FL95 with the KC-135 in its 2:30 position at a range of 4.3nm some 500ft above it. When the B757 was crossing through the KC-135's 12 o'clock at a range of 2.2nm, the ac's levels were FL83 and FL105 respectively. On first communication with Birmingham, no comment about the incident was volunteered by the pilot of the B757. It was only when the Birmingham APR enquired if he was aware they had been close to military traffic that the pilot stated "...negative nothing was said to us we got him on TCAS nearest about 700 feet above just increased our rate of descent".

Reflecting on the development of the incident, the controller considered that a contributory factor was certainly the increasing workload of the CO-ORDINATOR function on the suite. Unlike the flow of traffic which is usually measurable, CO-ORDINATOR workload is much more difficult to predict and can quickly balloon, irrespective of the anticipated traffic load. The controller felt that his inexperience was also a factor (he had only recently qualified on the TC MIDLANDS suite) and in hindsight should probably have taken steps to 'split-off' the CO-ORDINATOR role earlier. A Unit review of this incident resulted in the publication of an 'Information Notice', highlighting the need to 'split' sectors in sufficient time. In addition, Watch Managers have been reminded that due cognisance of controller's experience should be given when combining sectors. Considering the controller did not subsequently recognise the deteriorating situation until after he had transferred the flight, it was fortunate that both the pilot of the B757 and the military controller had initiated action; otherwise a more serious incident could have resulted. In the end, standard separation was only briefly eroded. The increasing workload was a significant contributory factor, particularly the co-ordinating element of the bandboxed MIDLANDS suite that the SC was operating at the time. This was evinced by the fact that the pilot of the B757 had to keep requesting further descent. As can be seen, this resulted in additional RTF transmissions, which could have been avoided and placed greater pressure on the SC. The prompt follow-up action taken by Unit management to remind staff of the need to split sectors in good time is acknowledged and to be welcomed.

HQ 3AF had nothing further to add.

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.

It was evident that the LJAO CEN controller had correctly co-ordinated the transit of the KC-135 through the Daventry RC with TC MID and it was CEN who had astutely detected that the B757 was descending through the level of the RC. The Board commended the LJAO controller for the steady flow of traffic information to the KC-135 crew and his perceptive appreciation of the situation. Although the avoiding action given to the tanker crew was wisely applied, by that stage the situation was already being resolved as the radar recording shows that the avoiding action transmitted to the KC-135 crew was issued after the B757 was in fact already below the level of the KC-135 with vertical separation steadily

increasing between the two ac. Nonetheless, CEN was evidently keeping a close watch on events, took charge of the situation and passed comprehensive traffic information, which had enabled the KC-135 crew to sight the B757 promptly as it descended ahead – as evinced by the RT transcript and contrary to the KC-135 pilot's recollection. That neither crew received an RA was indicative of the broad geometry of the situation and evidently TCAS did not consider that either ac's safety margins would be breached.

From the reporting B757 pilot's perspective it was fortunate that they had spotted the KC-135 when it was about 4nm away - probably just as they descended through the level of the RC - and reinforced by the TCAS TA. Thus alerted to the presence of the KC-135, the crew had sensibly elected to increase the ac's RoD and hence the separation from the Tanker, preventing the situation from deteriorating. The Board noted the comments by the reporting B757 pilot, citing controller workload as a possible relevant factor to this Airprox. Indeed this did appear to be the case and it was evident that the SC was working hard on this 'bandboxed' sector. Controller members thought it very significant that the SC had missed the first transmission from the B757 when the crew initially contacted the Sector. This could have been the trigger which induced the B757 crew to persist in their requests for further descent as they approached their destination of Birmingham – which ATSI had highlighted in their report. Nevertheless, the view of several CAT pilot members was that the descent profile was not abnormally high for the flight and there was no apparent need for the B757 crew to continually ask for further descent from the SC. TC MID would have been perfectly aware of the appropriate levels required in order to comply with the B757's arrival routeing. To continually ask for further descent was not only unwarranted, but in the Board's view probably compounded TC MID's workload and a pilot member observed that general advice on this topic had recently been released.

The ATSI report had reflected that the SC himself had been content to work the 'bandboxed' sector after taking over from his colleague some 50min before the Airprox occurred. Controller members observed, however, that this somewhat inexperienced controller was possibly not best placed to judge when the workload was building to the point that a sector split was warranted. The Board endorsed the ATSI view that the high workload resulting from 'bandboxing' all the MID Sector control and co-ordinator tasks onto one operating position manned by a recently qualified controller was highly significant but rather than just contributory, in the member's view it figured as part of the cause of this Airprox. Some CAT pilot members were concerned at the number of Airprox that had been presented where 'bandboxed' sector working featured: controller's were quick to point out that supervisors must play an active role in ensuring that workload is kept within the limits of their controllers capabilities. Whilst members agreed with the TC MID that the workload in the co-ordinator role can vary considerably and notwithstanding that action to split the sector was already in hand, controller members experienced in the supervisory role at ACCs suggested that it should evidently have been split earlier. Whilst the decision to split is clearly a matter of judgement, it is far better to split before the traffic/workload builds above acceptable levels. The Board welcomed the advice provided by the service provider to watch managers on this topic, seeing this as a positive step. Evidently, the TC MID controller had effected the correct co-ordination for the RC crossing and had the relevant fps to block the RC level. Controller members thought the cause, therefore was straightforward in that the TC MID SC had not recognised the confliction when he descended the B757. The Board agreed unanimously and concluded that this Airprox had resulted during a period of relatively high workload, because the TC MID SC descended the B757 through the RC without taking the KC-135 into account.

With regard to risk, it was unfortunate that the STCA triggered just as the B757 crew was reading back the frequency change instruction and switching from the TC MID Sector frequency. Thus the TC MID SC was not alerted to the situation before the B757 crew switched to Birmingham. Consequently, the TC MID SC was unable to effect the outcome when he was alerted to the situation by the LJAO CEN controller's landline call. Fortunately, the B757 crew had seen the KC-135 and had taken action to increase separation against it. Moreover, LJAO CEN had alerted the latter's crew who had also seen the airliner and been instructed to climb above it. This, coupled with a minimum of 4.3nm/500ft between the ac in the Board's view had removed entirely any risk of a collision.

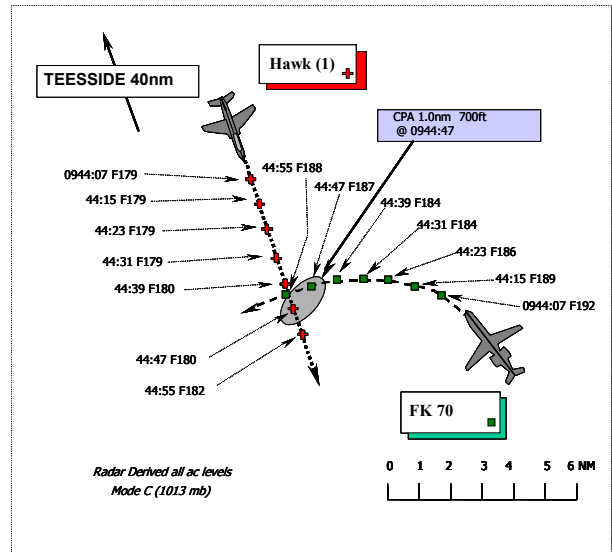
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: During a period of relatively high workload, the TC MID SC descended the B757 through the RC without taking the KC135 into account.

Degree of Risk: C.

AIRPROX REPORT NO 042/04

Date/Time: 25 Mar 0945
Position: 5412N 00032E
 (Descent to Teesside)
Airspace: Vale of York AIAA (Class:G)
Reporting Ac Reported Ac
Type: FK70 Hawk
Operator: CAT HQ STC
Alt/FL: FL170 N/R
 (N/K)
Weather VMC CLAC VMC CLAC
Visibility: >10km >10km
Reported Separation:
 1.5nm H 400ft V NR
Recorded Separation:
 1.00nm H 700ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FK70 PILOT reports flying a scheduled service from Amsterdam to Teesside, IFR in receipt of a RAS from London Military. He was inbound the TD NDB in the descent and was cleared to FL170 near OTR. London Mil advised them of traffic at 15nm and advised a left turn onto 270° to avoid it. Shortly thereafter the controller advised a hard turn on to 210° so they disconnected the autopilot and immediately received, and responded to, a TCAS RA with a 'Climb, Climb' instruction. This was followed by 'Adjust V/S' and then 'Clear of traffic'. They saw one of two black fighters passing 400ft below and at 1.5nm away in their 12 o'clock crossing from right to left. RA occurred at approx FL180 and they climbed to FL185 before continuing the descent direct to TD. They felt that their ac had been endangered by the proximity of the other ac.

UKAB Note (1): The FK70 pilot's report bore the date of the Airprox but was not received until 21 days after the event. This delayed tracing action, in the event making it impossible to gather complete data about the incident.

THE HAWK PILOT reports that at the time and date of the incident he was leading a pair of Hawk ac on an air combat training (ACT) mission conducting practise intercepts in the Vale of York AAIA in receipt of an ADIS from Neatishead. He was not made aware of the incident until one month after the event and neither pilot in the ac had any recollection of a confliction. Either the other ac was not seen or, more likely he thought, that it was seen but not considered to be a confliction. At the time the weather was clear above 8000ft with very good conditions and no cloud above.

THE HAWK STATION did not comment.

MIL ATC OPS reports that a FK70 was routing inbound to Teesside from Amsterdam while a pair of Hawks was carrying out an Air Defence sortie in the Vale of York under the control of Neatishead. The leader was the ac involved in the incident. The FK70 had been prenoted to LATCC (Mil) Controller 12 (CON 12) to depart UARs in the OTR area at FL260. The FK70 pilot called CON 12 at 0940, was identified and placed under a RCS and was instructed to "...maintain heading" at 0940:07. At 0940:55 CON 12 instructed him to descend to FL170 and changed the type of radar service to a RAS as the ac left CAS. At 0943:06 CON 12 called "traffic 12 o'clock, 15 miles, reciprocal, indicating FL 185, if not sighted turn left heading 270°". The pilot acknowledged the TI and initiated a turn. At 0944:11, further

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avoiding action was passed when CON 12 instructed "*C/S 1 further avoiding action turn hard left heading 210, previously reported traffic north west 5 miles southbound indicating FL175*". The FK70 pilot responded that "*we have got him on TCAS, he's 12 o'clock now turning hard left heading 210*" followed immediately by "*TCAS is right through the climbing C/S 1*" and at 0944:34 "*we've got visual with the traffic 12 o'clock now sir. We're climbing leaving FL185*". The pilot called clear of the confliction at 0944:50.

Analysis of the Claxby Radar recording shows the FK70 in the OTR area at FL260 tracking 330°. It commences a descent at 0941:28 and leaves the upper air 50 sec later. A further 40sec later the Hawk is observed in the FK70's 11 o'clock at 22.5nm indicating FL183 tracking 160° showing a Neatishead squawk. At 0943:39 the FK70 initiates a L turn onto 270° and its Mode C indicates FL198 descending when the two contacts are 12.5nm apart still converging. The Hawk is seen initiating a R turn to track 170° at 0943:53 while indicating FL180 which brings the 2 contacts back onto conflicting tracks. The FK70 continues to descend and at 0944:17 the Hawk is in its 1 o'clock at 6nm, Mode C showing separation of 1000 ft. The FK70 continues to descend to FL184 and this is maintained for 2 sweeps before a climb is initiated against the Hawk which maintained FL180 throughout. At 0944:50 the Hawk passed through the FK70's 12 o'clock and the separation then increases.

CON 12 reported his workload at the time as being high, with 3 ac on frequency and simultaneously being involved in 2 protracted handovers. The FK70 was carrying out the standard routing for ac inbound to Teesside leaving the UAR structure at OTR at FL260 and routing to the Teesside NDB. The UK AIP states that "*aircraft inbound to Teesside from the southeast are recommended to route via FAMBO to TD NDB...*" to take ac clear of the Vale of York AIAA. However, when the FK70 pilot called CON 12 he was placed under a RCS and instructed to maintain heading which negated any option he had to route via FAMBO, as recommended in the AIP. CON 12 passed TI to the FK70 pilot on the Hawk when the ac were 20nm apart (although he passed the range as 15nm) on a reciprocal heading. At the time, CON 12 gave a sound heading which would have ensured standard separation against the Hawk provided it maintained its heading. Thirty sec later however, the Hawk initiated a R turn to track 170° which brought the ac back onto conflicting tracks. CON 12 was then engaged in a protracted handover (*not evident on the tape transcript but heard on the tape held at LATCC(Mil)*) with another agency for an ac 75nm away from the location of the incident. This geographical split may have been a factor in the reduction in CON 12's attention that resulted in the late update to the TI on the Hawk (he did not update the TI nor pass any avoiding advice until 0944:11 when the ac were 6.5nm apart still converging). At this stage CON 12 passed avoiding action for the FK70 to turn further left heading 210° with "*traffic northwest, 5 miles, southbound, indicating FL175*". This was immediately followed by the FK70 pilot saying that he had the traffic on TCAS and was making a hard left turn which culminated in him making a TCAS RA climb to FL185.

CON 12 was late in updating the TI to the FK70 due to a number of factors. He had placed it on a heading, which he thought to be safe, and would achieve standard separation from the conflicting traffic while at the same time he initiated a protracted handover, which took his attention to a different geographical location. When CON 12 updated the avoiding action and TI the hard left turn given to the FK70 exacerbated the problem by reducing further the lateral separation. If he had taken the decision to reverse the turn - to R - at this stage, the FK70 would have routed further from the Hawk. However, he assessed that the FK70 was already in a left turn so to continue in the same direction would be the most effective option: unfortunately, this was not the case.

HQ 3 Gp ACC SM comments that due to the late notification of the Airprox, data tapes were re-used at Neatishead. An AIS (Mil) video replay of the incident was obtained and forwarded to Neatishead but when the WC and FA involved reviewed the replay they did not recollect the incident. Analysis of the replay showed the Hawk formation outbound from Leeming on a heading of 150° squawking 0415; the squawk then changed to a Neatishead allocated squawk of 2441/2442. The Hawks were placed on an ADIS while the FK70 was 23nm to the SSE. The Neatishead WC then split the Hawks, the No2 heading 040° and the Leader, the subject ac, on 170°. The FK70 in the meantime had turned left 20° from its

previous track at a range of 13.25nm, this heading lagged the Hawk and at 8.5nm separation it was 1500ft above. At 5.5nm separation the FK70 turned a further 30° left, giving some lead albeit with a speed disadvantage, and it descended a further 600ft. Hawk leader maintained heading 170° and FL179/180 throughout the incident. At 4.5nm the FK70 had descended to FL186 heading approximately 270° with the lead on the Hawk eroding quickly.

By 2.75nm the FK70 had descended to FL184 with the Hawk indicating FL179 and by this stage the FK70 was lagging the Hawk. Closure continued with the FK70 turning left towards the Hawk at FL184, to the E of leader's position by 1.5nm. The CPA occurred shortly afterwards, with the FK70 passing behind the leader and displaced by 0.75nm, indicating FL187 and heading 260° [See UKAB Note 2]. Thereafter, the separation increased with Hawk leader continuing S and the FK70 heading W having climbed to FL188. The Hawks were under the terms of service of an ADIS so without the supporting evidence it is assumed that the FK70 was called in to the Hawk formation. On the other hand the FK70 was under a RAS. The analysis shows that the FK70 was turned into conflict with the Hawk. The initial turn L to clear the projected track at 22nm did not resolve the potential conflict as the Hawks split and did not maintain an E track.

UKAB Note (2): The recording of the Claxby Radar shows the CPA as occurring at 0944:47, as the FK70 passes behind the Hawk and separated at the closest point by 1.00nm and 700ft above and climbing 200ft per radar sweep (8sec).

HQ STC comments that it is surprising to see that the controller was willing to give a service in such busy airspace (AIAA) during one of the busiest periods of the day for the Vale of York air stations. In doing this he had potentially absolved the FK70 from 'see and avoid' in Class G. The avoiding action given may have been appropriate at the time but with the vagaries of other ac manoeuvre, it should have been monitored closely until the conflict had passed.

TCAS worked 'as advertised', providing the FK70 crew with a suitable action to avoid the conflict. Also, the Hawk pilot had fulfilled his mandate of 'see and avoid' in Class G airspace – which has primacy over all other avoidance means. The avoidance margin given by the Hawk would seem reasonable for an encounter in Class G. However, given the nature of the FK70's duties, a jink to fly behind or further below it by the Hawk pilot would have been preferable. The fact that the Hawk pilot had no recollection of the FK70 some one month after is hardly surprising as this encounter would be unlikely to have alarmed 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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members were concerned that the late notification of the incident had hampered the investigation. They reminded pilots that the UK AIP ENR 1-14 3.2 et seq stipulates that 'An initial report of an Airprox should be made immediately to the ATS Unit with which the pilot is in communication'. Further 'If the Airprox cannot be reported on the radio at the time, an initial report should be made by the pilot immediately after landing by telephone or other means to any UK ATS Unit but preferably to an ACC'. The AIP also states that 'Initial reports **MUST** be confirmed within 7 days ...'.

Members were concerned that incidents involving ac not utilising the recommended routing via FAMBO to Teesside (and Newcastle) from the S were becoming frequent. This routing was specifically designed to try to reduce the amount of traffic transiting the Vale of York AIAA and thereby prevent incidents such as this one.

AIRPROX REPORT No 042/04

Following some concern, Members were assured that this incident had been properly reported and investigated by the Military authorities.

Members considered why the loss of separation had occurred. The Hawk was under an ADIS from Neatishead, but due to the late reporting and follow-up Neatishead could not provide any information to assist with the investigation. It was accepted however, that the Hawk Leader was probably informed about the FK70 by the Fighter Controller, placing the onus on the Hawk pilot to avoid it. That he did not recall seeing the FK70 was puzzling as it was initially coming from his 11 o'clock high and should have been easily visible if the canopy arch did not conceal it. In the event however, due in part to its TCAS functioning and being reacted to correctly by the FK70 pilot, his ac crossed well above and behind the Hawk (800ft and over 1nm when the tracks crossed).

The FK70 was under a RAS in Class G Airspace and was given, but reacted slowly to (1min until a turn is discernable on the radar) a turn left onto 270° to avoid the Hawks. This instruction was not prefaced by 'avoiding action': had it been the FK70 pilot would probably have reacted to it more promptly. Members however thought that, when the Hawk leader turned towards the FK70, giving the FK70 a further left turn rather than reversing it to the right had been unwise and had exacerbated the situation. In addition, the Hawk had levelled at FL180 and had been at that height for about 1min, so it may have also been appropriate to stop the FK70's descent (passing FL195 at the time) above the Hawk.

Members considered that this lapse by Con 12 had been the cause of the loss of separation. In this instance however, although there had been a serious erosion of the separation prescribed when applying a RAS, this had not resulted in any risk of collision since the FK70 pilot reacted correctly and promptly to the TCAS RA warning and, such that the ac were separated laterally by over a mile.

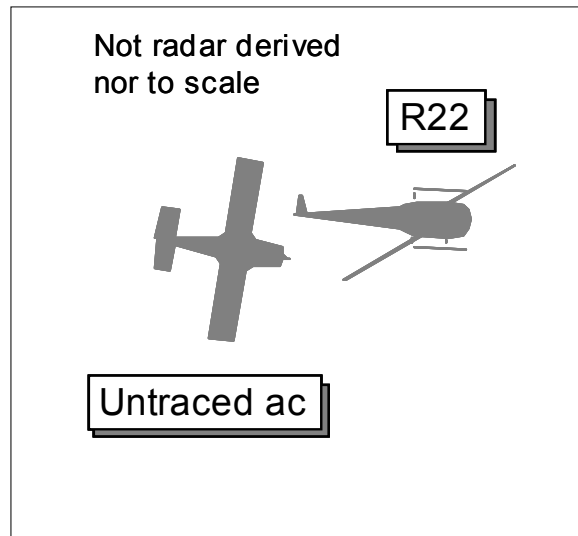
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following a turn by the Hawk leader, London (Mil) Con 12 did not achieve the desired separation required by a RAS.

Degree of Risk: C.

AIRPROX REPORT NO 043/04

Date/Time: 4 Apr 0919 (Sunday)
Position: 5111N 0128W (S Abm Andover)
Airspace: FIR (Class: G)
Reporting Ac Reported Ac
Type: R22 Untraced light ac
Operator: Civ Trg NK
Alt/FL: 2100ft
(QNH 1014mb)
Weather VMC CLNC NK
Visibility: >10km
Reported Separation:
100ft V 50ft H
Recorded Separation:
NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE R22 PILOT reports heading 090-100° at 70kt after departing Thrupton on a local G/H training flight and in receipt of an A/G service from Thrupton RADIO 130.45MHz squawking 7000 with NMC. The visibility was >10km in clear sky VMC and the helicopter was coloured white with anti-collision light switched on. When S abeam Andover cruising at 2100ft QNH 1014mb, a blue/white low wing single engine ac was seen to pass about 100ft below and 50ft horizontally to his R in level flight at about 2000ft altitude and 95-110kt on an easterly track. He had no time to take avoiding action as the other ac had appeared from behind and it was seen to continue on a steady slowing diverging track to his R. The ac had passed too close and fast for him to record its registration and he believed that his small tail-on profile, lack of relative movement and with both ac flying into sun probably had meant that he had gone unsighted to the other pilot. He assessed the risk of collision as very high.

AIS MIL reports that tracing action on the reported ac had been unsuccessful. Burrington and Pease Pottage radars were out of service and the incident occurred below Heathrow radar coverage. Extensive procedural tracing action covering all adjacent ATSUs and airfields did not reveal the identity of the reported ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available was the report from the R22 pilot.

It was unfortunate that this incident occurred outside of recorded radar coverage and that the procedural tracing action had not revealed the other ac's identity. Therefore, assessment of the incident was limited to the reporting pilot's information. The R22 pilot had only seen the conflicting untraced light ac as it overtook him, passing 100ft below and 50ft to his R, having approached from behind with no opportunity to take avoiding action. Whether the R22 had gone unsighted to the untraced light ac's pilot was unknown, but members agreed that all of the reporter's observations were pertinent factors to the encounter and could add no further elements. On the limited information available, members could only conclude that the untraced light ac had flown into conflict with the R22.

Turning to risk, although corroboration of the reporting pilot's viewpoint had not been forthcoming, the Board considered that, from R22 pilot's graphic description of the encounter, the untraced ac pilot had, for whatever reason, flown unnecessarily close during the overtaking situation. This had left little margin

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for error or unforeseen manoeuvring to the extent that safety had not been assured during the encounter.

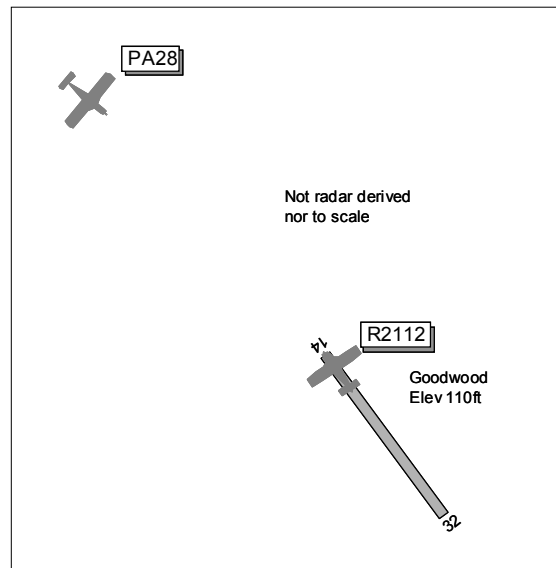
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Untraced light ac flew into conflict with the R22.

Degree of Risk: B.

AIRPROX REPORT NO 044/04

Date/Time: 11 Apr 1017 (Sunday)
Position: 5052N 00045W
(O/H Goodwood - elev 110ft)
Airspace: ATZ (Class: G)
Reporting Ac Reported Ac
Type: Robin2112 PA28
Operator: Civ Trg Civ Club
Alt/FL: 150ft↑ 1000-1200ft↓
(QFE 1020mb) (QFE)
Weather VMC CLBC VMC CLBC
Visibility: 15km 'clear'
Reported Separation:
nil V 300m H 1000ft V 1300m H
Recorded Separation:
NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE ROBIN2112 PILOT reports flying a dual training sortie (PPL annual check) from Chichester/Goodwood and in receipt of an AFIS from Goodwood INFORMATION on 122.45MHz. The visibility was 15km 4000ft below cloud in VMC and the ac was coloured white/red with the fuselage strobe light switched on. On climbout from RW32 passing 150ft QFE 1020mb heading 325° at 70kt, he was alerted by the duty AFISO to a PA28 on final approach to RW14. He saw the conflicting ac head-on, 500m ahead as the RT call was heard, took control and turned immediately R to avoid, estimating the PA28 passed 300m clear to his L at the same level. He assessed that a head-on collision would have occurred if avoiding action had not been taken. He had previously heard the PA28 pilot position incorrectly for downwind and being warned to reposition correctly for a RH cct for RW32. Later he spoke to the PA28 pilot who had been very upset and shaken by his actions, somehow confusing RW direction and live/dead-sides at Goodwood, ending up 180° out of 'sync' with the duty RW. The instructor opined that several factors should have alerted the PA28 pilot to his error on final to RW14, rather than RW32. These included compass/DI heading indications, RW numbers, position of the sun and other cct traffic, including his ac which had just tracked along the RW carrying out a touch and go. The instructor believed the Goodwood AFISO reacted superbly in issuing a traffic warning and it had been fortuitous that he had been carrying out a lookout scan at the time and spotted the traffic whilst his student had been at the controls.

THE PA28 PILOT reports flying solo inbound to Chichester/Goodwood and in communication with Goodwood INFORMATION on 122.45MHz. The visibility was clear below cloud in VMC and the ac was coloured brown/white; anti-collision light switched on. When he called on frequency approaching the airfield, he was told RW32 was in use with a RH cct and, after referring to his loose-leaf flight guide, he envisaged his approach by reference to the airfield plan. He decided to fly to the W of the airfield and then approach from the W, which he did, he thought. The Goodwood airfield plan was lying sideways on the passenger's seat and, for some unexplained reason, he misread the diagram and thought he was approaching the cct in the direction of RW32. Consequently, he made what was an otherwise correct cct and approach but unfortunately from the wrong direction. He called 'overhead' and what he believed to be 'downwind'. In the process of turning 'finals', he noticed an ac on the RW facing in his direction about 1300m ahead and 1000ft below but was unable to see whether it was moving or not. He then realised that he was, erroneously, approaching RW14 instead of RW32 and aborted the landing by executing a R turn and climbing: seconds later the AFISO directed a similar course of action.

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UKAB Note (1): During a subsequent telephone conversation with the PA28 pilot, he confirmed to the UKAB Secretariat that he had been turning onto final approach about 1.5nm from touchdown, having descended on base leg from the cct height of 1200ft, when he noticed the ac on the RW. During the go around, turning R and climbing, he had lost sight of the other ac.

THE GOODWOOD FISO reports the PA28 pilot was given joining information for RW32 but joined for RW14. The pilot was instructed to turn R from final to avoid a Robin2112 which was lifting off from RW32.

UKAB Note (2): The Chichester/Goodwood RT transcript reveals that shortly before 1015, after the PA28 pilot reports "...crosswind", the AFISO transmits "PA28 c/s roger report downwind there's one downwind there's also one crosswind er probably out to your left". The PA28 pilot replies "copy traffic er report downwind". Shortly thereafter the AFISO transmits "er PA28 c/s confirm your position" to which the pilot replies "er turning downwind PA28 c/s". The AFISO responds at 1015:30 "PA28 c/s roger I believe you're actually deadside at the moment report crosswind. This transmission was not acknowledged and 30sec later when further departing traffic requests a L turn out, the AFISO informed the pilot of "...caution there's traffic deadside er to turn crosswind some distance out keep a good lookout". At 1016:30 the Robin2112 pilot reports "...finals touch and go" and the AFISO replies "Robin2112 c/s roger touch and go is your discretion surface wind er zero three zero one zero". Less than 30sec later the AFISO transmits "...PA28 c/s your present position" to which the pilot replies "er finals turning finals PA28 c/s". The AFISO then transmits "PA28 c/s roger immediate right turn please immediate right turn you're on finals for the wrong runway the traffic on the runway is doing a touch and go". The PA28 pilot transmits "immediate right turn" and the AFISO then transmits "Robin2112 c/s caution traffic making an approach head on to you at the moment". Thereafter simultaneous transmissions were recorded followed by an open transmitter for 37sec.

UKAB Note (3): The Airprox occurs below recorded radar coverage. An intermittent primary only return is seen, believed to be the PA28, tracking towards the Goodwood overhead from the N before fading with 4nm to run. It is seen again at 1015:10 1nm W of Goodwood tracking NW in a RH downwind position for RW14 whilst a 7000 squawk NMC, believed to be the Robin2112 is seen 2nm SE of Goodwood tracking SW on R base RW32. The PA28 fades 40sec later 2nm NW of Goodwood in a R turn passing N, turning onto R base RW14, as the Robin2112 also fades 1nm final for RW32.

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 aerodrome flight information service officer involved.

Members could add little further comment to the Airprox. The PA28 pilot had been convinced that his joining plan for RW32 was correct and, in following this, had ended up flying a RH visual cct to RW14 onto final approach, head on to the Robin2112. In doing so, the PA28 pilot did not integrate safely into the Goodwood cct pattern which caused the Airprox.

Members commended the actions taken by the Goodwood AFISO. He had noticed the PA28 pilot's incorrect positioning, when the pilot thought he was downwind but was in fact dead-side, but his transmission was not acknowledged and unfortunately this pertinent information had gone unheeded. The PA28 pilot had noticed his error as he turned onto final approach and commenced a go-around seconds before the 'break-off' instruction had been issued by the AFISO. The AFISO then passed TI to the Robin2112 pilot who saw the PA28 500m ahead and immediately took avoiding action by turning R. All of these factors 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 PA28 pilot did not integrate safely into the Goodwood cct pattern.

Degree of Risk: C.

AIRPROX REPORT No 045/04

AIRPROX REPORT NO 045/04

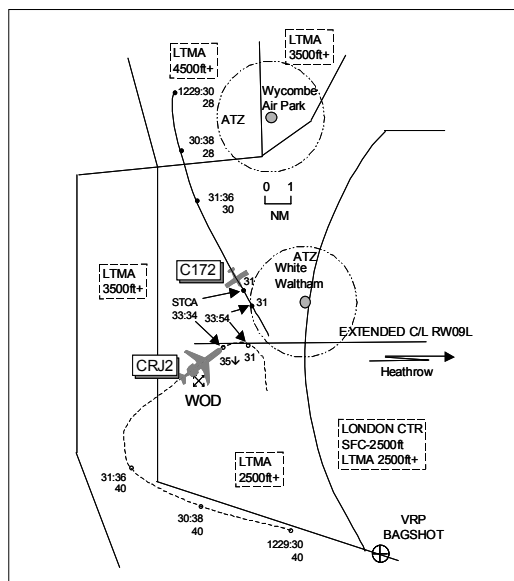
Date/Time: 9 Apr 1234

Position: 5129N 00049W (3nm NE WOD)

Airspace: LTMA (Class: A)

Reporter: HEATHROW FIN DIR

	<u>First Ac</u>	<u>Second Ac</u>
<u>Type:</u>	CRJ2	C172
<u>Operator:</u>	CAT	Civ Pte
<u>Alt/FL:</u>	3000ft↓ (QNH)	3200ft (QNH 1020mb)
<u>Weather</u>	VMC CLAC	VMC CLNC
<u>Visibility:</u>	30nm	>10nm
<u>Reported Separation:</u>	not seen	nil V 1nm H
<u>Recorded Separation:</u>	nil V 1.4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HEATHROW FIN DIR reports that she was vectoring traffic for Heathrow RW09L. She noticed unknown traffic just S of White Waltham squawking 0436 at 3000ft tracking SSE towards the RW09L extended C/L whilst the CRJ2 was on a closing heading of 055° from the R to establish on the LLZ at 3000ft. She gave avoiding action to the CRJ2 crew - a R turn onto 180° - and TI followed by climb clearance to 4000ft and a further R turn onto 240°.

THE FARNBOROUGH LARS CONTROLLER reports that the C172 pilot called on frequency at 1230 routing from Barton to Fairoaks. A squawk code 0436 was issued and the Farnborough QNH of 1020mb was passed and the flight was given a FIS in an area of high traffic density. The frequency was very busy [Easter Bank Holiday Friday]. At 1234 a telephone call was received from Heathrow Radar that the 0436 squawk had infringed CAS. The C172 pilot was asked to report his altitude and replied 3200ft QNH 1020mb. Immediately the pilot was instructed to descend to 2400ft and leave CAS and informed that Heathrow had taken avoiding action on his ac. One minute later the C172 pilot reported level at 2400ft as was told to turn onto a southerly heading as the ac was tracking towards the Heathrow CTR.

THE CRJ2 PILOT reports inbound to Heathrow established on the ILS LLZ RW09L at 3000ft and in receipt of an ATS from Heathrow TOWER, he thought, squawking an assigned code with Mode C. The visibility was 30nm 1000ft above cloud in VMC and the ac was coloured white with strobe lights switched on. The controller gave him avoiding action, an immediate R turn heading 150°, he thought, owing to a light ac. The turn was commenced and the ac was automatically levelled off at 3000ft. A few seconds later the controller said, still without raising her voice, *“that’s not enough turn further right heading 180° and climb to 4000ft”*. After then being told that they were clear of the unknown VFR traffic, a further R turn was given to allow them to re-establish on the ILS and the approach was completed without further incident. The other ac was not seen visually and no TCAS alerts/warnings were received.

THE C172 PILOT reports that the Airprox really happened on his kitchen table when he had planned his flight. On his planned trip between Barton and Fairoaks he knew that he had to be below 4500ft in the sector immediately to the N of the Airprox area but he had simply not noticed the requirement to be below 2500ft abeam White Waltham. The figures on the 1:500,000 chart were to the N and E of the associated sector. He could offer no reason, having spent 2hr planning, what was for him, an

adventurous trip. Heading 185° at 120kt and 3200ft QNH at the time, he was in receipt of a FIS from Farnborough on 125.25MHz squawking 0436 with Mode C. The visibility was >10km in VMC and the ac was coloured white/green with anti-collision light switched on. About 2nm W of White Waltham he saw a white coloured airliner, possibly a Jumbo jet, in his 2.30 position range 2-2.5nm converging from R to L but in a R turn. It passed about 1nm away on his RHS as it turned through an easterly heading onto a southerly track, slightly above his level. He wondered if there was a problem and it was then that Farnborough asked him for his height and then to descend immediately to 2400ft. In his report, the C172 pilot offered sincere apologies for any problems that he had caused.

ATSI reports that the pilot of the C172 established communication with the Farnborough LARS controller at 1229:30. He reported at 3000ft on QNH 1020mb, 2 miles abeam Wycombe, en route from Barton to Fair Oaks. A "... *Flight Information Service to Bagshot Mast ...*" was requested. The LARS controller confirmed the QNH and instructed the flight to squawk the discrete code 0436. No further communication took place until the Airprox occurred.

The CRJ2 was being radar vectored for an ILS approach to Heathrow's RW09L by the TC Heathrow FIN Director. When on a closing heading and descending to 3000ft, STCA activated (1233:34) in respect of unknown traffic in its 11 o'clock position at a range of 2.2nm with Mode C indicating 3100ft. At that point the CRJ2's Mode C indicated 3500ft. The Heathrow controller issued the CRJ2 an 'avoiding action' instruction to turn R onto heading 180°, passed TI and then instructed the flight to climb to 4000ft, emphasising that that this was also part of the avoiding action due to traffic "... *to the north of you at a range of one and a half miles at the same level.*" Half a minute later, the CRJ2 was advised that the traffic was now to the NE, at a range of 3nm descending, and was subsequently repositioned for an uneventful ILS approach.

Analysis of the relevant RT and radar recordings provided the following additional information. At the time of the C172 pilot's initial call, the ac was approximately 3.8nm to the W of Wycombe Air Park (Booker) with its Mode C indicating 2800ft. In that position, the base of the LTMA is 4500ft, however, on its track the flight would enter an area where the base is 2500ft in approximately 2nm. When the 0436 squawk was issued, the flight was still indicating 2800ft Mode C with just over 1nm to run to the boundary of the area with a base of 2500ft. With approximately 0.5nm to run to the boundary (1230:38), the C172's 7000 squawk disappears and when the 0436 squawk appears (1231:36), the flight is indicating 3000ft Mode C, 1.4nm inside the portion of the LTMA with base 2500ft, i.e. apparently inside CAS. No further communication took place between Farnborough and the C172 until 1234:09, when the flight had travelled a further 5nm and into conflict with the CRJ2. In a telephone call, commenced at 1233:56, TC alerted Farnborough to the conflict developing between the subject ac. The Farnborough controller asked the pilot of the C172 to report his altitude, to which he replied 3200ft. The controller instructed the pilot to descend immediately to 2400ft and informed him that he was inside CAS. A few seconds later he informed the pilot that "... *Heathrow have taken avoiding action on you this time*" but no TI was passed. By that stage, the CRJ2 was 1.4nm to the S of the C172 at a similar altitude, 3100ft Mode C, turning away to the S. This was the point of minimum separation. The requisite vertical separation was quickly re-established as the ac followed their respective climb and descent instructions and, at 1235:09, the pilot of the C172 reported at 2400ft. A few seconds later it was necessary for the Farnborough controller to instruct the C172 to take up a more southerly heading in order to avoid infringing the London CTR.

From their written reports, both the pilot of the C172 and the Farnborough controller were under the impression that the ac was in receipt of a FIS at the time of the Airprox. However, although the pilot had requested a FIS, no service was ever specified. MATS Pt. 1, Section 1, Chapter 5, para. 4.4.1 states: "*A controller assigning any Mode A code must validate the code by checking as soon as possible, either by direct reference to his display or with the assistance of another controlling agency, that the data displayed corresponds with the code which has been assigned.*" In addition, para. 4.3.1 states: "*Unless otherwise directed by an air traffic control unit, Mode C will be selected in conjunction with Mode A. Controllers must, therefore, verify the accuracy of the Mode C readout when assigning codes to aircraft.*"

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As soon as controllers have identified ac flying outside controlled airspace, they are required to inform pilots that they are identified and to pass them their position. From this it follows that a pilot, who should be flying outside CAS but is identified inside CAS, should be informed without delay. (Section 1, Chapter 5, Paras. 7 and 8 refer). It is disappointing that the Farnborough controller was unable to prevent the Airprox situation developing. If he had paid stricter attention to the MATS Pt. 1 instructions for validating and verifying SSR data, even though he may not have been able to prevent the infringement, he may well have been able to detect it at an early stage and, thereby, to have prevented the subsequent Airprox. The unit was asked whether the pilot's initial reported position and altitude (2nm abeam Wycombe at 3000ft) and intention to route via the Bagshot Mast should have raised questions in the controller's mind. The response was that calls of this nature are commonplace and would not, in isolation, cause undue concern. Under such circumstances, flights not wishing to descend will normally track slightly further west, to remain in the area where the base of CAS is 3500ft, and those wishing to remain on the track followed by the C172 will descend below 2500ft.

There were other ac in receipt of a service on the Farnborough controller's frequency but the RT recording does not indicate that the workload was excessive, particularly around the time that the actual infringement took place. After the pilot of the C172 had acknowledged the assigned squawk, there were no further transmissions on the frequency for over a minute and from 1229:52, the time that the pilot of the C172 made his initial call, until 1231:40, 3sec after the 0436 squawk first appeared within CAS, no RT transmissions to or from any other ac were made and there is no record of the controller making or receiving any telephone calls. That said, the latter transmission, at 1231:40, was to pass TI to an ac in the Hook/Odiham area so it is likely that the controller's attention was focussed in that area at the time and, from that point until the Airprox occurred, the controller dealt with 5 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 video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

It was clear that the cause of this Airprox was the unauthorised penetration of the LTMA, Class A airspace, by the C172 pilot. During the planning stage of the flight, the Cessna pilot had missed the LTMA's base level change, down to 2500ft, to the N and W of White Waltham. However, the change in level is shown on the 1:500 000 topographical chart as a line, with qualifying altitude figures displaced to the NE of High Wycombe, so the pilot should have assimilated the information during the planning process. Controller members agreed that the Farnborough LARS controller should have validated and verified the C172's discrete code as soon as possible but a number felt that the ATSI criticism was harsh. The discrete code appeared seconds before the controller passed TI to another flight and then dealt with 5 other flights during the intervening period before the Airprox occurred.

Members noted that the Heathrow FIN DIR had not noticed the potential conflict until STCA activated. ATCOs members said the FIN DIR's attention would be focussed on the primary task of vectoring ac in the Heathrow traffic sequence and, although the discrete Farnborough code would have been displayed, a conscious check would have to be made to 'assimilate' the associated height readout. It was not uncommon for there to be several other squawks showing on radar in this area, owing to traffic routeing around the London CTR and under the LTMA. The STCA 'safety net' warned the FIN DIR of the potential conflict and she issued an avoiding action R turn, TI and then climb. The CRJ2 had not visually acquired the Cessna nor received any alerts/warnings on TCAS. The C172 pilot had seen the CRJ2 in his 2.30 position about 2-2.5nm away in a R turn and watched it pass about 1nm clear to his R. After being warned by TC of the CAS infringement, the Farnborough controller told the C172 pilot to descend which had quickly removed the Cessna from CAS. The radar recording had revealed the ac had passed 1.4nm apart at the CPA with the CRJ already diverging in a turn and pulling away from the Cessna. The Board agreed that the prompt and robust avoiding action taken by the FIN DIR had taken

any 'sting' out of the deteriorating situation, making the potential conflict benign, to the extent that any risk of collision had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

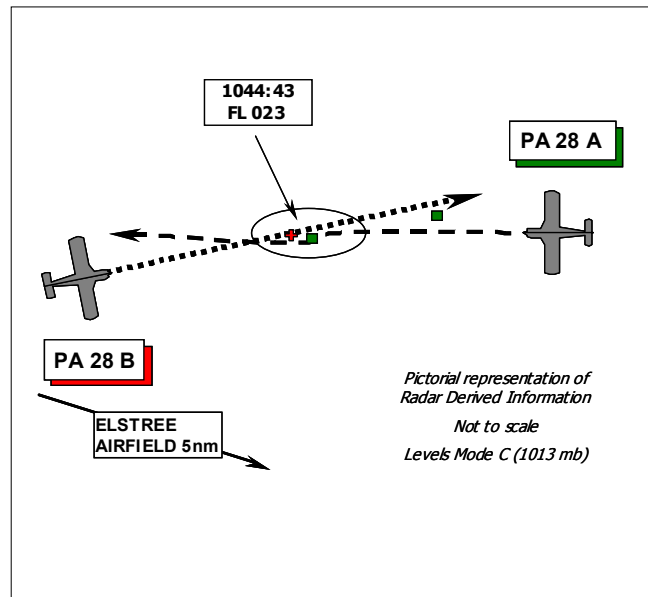
Cause: Unauthorised penetration of Class A airspace by the C172 pilot.

Degree of Risk: C.

AIRPROX REPORT No 046/04

AIRPROX REPORT NO 046/04

Date/Time: 11 Apr 1045 (Sunday)
Position: 5141N 00030W
(1.5nm West of M1/M25 Junction)
Airspace: London FIR (Class: G)
Reporting Ac Reporting Ac
Type: PA 28 (A) PA28 (B)
Operator: Civ Trg Civ Pte
Alt/FL: 2300ft 2350ft
(QNH 1022 mb) (N/K)
Weather VMC VMC
Visibility: 12km 10kmn
Reported Separation:
20-50ft V <50m H50ft V 100ft H
Reported Separation:
Contacts Merge at 2300ft



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA 28 (A) PILOT reports flying a white and yellow ac with the strobes and nav lights selected on squawking 7000C on a local instructional sortie, and in receipt of FIS, from Elstree. Heading 270° at 97kt and 2300ft (QNH) (which equates to about 2000ft agl) he was in a high workload situation monitoring the student who was adjusting the VOR radial. Unlike the student however, his view to his 1130 was obscured by the windscreen pillar and magnetic compass. He saw another ac 2sec before it passed through his nose from the 1130 to the 430 just below his height and he initiated an immediate avoiding action steep turn to port to ensure they did not cross the other pilot's flight path. At time of incident the pilot of the other ac was transmitting to Elstree Info and he subsequently reported an Airprox to them. Although he could recall being slightly to the starboard side of the other ac; he thought that it was so close to being a 'head on' that blame could not be attributed to either pilot. The other pilot and his own student were understandably quite shaken by the incident and he assessed the risk as being very high. There seemed to be more ac than usual in the Elstree Local Flying Area (WNW of airfield). He compiled his report using notes made immediately after the event.

THE PA28 (B) PILOT reports flying a white burgundy and grey ac solo on a local flight to the E of Wycombe squawking 7000C. While heading 090° at 130kt and 2350ft just to the N of the M25 at Radlett he looked in to check the map in anticipation of a radio call to Elstree and on starting the transmission and looking out again he saw a low wing ac with yellow markings, registration G-XXXX, virtually on a reciprocal heading but approaching from slightly L of his 12 o'clock. The ac was making a climbing L turn to avoid him and was clearly a step ahead of him on the see and avoid principle and passed safely to his R about 50ft above and displaced laterally by 100ft. Details were exchanged on the radio on Elstree's frequency direct with the other pilot, as Elstree radio did not want to log an Airprox, as they were not receiving a service from them. He thought that they would have missed each other without the other pilot's avoiding action due to the slight difference in height but it would have been very close. He took no action, as it would have been after the event. As this was his second near miss in this vicinity within 5 years he believed it was time that the base of CAS should be raised to at least 3000ft or other measures taken to allow more space for E/W transiting ac.

UKAB Note (1): The base of CAS above the area of the incident is 2500ft amsl. The height of the terrain is up to 300ft and, although it varies, is slightly higher to the W.

UKAB Note (2): The vertical separation reported by both pilots was of the order of 50ft. Further, although there was also some, albeit minimal, horizontal separation reported by both pilots, the precise tracks of the ac relative to one another at the moment of the incident is less clear since both pilots show the other ac as passing in front on their diagrams. In their written description of the sequence of events however, both pilots agree that the L turn by the pilot of PA28 (A) achieved or increased lateral separation. The latter is probably more accurate.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both ac and radar photographs/video recordings.

The Board noted that in this incident, although the visibility was relatively good and the light conditions and sun were not a factor, the ac had been effectively head-on to one another with minimal relative movement and therefore were difficult to see. At the time leading up to the occurrence, both pilots had been engaged on other activities, one busily instructing a student and the other, who was solo, changing radio frequency and also concentrating on map reading.

Members noted that there had been a sizeable number of Airprox and recently a mid-air collision in this congested area where CAS above, to the S and to the N squeezes all GA movements, which are predominantly E/W, into a small 'letterbox'.

The Chairman noted the pilot of PA28 (A)'s comment regarding blame-worthiness but reminded all that the UKAB never apportions blame but rather determines the circumstances of incidents to draw lessons from them.

The Board was disappointed that Elstree Radio would not accept the Airprox on the RT. In the light of this and another incident yet to be investigated, ATSI undertook to clarify the situation.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sightings by both pilots.

Degree of Risk: B.

AIRPROX REPORT No 047/04

AIRPROX REPORT NO 047/04

Date/Time: 14 Apr 1505

Position: 5258N 00435W (130°/14nm VAL)

Airspace: London FIR (Class: G)
(VATA)

Reporting Ac Reported Ac

Type: Hawk T1 Hawk T1

Operator: HQ PTC HQ PTC

Alt/FL: 13000ft FL130

(RPS 1008 mb)

Weather VMC CLAC VMC CLAC

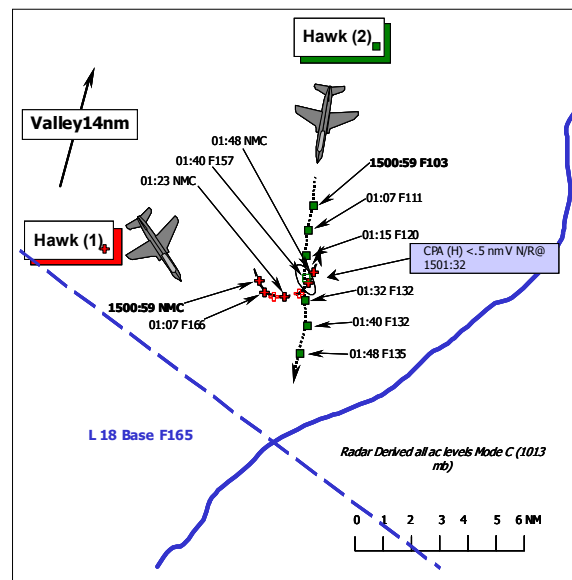
Visibility: >10km >10km

Reported Separation:

700ft H 200ft V 5-800ft H 5-800ft V

Recorded Separation:

<0.5nm H N/R V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK (1) PILOT reports flying solo on a local student training sortie as leader of a pair in the Valley ATA W. The ac is coloured black and he had HISLs selected on, was squawking a Valley code but was not in receipt of an ATC service. The formation was heading 070° at 200kt with leader at 13000ft amsl 45° nose-down with 60° angle of bank and his No2 on the R at 15000ft, 40° nose-up and also turning with 60° angle of bank. They were in a high workload situation practising air combat manoeuvres (ACM), when another Hawk ac from the same base appeared 700ft away in plan form to and below the leader, crossing from L to R. He had no time to take any avoiding action and he assessed the risk as high.

THE HAWK (2) PILOT reports that he was the rear seat captain of a black Hawk ac flying with a student on a hi-low navigation training sortie with HISLs on and squawking with mode C. The sortie was planned to climb to High Level before descending to enter low level in Cornwall. After take off, heading 190° at 350kt, the weather was good but there was a cloud layer between 2-4000ft so it was decided to obtain a RAS from Valley for the cloud penetration; once above the cloud layer the weather was good and the service was downgraded to a RIS for the climb through the ATA. At about FL170, with the student flying the ac, Valley Radar handed them over to Lon (Mil) and they did not recall any TI being passed prior to the handover. On the initial call to Lon (Mil), radar contact was confirmed followed immediately by TI on traffic in their 1-2 o'clock at 2nm. The traffic was sighted immediately by both crew members and consisted of two Hawks engaged in a rolling scissors manoeuvre. Avoiding action was initiated after a slight pause to analyse the flight paths of the ac and which one presented the greatest collision threat. The captain took control of the ac and pulled hard, low and L away from the other ac. After a 90° turn away he rolled wings level and caught a flash of an ac going below theirs at an estimated distance of 5-800ft. He did not consider that at any time during the manoeuvre there was a collision risk however, if he had not taken avoiding action, the potential for a collision would have been high.

THE HAWK STATION comments that they have reviewed a number of procedures in light of the Airprox. Valley ATC did not inform the pilot of Hawk 2 that VATA West was active; however on this occasion he should have been aware of the VATA activity from his 'out brief'. With immediate effect however, all departing ac will be informed of the status of the VATA by ATC.

MIL ATC OPS reports that 2 RAF Valley based Hawks Callsign 1 A&B, were working autonomously in the Valley Aerial Tactics Area (VATA), operating on the nominated air-to-air frequency. At the time of the Airprox the ac were conducting a 'rolling scissors' manoeuvre in the block 13-17000ft on the Holyhead RPS, on an axis of 120° with 2000ft vertical displacement between them. Simultaneously a single Hawk ac, C/S 2, was getting airborne from Valley for a high level transit with Lon (Mil). C/S 2 climbed out at 1459:50 calling Valley RAD calling "*C/S 2 passing 2000ft request Radar Advisory Service.*" At 1500:27 C/S 2's service was down graded by RAD to a RIS due to a change in his flight conditions. A handover to LATCC(Mil) (CON 31) was initiated at 1500:46 and C/S 2 was transferred at 1501:10 and 2sec later he contacted CON 31 and was immediately placed on a RIS and informed of "*...that traffic right one o'clock, three miles manoeuvring indicating FL 165*". C/S 2 reported "*tally right C/S 2*". C/S 1 contacted RAD at 1502:14 calling "*C/S 1...we had a Hawk just fly in between our 2 ac during a combat, can you figure out who it is?*" and subsequently returned to the air-to-air frequency.

Analysis of the Clee Hill Radar shows C/S 1 formation manoeuvring within the VATA squawking 3767 (Valley ATA) with an unverified Mode C. Meanwhile C/S 2 is seen climbing out into radar cover at 1500:11 indicating FL056 Mode C, tracking 190°. At this time the C/S 1 formation and C/S 2 are 15nm apart converging. They continue to converge and at 1501:10 C/S 1 formation's Mode C indicated FL166 and C/S 2's indicated FL111 climbing with a lateral separation of 5nm between the contacts. C/S 2 continued to track 190° and C/S 1 formation turned to track 160° and the separation reduced to 3nm with the C/S 2 indicating FL120 while the C/S 1 Mode C had disappeared, not returning until after the Airprox had occurred. The CPA occurred at about 1501:32 but the contact of Hawk 2 dropped out on the sweep when it occurred; however by using a predicted position on that sweep it can be deduced that the lateral displacement was under 0.5nm but due to the lack of mode C information from C/S 1 it has not been possible to predict the vertical separation. Following the event the contacts diverged.

The VATA is described in the UK Mil AIP as:

"...an area of intense military air activity, including air combat training manoeuvres" with:

"Military flying is at its peak 0800-1800 Mon to Thu and 0800-1700 Fri" and goes on to state that:

"Pilots are strongly recommended to avoid the Area. If this is not possible they should request a service from RAF Valley ATC or London Radar, via London Flight Information if necessary, at least 15 nm range from the edge of the airway."

In addition, The Valley FOB states:

"Radar Service. Ac are normally to operate VFR within the VATA. Unless conducting AD training with ASACS GCI, formations are encouraged to obtain a RIS from either Valley ATC or London Mil who will assist with deconfliction of formations within the VATA and warn of the proximity to the boundaries of the VATA".

On this occasion, C/S 1 leader had not requested a service from Valley ATC as encouraged by the Valley FOB. Had C/S 1 formation been under a RIS it would have provided the pilots with TI on the conflicting traffic.

C/S 1 formation had been carrying out air combat manoeuvres in the W part of the VATA which was active from 6000ft to FL245. At the time of the Airprox, the formation was operating in the block 13-17000ft. On his departure C/S 2 pilot was cleared to climb to FL 350 and took up a track of 190°. This track immediately took them into a converging flight path with C/S 1 formation although at this time, C/S 2 was indicating well below them. RAD deemed C/S 2 to be far enough below the formation to not warrant passing TI. At the time when RAD initiated a handover to CON 31 the vertical separation between the 2 contacts was indicating 10000ft. However, during the handover procedure the C/S 1 Mode C disappeared and reappeared briefly at the end of the handover when 5000ft separation

AIRPROX REPORT No 047/04

between the 2 contacts was shown. RAD did not pass TI to C/S 2 at any time and further during the handover CON 31 did not question RAD as to whether the conflicting traffic had been called, thereby accepting responsibility for the passing of TI to C/S 2. The separation between the 2 contacts on completion of the handover was 5nm and 5000ft which was decreasing as C/S 2 continued its climb. CON 31 did pass TI to C/S 2 when the ac called on his frequency passing it as "*C/S 2, identified radar information, that traffic right one o'clock 3 miles manoeuvring indicating FL165*". C/S 2 replied "*tally right..C/S 2*" but continued to track 190°. Although TI was passed to C/S 2 it was very late giving the pilot little opportunity to avoid the conflicting traffic. Both RAD and CON 31 had ample opportunity to call the manoeuvring formation to C/S 2. Although there was 10000ft vertical separation at the start of the handover this had reduced to 5000ft by completion as C/S 2 continued its climb to FL350. Any TI would have been particularly relevant when no Mode C information was available on C/S 1 formation and may have afforded the opportunity for pilot of C/S 2 to become acquire visual contact with the formation sooner and to take earlier avoiding action.

HQ PTC comments that they were disappointed that neither the handing-over Valley controller nor the receiving Lon (Mil) controller mentioned what was a self-evident "dead-ringer" of a conflict during their handover. When ac are engaged in ACM they are best given a very wide berth; such manoeuvres can eat up apparently respectable separation in a couple of radar sweeps. Whilst the late TI from London may have been helpful, the singleton was so close to the pair that he had to choose which one to avoid most.

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.

Members noted that this was the latest of a number of Airprox where controllers have not passed TI until a very late stage of a conflict. Notwithstanding that pilots are responsible for collision avoidance when in receipt of a RIS, the reason that they ask for ATC assistance is to help them to be able to fulfil this obligation. If TI is not passed until it is too late to prevent the ac coming, into conflict the system has failed them.

Members considered in turn the part played in this incident by the 4 parties involved. Valley ATC were aware that the VATA was active with the Hawks 1 operating between 13-17000ft yet they released Hawk 2 to climb to FL350 through the area. A restriction of say FL120 until clear of the VATA to the S or visual with the formation would have prevented the Airprox. Further, even without such a restriction had they passed timely TI when it was obvious that the ac climbing out was tracking directly towards the manoeuvring pair it is probable that the pilot of Hawk 2 would have taken action to avoid them on his own initiative. Accepting that no one actually contravened the rules or procedures, specialist Members considered that this was an unpolished performance that did not inspire confidence in the ATC team, particularly since they were not busy at the time.

The handover to London (Mil), although accomplished in a prompt fashion, was not started until the formation was in Hawk 2's 12 o'clock, under 30 sec away and 5000ft above. At that point Hawk 2 was at FL111, climbing at over 3000ft/min, while the pair were manoeuvring through the whole of their 13-17000ft block. In sum the conflict should have been apparent at the start of the handover but the Valley controller did not make any mention of TI in the handover and the London (Mil) controller did not challenge this. He did however see the conflict very shortly after and passed TI but by this time it was too late to allow the pilots of Hawk 2 to avoid the other ac by a safe margin.

The pilot of Hawk 2 downgraded his service from a RAS to a RIS after he had cleared the cloud layer and by doing so accepted responsibility for collision avoidance. Neither student nor instructor saw the

pair until prompted by the late TI and by then were not able to manoeuvre clear of the formation by a sufficient margin to ensure the safety of all involved instead passing through it, albeit with both ac sighted.

The Board also thought the pilots of Hawk 1 formation had been remiss in not requesting a RIS as advised by the Valley Flying Order Book. By not requesting such assistance they accepted total responsibility for collision avoidance while engaged in high energy manoeuvring in a high workload situation. Although it would not have been easy for them to see the climbing Hawk it would have emerged from the cloud in their 9 o'clock low on an undeviating flightpath over a minute before the encounter and it should have been visible to both pilots.

Although sympathising with the pilots of Hawk 2 who the Board thought were entitled to expect a better service from ATC, all aircrew involved were ultimately responsible for collision avoidance in this instance and none saw the opposing ac until too late to take effective avoiding action.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sightings by the crews of all ac compounded by the lack of TI to the pilot of Hawk 2.

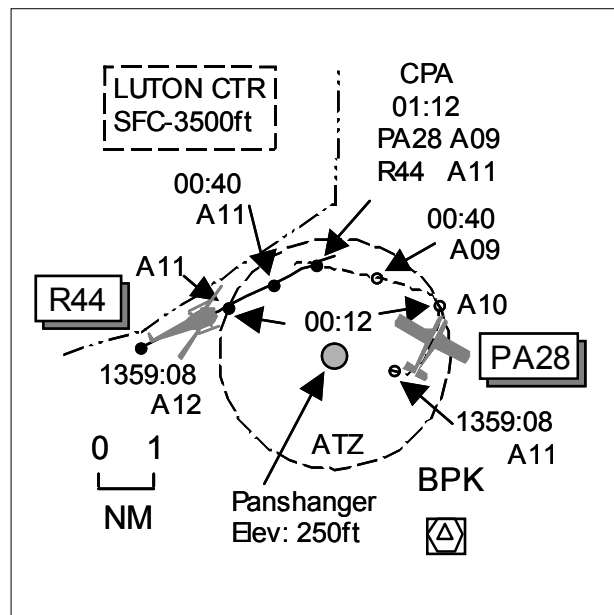
Degree of Risk: B.

Contributory Factors: The pilots of Hawk 1 formation did not adhere to the guidance in the Valley FOB regarding the utilisation of a radar service when operating in the VATA.

AIRPROX REPORT No 048/04

AIRPROX REPORT NO 048/04

Date/Time: 16 Apr 1401
Position: 5150N 00010W
(1.5nm N Panshanger - elev 250ft)
Airspace: ATZ (Class: G)
Reporting Ac Reported Ac
Type: PA28 R44
Operator: Civ Trg Civ Pte
Alt/FL: 800ft 1300ft
(QFE 1001mb) (QNH)
Weather VMC CLOC VMC CLBC
Visibility: >10km >10km
Reported Separation:
50-100ft V 300ft V&H
Recorded Separation:
Contacts merge 200ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports flying a dual local training sortie (visual ccts) from Panshanger and in communication with Panshanger RADIO on 120.25MHz squawking 7000 with Mode C. The visibility was >10km in VMC, the ac was coloured white/mauve/pink with the anti-collision and wing-tip strobe lights all switched on. When flying downwind LH for RW11, heading 280° at 105kt and 800ft QFE 1001mb, the instructor saw an ac 1.25nm ahead. She called on the radio but there was no response but then quickly realised that it was a helicopter on a reciprocal heading at the same level. She took control from the student, cut power to descend and turn L as the helicopter was seen to do the opposite. The helicopter, a dark coloured R44, passed over her starboard wing about 100ft above and she assessed the risk of collision as high. She contacted the A/G operator who telephoned Luton ATC: the helicopter's registration was provided and information that it was under a FIS. Later she spoke to the R44 pilot who had said that he had been aware of the Panshanger ATZ and believed that he had passed 150-200ft above her ac with sufficient separation.

THE R44 PILOT reports flying en route from Swindon to a private site near to Stansted and in receipt of a FIS from Luton on 129.55MHz squawking 7000 with Mode C. The visibility was >10km below a 4000ft cloud base in VMC, the ac was coloured magenta/gold with nav and strobe lights switched on. The incident occurred owing to his transit very close to the northern boundary of the Panshanger ATZ, causing a conflict with cct traffic which was flying a wide downwind leg. Heading 060° at 110kt and 1300ft Luton QNH, he saw the white/blue low wing single-engined ac in his 1.30-2 o'clock position about 300m ahead and below in level flight. He maintained his level as he judged that the other ac would pass clear, which it did by 300ft away to his R and below.

ATSI reports that there are no apparent ATC causal factors. The R44 pilot was in communication with LTCC Luton INT DIR at the time and the flight was being provided with a FIS and was not identified.

UKAB Note (1): The Luton QNH was 1009mb.

UKAB Note (2): The UK AIP promulgates Panshanger ATZ as a circle radius 2nm centred on the longest notified RW11/29 514809N 0000929W up to 2000ft agl, elevation 250ft amsl. The aerodrome is active winter 0900-SS, summer 0800-SS with A/G available during the notified hours.

UKAB Note (3): The Rules of the Air Regulations 1996 Rule 39 Flight within aerodrome traffic zones para (2) states *“An aircraft shall not fly, take off or land within the aerodrome traffic zone of an aerodrome to which this paragraph applies unless the commander of the aircraftwhere there is no air traffic control unit nor aerodrome flight information service unit, has obtained information from the air/ground radio station at that aerodrome to enable the flight to be conducted with safety.*

UKAB Note (4): Analysis of the Stansted radar recording at 1359:08 shows a 7000 squawk, believed to be the R44, 3.4nm W of Panshanger tracking 065° indicating unverified 1200ft altitude QNH 1009mb. At the same time, another 7000 squawk, believed to be the reporting PA28, is seen 1nm SE of Panshanger tracking 105° level at 1100ft altitude, unverified, before it turns L shortly afterwards onto the crosswind leg for RW11. At 1400:12, the R44 is seen to enter the Panshanger ATZ 2nm WNW at 1100ft altitude by which time the PA28 is turning L onto the downwind leg at 1000ft altitude. Twenty-eight seconds later the PA28 is 1.4nm NNE of Panshanger downwind maintaining 900ft altitude with the R44 in its 11 o'clock range 1.5nm on a converging/crossing track 200ft above. The subject ac continue on steady tracks until the CPA occurs at 1401:12 when contacts merge 1.5nm N of Panshanger with the R44 still indicating 1100ft and the PA28 900ft.

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.

Given the proximity of the Luton CTR to the Panshanger ATZ, the R44 pilot's plan to route between both had been ill-conceived. Moreover, without ATC clearance from Luton to route through the Class D Zone, penetration of the ATZ was inevitable. The recorded radar shows the R44 entering it to the WNW of the airfield, which had caused the Airprox. At the time, the R44 pilot was in receipt of a FIS from Luton, contrary to the requirements of Rule 39 where the R44 pilot should have contacted Panshanger, prior to entering the ATZ, to obtain information to enable the flight to be conducted with safety. Following this, the helicopter had then flown into conflict with the PA28 in the visual cct flying in the downwind leg.

Looking at the risk element, the PA28 pilot had seen the R44 1.25nm ahead but had not immediately assimilated it as head-on conflicting traffic. After then realising the geometry, the PA28's instructor had taken positive action by taking control, turning L and descending whilst she watched the helicopter pass just to her R about 100ft above. It appeared that the R44 pilot had seen the PA28 later, in his 1.30-2 o'clock range 300m, below in level flight and had maintained his level, judging that it would pass clear. He estimated that the PA28 passed 300ft away to his R and below. The recorded radar had shown the subject ac on converging tracks, vertically separated by 200ft, which is maintained during the incident as the ac's returns merge. The PA28 pilot had undoubtedly been surprised at seeing the unknown traffic flying in the opposite direction of the visual cct. However, the visual sightings by both pilots combined with the PA28 pilot's timely actions were enough to persuade the Board that any collision risk had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

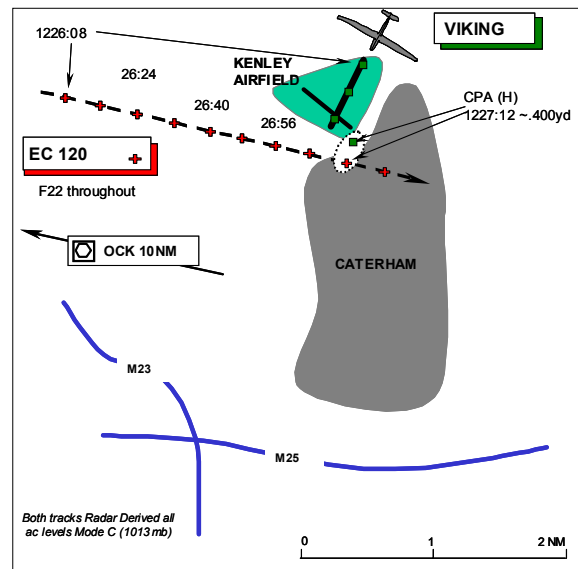
Cause: The R44 pilot entered the Panshanger ATZ contrary to the requirements of the Rules of the Air Regulations 1996 Rule 39 and flew into conflict with the PA28.

Degree of Risk: C.

AIRPROX REPORT No 049/04

AIRPROX REPORT NO 049/04

Date/Time: 17 Apr 1227 (Saturday)
Position: 5118N 00005W (S perimeter Kenley Airfield - elev 566ft)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: Viking Glider EC120
Operator: HQ PTC Civ Pte
Alt/FL: 1300ft 2000ft amsl
(QFE 984 mb) (N/K)
Weather VMC CLBC VMC N/R
Visibility: >10km N/R
Reported Separation:
200ft H 50/100ft V N/R
Recorded Separation:
Approx 400yd H N/R V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIKING GLIDER PILOT reports flying from Kenley, instructing a student pilot on his first sortie in a Day-Glo and white glider. The instructor was at the controls and had just released the cable at the top of the launch and was about to explain the normal gliding attitude. At the time the ac was over the S perimeter of the airfield, heading 210° at 55kt and 1300ft on the QFE [1866ft amsl] when he saw a helicopter 200ft away in his 2 o'clock level, converging with him on a course approx 90° to the glider launch line of 210°. He estimated that the helicopter passed with 200ft horizontal clearance, very slightly above. The instructor lowered the nose of the glider and banked hard, turning L through 270°. He saw no apparent avoiding action by the helicopter and assessed the risk of collision as being high had he not taken avoiding action. He reported the incident to Kenley Radio during avoiding turn.

THE EC120 HELICOPTER PILOT reports flying a black ac from Nether Warton, Oxfordshire, to East Grinstead routeing via OCK VOR, tracking S of Sevenoaks VRP, then following M25, staying N to avoid Gatwick Zone, but remaining S of Kenley and Biggin Hill ATZs. At Sevenoaks he turned S to enter the Gatwick Zone under Gatwick's control. He understood that an Airprox was reported S of Kenley: however, he was unaware of any potential collision. Assuming the Airprox took place at a position S of Kenley he was receiving a FIS from Biggin Hill and neither he nor his passenger saw a glider close to them. He thinks that at the time he was at 1500-2000ft, but was descending to 1500ft for entry to Gatwick Zone after passing S of Sevenoaks. He was certain that he passed between Kenley and M25/M23 Intersection.

UKAB Note (1): Kenley is promulgated in the UK AIP ENR 5-5-1-3 as a Glider Launching Site up to 1700ft agl (2266ft amsl) daily from sunrise to sunset. It has no ATZ.

UKAB Note (2): Both ac paint on the Gatwick radar recording. The EC120 can be seen as it approaches from the W at a constant altitude of FL22 while a primary-only contact of the glider is seen shortly after it gets airborne. The contacts continue to merge and the glider can be seen apparently commencing a hard L turn. Shortly after, it disappears, reappears 20 sec later a few hundred yards to the WSW of the field whilst the EC120 continues to track to the E.

UKAB Note (3): The Biggin Hill QNH at 1220 from Met Office data was 1001mb; it can be calculated therefore that EC120 was flying at an actual altitude of 1840ft amsl while the reported altitude of the glider was 1866ft amsl.

UKAB Note (4): The base of the London TCA in this area is altitude 2500ft.

HQ PTC comments that this is just the latest of a continuing number of Airprox between gliders at Kenley and GA traffic. More disturbingly, it is not the first where the GA pilot has not even been aware of the glider. Previous informal approaches to avoid such occurrences seem to have brought no improvement in the local airspace management. HQ PTC is aware that 2 further local initiatives, both by the VGS and the civilian club, are in progress. If these bear no substantial fruit, more formal avenues will be explored.

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 glider operating authority.

The BGA provided the Board with written comments. In summary they believed that this incident could have been prevented if the helicopter pilot had not routed so close to Kenley or had flown at a lower height. Further, at the speed he was flying the helicopter pilot should have been able to see both the airfield and the glider. Members also thought that the Viking instructor not only saw the situation and acted promptly, but also was able simultaneously to warn others on the frequency. Finally, they commended the local initiatives, mentioned by HQ PTC, to try to resolve the continuing worrying number of GA/glider conflicts in the vicinity of Kenley.

Members agreed with the BGA view that the prime cause of this incident had been the EC120 flying close to the promulgated glider site at Kenley. Although he did not overfly the site or contravene any regulations or procedures, Members considered that it was unwise to fly so close to busy glider sites particularly at a weekend. A Member with considerable experience in this field informed the Board that he believed that, given the height and speed of the helicopter, it should have been spotted by the glider launch party and they should have delayed the launch.

Members agreed with the BGA comment that the helicopter pilot had been in a position to see the glider but had not done so, possibly due to it being obscured by window or door supports. Although they accepted that there had been airmanship deficiencies by the helicopter pilot the good lookout and correct follow-up action by the glider instructor had prevented this from becoming a more serious occurrence. Members therefore concluded that there had not been any risk of the ac colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace in the close vicinity of a promulgated glider site, resolved by the glider pilot.

Degree of Risk: B.

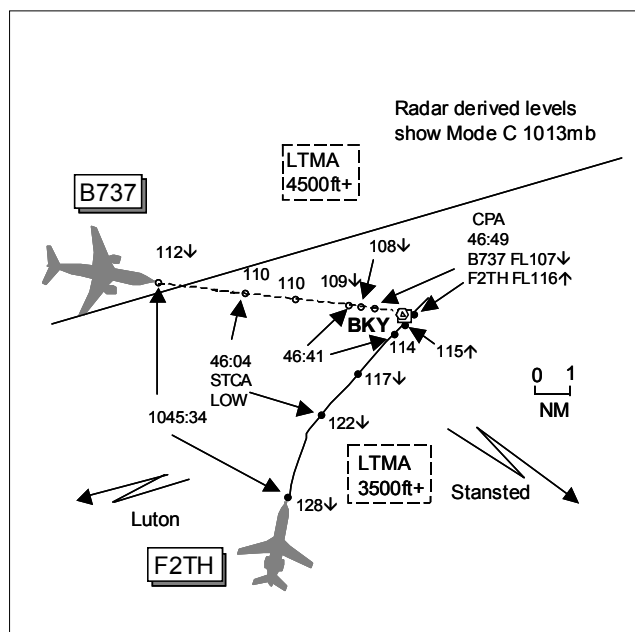
AIRPROX REPORT No 050/04

AIRPROX REPORT NO 050/04

Date/Time: 17 Apr 1047 (Saturday)
Position: 5159N 00002E (2nm W BKY)
Airspace: LTMA (Class: A)
Reporting Ac *Reporting Ac*
Type: B737-300 Falcon2000
Operator: CAT Civ Comm
Alt/FL: FL110 ↓FL90

Weather VMC NR VMC CLAC
Visibility: NR 8km

Reported Separation:
600ft V 2nm H 400ft 2-3nm H
Reported Separation:
500ft V 1.7nm H or 900ft V 1.2nm H



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 090° at 250kt level at FL110 inbound to Stansted and in receipt of an ATS from Essex RADAR on 120.62MHz squawking 5055 with Mode C. TCAS demanded a descent and the conflicting traffic was sighted in their 1.30 position above them. The A/P and autothrottle (A/T) were both disconnected and the ac was descended following the TCAS guidance; ATC were informed. ATC issued a R turn of approx. 40° onto 130°, minimum separation estimated as 600ft and 2nm. Once clear of the traffic, the ac was climbed back to FL110 and ATC were informed. He assessed the risk of collision as medium.

THE FALCON2000 (F2TH) PILOT reports heading 030° at 210kt descending to FL90 inbound to Luton and in receipt of a RCS squawking 3017 with Mode C. ATC were very busy at the time when a TCAS 'climb' warning was triggered on traffic in their 10 o'clock range 2-3nm indicating -400ft; the other ac was seen as a B737. The RA guidance was followed and ATC were informed although the frequency was very congested. It appeared that a supervisor then took over the control position. He assessed the risk of collision as high.

THE ESSEX RADAR CONTROLLER reports the Falcon2000 crew called her inbound to BKY released at FL120. She descended the ac to FL90 and turned it onto heading 050° whilst the B737 was approaching BKY at FL110. STCA alerted her to the conflict and, on realising her error, she gave the Falcon2000 an avoiding action turn onto 130° but this was not acknowledged. The B737 crew checked in on the frequency, advising of a TCAS descent to FL100. She reiterated the turn to the Falcon2000 flight but the B737 crew took the call and then turned.

ATSI reports that the controller described her workload at the time of the Airprox as medium. She commented that she had been operating the Essex Radar and Stansted FIN positions in bandboxed mode but another controller had been available if it had been considered necessary to split the sector. In any case, with the offering traffic predominantly favouring Luton arrivals, a split would not have been advantageous, as these ac would be transferred to the TC Luton Controller for final vectoring.

The Falcon2000 established communication with Essex Radar at 1045:34, reporting descending to FL120, with a speed of 210kt. The Essex Radar Controller instructed the flight to turn R heading 050° and descend to FL90. This clearance, however, did not take the B737 into account. This flight, not yet in contact with Essex Radar, was approaching BKY from the W, with a release level of FL110. The controller could offer no definitive reason for overlooking the B737. She thought that possibly she might have misread the fps display. She recollected that the Falcon2000's fps was positioned in the LOREL bay, above 2 or 3 other flights, organised in level order. The fps immediately underneath was for a flight (AC3) with the same company c/s prefix as the B737. She thought that she may have looked at the display but erroneously believed this fps related to AC3, a Luton inbound, which was about 10nm ahead of the Falcon2000 and passing FL90, rather than to the subject B737 at FL110. Additionally, the fact that the B737's SSR label was overlapping with other traffic at the time, thereby making it difficult to see on the radar display, may also have been a contributory factor to her overlooking its presence. The radar recording, timed at 1045:34, when the Falcon2000 made its initial call, shows the ac tracking NNE towards BKY, passing FL129. The B737 was 7.4nm to the NW, passing FL112, in an area where other SSR labels were displayed.

The Essex Radar Controller said that she became aware of the resultant confliction, between the subject ac, when STCA activated. She then instructed the Falcon2000 to *"turn right heading one three zero degrees this is avoiding action turn right now heading one three zero degrees"*. The radar recording reveals that the two ac were 2.7nm apart at the time, with the Falcon2000, passing FL117, SE of the B737. However, before any reply was received, the B737 made its first call on the frequency, reporting a TCAS descent and passing FL110. The controller did not respond to this transmission but reiterated the R turn instruction to the Falcon2000. This time, the pilot of the B737 replied to the instruction and read back the heading, believing it related to his flight. Immediately afterwards the pilot of the Falcon2000 reported a *"TCAS climb"*. The controller acknowledged the call and instructed the Falcon2000 to maintain FL110. She agreed that this was not in accordance with the procedures stated in MATS Part 1, Supplementary Instruction 3/01. *"On being informed that an ac is manoeuvring in accordance with a TCAS Resolution Advisory (RA), a controller must not issue control instructions to that ac which are contrary to the RA communicated by the flight crew."* When a pilot notifies a controller of a TCAS climb or descent, the controller *"should acknowledge the report"*. She explained that when she issued this instruction she believed that the incident had been resolved. Radar recordings of the event show that the minimum separation occurred at 1046:41. The Falcon2000 had arrested its descent at FL114 when it was 1.7nm distance from the B737. The latter had just commenced descent from FL110 and was passing FL109 at the time. STCA changed from a low to a high severity alert at the same time. Thereafter, the Falcon2000 climbed to FL116 and the B737 descended to FL105 in reaction to their respective TCAS RAs. The Falcon2000 maintained a constant northeasterly track throughout, whilst the B737 is seen to turn onto the 130° heading, after the ac had passed.

[UKAB Note (1): The CPA occurs at 1046:49, the B737 is seen descending through FL107 as the Falcon2000 passes through its 12 o'clock range 1.2nm indicating FL116, 900ft above.]

Copies of the fpss of both ac show that the Falcon2000 was estimating LOREL at 1047, released at FL120. This was 8min ahead of the B737, its release having been changed from FL120 to FL110. The Essex Radar Controller confirmed that the time discrepancy was not, in her opinion, a contributory factor. She commented that, once fpss are placed in the display in level order, she concentrates on levels rather than times. It was unfortunate that the two ac called in reverse order to their level allocation but they were being controlled previously by different agencies i.e. the Falcon2000 by TC Capital and the B737 by TC NW. Had the B737 made its initial call before the Falcon2000, the Airprox would probably not have occurred.

The Essex Radar Controller agreed that she did not use the 'revised' phraseology when issuing the avoiding action instruction. She said that she reverted to the phraseology she was more used to in the "heat of the moment". However, the avoiding action turn was passed clearly and stressed the need for urgent action. It is not known why the Falcon2000 did not reply to this transmission nor why the B737

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responded to the instruction clearly addressed to another flight. After the ac had passed and about 1 min after the Falcon2000 had been instructed to maintain FL110, the transcript reveals that the controller asked the B737's pilot if he was on frequency. She said that it was probable that she had not registered the B737's previous transmissions and was unaware it was on the frequency. This could explain why she had not challenged its pilot when he read back the turn instruction addressed to the Falcon2000.

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 could add little to the ATSI report. The Essex Radar controller had, for whatever reason, descended the Falcon2000 into conflict with the B737 which had caused the Airprox. Although the subject acs' crews had called her in reverse order to their level allocation, the fps display would have shown the correct information even if the radar display had been suffering from label overlap/clutter. The controller had been alerted to the conflict by STCA although her attempts to resolve the deteriorating situation had been unsuccessful. The B737 crew had been given the 'heads-up' by TCAS and had followed the TCAS RA descent guidance, having seen the Falcon in their 1.30 position above them. During this manoeuvre, the crew contacted the Essex Radar controller reporting a TCAS descent and would, understandably, be expecting an RT call from the controller, giving TI and/or avoiding action. Members could understand the B737 crews mindset who, on hearing an avoiding action turn instruction being given, 'in the heat of the moment' had taken the call, as the R turn appeared to 'fit the picture' from their cockpit viewpoint, although the call had been clearly addressed to the other subject ac. Pilots reminded all members that TCAS was designed to resolve encounters by manoeuvres in the vertical plane and that normally resolution would be actioned ideally 'wings-level' and not whilst turning. The Falcon2000 crew had not answered the RT avoiding action instructions that were passed twice, nor challenged the B737 crew's acknowledgement of the transmission addressed to their flight. Members opined that the Falcon crew were probably busy assimilating and then reacting to their TCAS RA climb warning, having visually acquired the B737 2-3nm away 400ft below, before informing the controller of their manoeuvring. Members were concerned that the controller had issued instructions that were contrary to the reported TCAS manoeuvre reported but the radar recording shows that the Falcon crew had ignored this and continued following the TCAS guidance. Despite these shortcomings, the robust TCAS RA manoeuvres flown by both crews, combined with their mutual visual sightings, persuaded the Board the any risk of collision had been quickly and effectively removed.

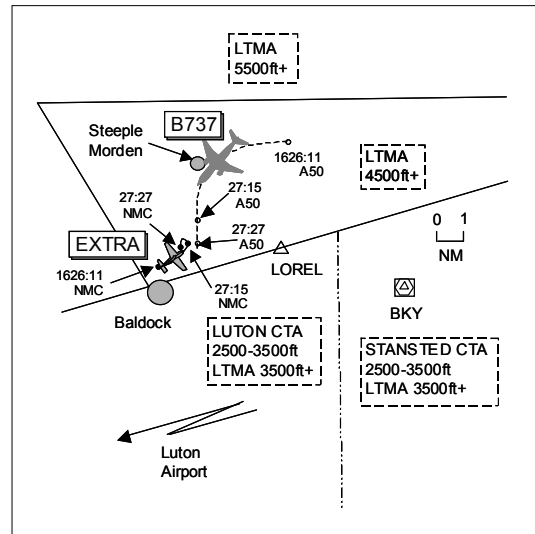
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Essex Radar controller descended the Falcon2000 into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT NO 051/04

Date/Time: 19 Apr 1627
Position: 5201N 00008W (12nm NE Luton)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: B737 E300L Extra
Operator: CAT Civ Trg
Alt/FL: 5000ft <4400ft
 (QNH 993mb) (QNH)
Weather VMC CLOC VMC CLBC
Visibility: >10km 40km
Reported Separation:
 0ft V 1.5-2nm H 600ft 1000m H
Recorded Separation:
 0.6nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE B737 PILOT reports inbound to Luton IFR and in receipt of ATS from Luton on 129.55MHz. On base leg about 14nm from Luton heading 180°, he thought, at 250kt and 5000ft a TCAS TA alert was received on traffic in his 1230 position range 5nm. The ac was sighted visually, just below their level tracking to pass down their RHS. ATC gave a further 'avoiding' turn onto 170° and as the ac passed through their 2 o'clock position range 1.5-2nm it was seen to pull up into the vertical plane and climb through their level, passing out of view above them. The FO identified the ac as a red coloured Extra type. ATC were informed, who, he thought told the crew that the turn onto 170° had been for separation from the traffic.

THE E300L EXTRA PILOT reports flying a dual aerobatic training sortie from Panshanger and in receipt of an A/G service from Panshanger RADIO on 120.25MHz squawking 7000; no mention was made of Mode C being fitted. The visibility was 40km 1000ft below cloud in VMC and the ac was coloured white/red. This was the 4th flight of the day operating in the area between Baldock and Steeple Morden. The visibility was excellent making objects probably appear closer than they really were. A Boeing jet was seen 5-8km away and was seen to pass 1000m away and 600ft above. Many airliners were seen inbound to Luton with constant efforts being needed to ensure separation and to remain outside CAS. The inbound jets were usually turning which would also have presented their crews with problems in determining the height of VFR traffic below. He was uncertain in retrospect which airliner had reported the conflict. At no time was he flying above 4400ft amsl (London QNH set) and several manoeuvres were terminated at this altitude to remain outside the LTMA. There was no risk of collision at any time with any airliner traffic.

ATSI reports that the B737 was being vectored for an ILS approach to RW26 at Luton. The crew established contact with the Luton INT controller (1624:30) and reported that they were descending to 5000ft. Shortly afterwards (1626:10), the crew were instructed to turn L onto a heading of 185°. To the SW of the B737, at a range of 6.7nm, was a 7000 squawk with NMC displayed. The base of CAS in that area is 4500ft, and so the controller was complying with the MATS Part 1 requirement to keep traffic 500ft above the base of CAS.

[UKAB Note (1): The RT transcript at 1627:20 reveals the B737 pilot transmitting "and Luton er B737 c/s" to which the controller replies "B737 c/s turn further left heading one seven zero degrees and further descent shortly".]

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The crew then reported traffic in their 3 o'clock that was carrying out aerobatics and had passed through their level when lateral separation reduced to 0.6nm at 1627:27. The controller advised that such traffic should not be above 4500ft and then issued descent clearance to the B737. The crew read back the clearance and added that the aerobatic ac was above them and they were just leaving 5000ft. No apparent civil ATC errors disclosed.

UKAB Note (2): The London QNH was 993mb.

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 wondered whether this had been a suitable area in which to carry out aerobatics. It appeared that the area chosen was a short distance from Panshanger and one that facilitated airspace for manoeuvring in the vertical plane above 2500ft. Noteworthy was the fact that the E300L pilot had not selected the aerobatic conspicuity code of 7004. This code, together with Mode C if fitted, should be selected on 5min prior to commencing aerobatics until ceasing manoeuvring and normal operations resume. Pilots are also encouraged to contact an ATCU to advise them of the vertical, lateral and temporal limits within which they will be operating. This 'squawk' would have alerted controllers at SSR-equipped ATSU's to the E300L pilot's intentions. It had not been possible to establish whether the E300L carried Mode C.

Members were unable to resolve the discrepancy between the disparate reports of the incident as to whether the Airprox occurred inside or outside the LTMA. The E300L pilot had reported carrying out aerobatic training manoeuvres not above 4400ft altitude at all times, having to terminate several manoeuvres at this altitude to remain outside CAS. Some members thought that perhaps it would have been prudent for the E300L pilot to build in a vertical 'buffer' zone, to cater for any unforeseen deviations that may occur during the flying of any planned manoeuvre/sequence. The B737 crew had been following radar vectors at 5000ft and had been steady on a southerly track until immediately prior to the Airprox. The 2 crew members on the flight deck had visually acquired the E300L 5nm ahead just below their level, after receiving a TCAS TA, tracking to pass down their RHS. Then, when instructed to execute a 15° L turn, as the E300L reached their 2 o'clock position, it was seen to pull up to the vertical plane and climb through their level, passing an estimated 1.5-2nm clear to their R. The E300L pilot had reported seeing a Boeing jet pass 1000m away 600ft above. Recorded radar had revealed the CPA as 0.6nm. The Board concluded that at the end of the day, only the pilots involved know exactly what happened. The radar recording shows the geometry of the incident but without Mode C altitude reporting on the E300L, only its horizontal track can be seen. From the information available, the Board could only state that this encounter had occurred because the E300L Extra pilot had flown aerobatics close to the base of the LTMA. With both crews seeing each other's ac and monitoring their respective flight paths, even with the understandable 'surprise' element in the B737 cockpit, the Board had no doubt that safety had been assured during the encounter.

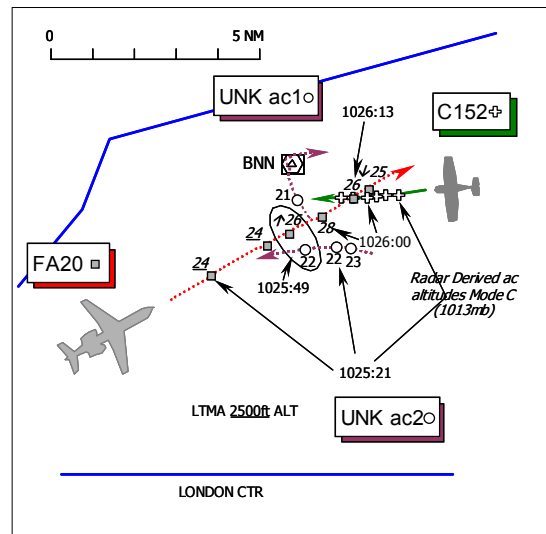
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The E300L Extra pilot flew aerobatics close to the base of the LTMA.

Degree of Risk: C.

AIRPROX REPORT NO 052/04

Date/Time: 5 Apr 1023
Position: 5142N 00031W (1½nm SE of BNN)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: Cessna 152 Falcon 2000
Operator: Civ Pte Civ Comm
Alt/FL: 2000ft 2400ft
 (QNH 1007mb) (alt)
Weather VMC CLBC VMC CLBC
Visibility: >10km 10km
Reported Separation:
 Nil H/100ft V <3nm H/100ft V
Recorded Separation:
 Contacts merged in azimuth

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE CESSNA 152 PILOT reports his ac has a white colour-scheme with a red stripe on the fuselage; the anti-collision beacon was on. Whilst in transit from Andrewsfield to Kemble he was in receipt of a FIS from LONDON INFORMATION on 124.6MHz, squawking A7000 with Mode C selected on [though not shown at all on the radar recording]. In a level cruise at 2000ft London QNH (1007mb), he was flying some 500-1000ft below cloud with an in-flight visibility of >10km.

Approaching a position about 1nm S of BOVINGDON [BNN] VOR heading 270° at a TAS of 95kt [GS 72kt] another ac came into view very quickly in the upper left hand corner of his screen about 500ft away descending through cloud. To avoid the other ac – a twin rear-engine low-wing executive jet - he immediately entered a steep dive and within 5-6 seconds it passed within 100ft directly overhead with a “high” risk of a collision. As he looked out of the right hand rear facing window he saw the jet was below his altitude tracking about 050°-060° and it appeared that its crew had not seen his Cessna nor, he thought, taken any avoiding action.

He added that as the ac passed overhead he could actually hear it; he was also very concerned about any possible turbulence but did not encounter any, possibly due to his dive. If he had passed directly overhead the BNN then both ac would have been at the same altitude.

THE FALCON 2000 (FA20) PILOT reports 4½ months after the event, that his ac has a white/red and grey livery and the HISL was on whilst in transit on an IFR FPL from Farnborough to Luton, but flying in VMC some 600ft below cloud. He was in receipt of a RAS from THAMES RADAR, he thought and squawking the assigned code with Mode C; TCAS is fitted.

On course to the BNN VOR, at 210kt in a level cruise at an altitude of 2400ft, there appeared to be a lot of traffic holding at BNN. An ‘intruder’ was identified on TCAS flying in the opposite direction at about 2000ft (+/- 300ft), whereupon an RA was enunciated to “CLIMB” at 1500ft/min, which was followed. A second RA was then triggered by conflicting traffic above giving “MAINTAIN VERTICAL SPEED”, followed by “CLEAR OF CONFLICT”. Assessing the risk as “high” he believed that the first ac passed within 3nm about 100ft below his jet, with the second 500ft above some 5nm away.

LTCC ATCI reports with RT transcript that the FA20 was the subject of a radar handover from Farnborough ATC to the TC Luton INTERMEDIATE DIRECTOR (INT DIR). The FA20 crew contacted

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the INT DIR 1min later at 1022:00, squawking A4666, in the vicinity of the WOD NDB heading 010° towards the BNN VOR and was instructed to fly at 2400ft Luton QNH (1011mb), identified and the crew advised that it was RIS. At 1023, overhead Booker, the FA20 crew was instructed to turn R on to a heading of 040° for positioning for RW26 at Luton and a little later the crew was instructed to turn further R on to a heading of 060°.

At 1024:22, as the FA20 approached the vicinity of BNN, the radar service was amended by the controller to a Limited RIS due to traffic holding at BNN obscuring other traffic which may be operating below the 'stack'. Approximately 20sec later the FA20 crew was given traffic information on two contacts in the ac's 1 o'clock at a range of 4nm; one was indicating an altitude of 2300ft Mode C, with the other at 2100ft Mode C, both unverified. The FA20 crew acknowledged this information advising that they had TCAS contact and the controller continued to update the crew on the tracks, together with information at 1025:00, on a further contact which had appeared *"...1 o'clock position range 4 miles this one is opposite direction no altitude information"*- the C152. The crew again acknowledged this, reporting that *"..we have also traffic..same altitude opposite direction and one unknown altitude opposite direction"*. INT DIR updated the FA20 crew with traffic information again on the 2300ft traffic, which at 1025:20 was now making a R turn towards the FA20 at a range of 2nm. The crew replied at 1025:30, that they had a *"..traffic advisory"*, but this response was quickly followed by another crew member announcing at 1025:40, that they were responding to a *"TCAS climb"*. INT DIR added at 1026:00, *"...the second contact nearly 12 o'clock now range one mile no altitude information but it should be altitude two thousand four hundred or lower"*. The FA20 crew responded immediately at 1026:10, *"..visual it's a Cessna 152 regaining altitude now 2400ft 1011"* as the FA20 descended.

Simultaneously, the controller co-ordinated the climb of the FA20 into the LTMA with the TC TMA/NE SC, to afford the 'protection' of the Class A CAS, the crew was then instructed to climb to 3000ft at 1026:30, and thereafter continued their approach to RW26 with no further comment about the encounter.

Analysis of the FPL filed by the FA20 crew reveals that the crew had filed an IFR FPL at FL50. Farnborough ATC have analysed the relevant RT recordings and report that the crew elected to continue under VFR, but no reason was given for this and it was not enforced on the crew to avoid an ATC delay.

UKAB Note: Analysis of the Heathrow 10cm radar recording shows the C152 squawking A7000 but with no Mode C apparent at all throughout the encounter. The FA20 is shown approaching the Airprox location from the SW in level cruise indicating 2400ft on the actual London QNH of 1013mb at the time. Unknown tracks faithfully reported by the INT DIR are also shown as the FA20 closes on the C152 and passes Unknown ac 2 (Unk ac2) on the starboard beam indicating 2200ft ALT at 1025:49. The FA20s Mode C shows a climb at this point through 2600ft (1013mb) indicative of the reported "CLIMB", but in all probability triggered by the presence of Unk ac 2. Ascending to a maximum of 2800ft (1013mb) – some 300ft inside the LTMA, the contact of the FA20 merges with that of the C152 at 1026:13, some 1½ nm SE of the BNN - passing from the light ac's 11 o'clock – 5 o'clock whilst indicating 2600ft Mode C (1013mb) – about 2540ft QNH (1011mb) and equating to some 420ft above the C152 pilots reported altitude of 2000ft (1007mb). The FA20's Mode C indicates a rapid descent through 2500ft (1013mb) on the very next radar sweep 4 sec later at 1026:17, evincing the jet's descent whilst overflying the C152 as reported. However, without a Mode C indication from the C152, neither the minimum vertical separation nor the reported avoiding action dive can be confirmed with certainty.

ATSI commented that the FA20 was receiving a limited RIS, because of traffic in the BNN hold area obscuring other ac returns, from the TC Luton INT DIR. Nevertheless, traffic information was passed on a number of contacts in the vicinity of the FA20. This included information about an ac squawking A7000 but not displaying Mode C, which the pilot subsequently reported as a C152. Shortly after the encounter with the subject C152, the INT DIR cleared the FA20 to climb to 3000ft to position it within CAS (base 2500ft).

As a result of a previous incident in similar circumstances a TC Supplementary Instruction (SI 116/04) was issued. This included the following procedure: *"To avoid the workload and conflicts inherent in the provision of ATSOCAS (Air Traffic Services Outside Controlled Airspace), IFR aircraft which have filed a flight plan to join CAS, inbound Stansted, Luton, London City, Gatwick or Heathrow, should be afforded the protection of CAS as soon as practicable"*.

It is considered that the Luton INT DIR fulfilled his responsibilities with respect to the provision of a limited RIS. The procedure stated in the SI, should assist in reducing the possibilities of similar incidents occurring in future.

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.

From the reporting C152 pilot's perspective, he was operating under VFR some 500ft below the base of the LTMA in the 'see and avoid' environment of Class G airspace - he reported at an altitude of 2000ft London QNH, which he perceived was 1007mb, though at the time of the Airprox it was actually a value of 1013mb – placing him in the order of 180ft closer to CAS than he thought. For his part, without the benefit of any radar service to supplement his lookout, the C152 pilot had spotted the FA20 some 5-6 sec before it flew directly over his aeroplane barely 100ft above his Cessna. It appeared that the C152 pilot had probably spotted the FA20 as early as he could in the prevailing conditions clear below cloud, but his account equated nevertheless to very late spot indeed and he may not have expected to see another ac closing from above. Fortunately, the C152 pilot had just sufficient time to effect an avoiding action dive, but alas the absence of Mode C data from the C152 did not enable this to be confirmed independently from the radar recording, which had not shown any altitude data at all from this aeroplane. Some members wondered if the identity of the C152 was correct: it was explained that AIS (Mil) had double-checked the recorded data so the radar identity of the C152 flown by the reporting pilot's ac had been positively attested as correct. Others questioned if the C152 pilot had not switched his Mode C on, or whether the altitude reporting was just inoperative: this aspect was not clear, but controller members stressed how important Mode C was to them, as it enabled the fullest 'picture' to be painted for aircrew when transmitting traffic information about the other ac or trying to avoid it whilst providing a RAS.

Unbeknown to the Cessna pilot, the FA20 crew had been provided with copious traffic information by the TC INT DIR, under the RIS, about traffic observed in the FIR beneath the LTMA, one of which had triggered an RA in the Falcon's TCAS. Without Mode C data it was not feasible for TCAS to generate an RA and the Board concurred that the FA20 pilot's RA had not been triggered by the reporting C152 pilot's aeroplane. It was after their excursion into the TMA when the FA20 crew were regaining their assigned altitude by descending back down to 2400ft Luton QNH (1011mb) that the Airprox occurred and it was clear that TC INT DIR had done his best to forewarn the FA20 crew about the contact. The TC RT transcript had reflected the accurate traffic information and helpful advice provided about the subject C152 transmitted at 1026:00, *"...nearly 12 o'clock now range one mile no altitude information but it should be altitude two thousand four hundred or lower"*. This also evinced the FA20 crew's sighting immediately thereafter, *"..visual it's a Cessna 152 regaining altitude now 2400ft 1011"*, only moments before the contacts merged. It was the FA20 crew's responsibility under the 'Rules of the Air' to ensure that they 'gave way' to the other ac – and ultimately to avoid it – the latter aspect in concert with the C152 pilot. From the FA20 pilot's account provided some 4½ months after the event, he had reported the closest ac being 3nm away, which was evidently not the case. Whether this was based on visual acquisition, from the TCAS horizontal separation displayed by TCAS at the time - perhaps from a memory faded by the passage of time and many sectors later - was not clear. Indeed members were dismayed that it had taken so long for the FA20 pilot to render his report and urged reporters to submit

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their accounts promptly to ensure optimum accuracy. In the Board's view, the TC INT DIR had provided a very effective service to the FA20 crew under the RIS, conscientiously passing traffic information on the contacts observed in the vicinity of the Falcon. This coupled with the information gained from TCAS should have been enough to 'paint a good picture' for the crew about the conflicting traffic ahead of the FA20. Taking all these factors into account, the Board concluded that this Airprox had resulted from a late sighting by both pilots close to the base of the LTMA.

In one GA member's view, when crews elect as a matter of expedience, to cancel an IFR flight plan and operate under a RIS - essentially a VFR service where pilots are passed traffic information but where no avoiding action or provision of separation is implied or proffered – then it is essential that they understand their responsibilities for conflict detection and resolution in Class G airspace without relying entirely on ATC and TCAS to keep them out of trouble. As a rule TCAS is generally less accurate in providing azimuth information: moreover, here it is feasible that the FA20's TCAS never detected the C152 at all. If this was the case, then one member opined that the whole incident was much more hazardous. Members reviewed the controller's decision to climb the FA20 into the relative sanctuary of the LTMA and wondered if this could have been done sooner. A controller intimately familiar with the traffic in this vicinity observed that this congested Class G airspace below the LTMA affords controllers little room to manoeuvre when controlling ac in the Open FIR. Effectively the only radar vectoring altitudes available here to the controller in Class G airspace are 2300ft and 2400ft ALT – which then reduces to only 2400ft further to the east. The member stressed that with most outbounds in the LTMA routeing through BOVINGDON, negotiating an entry through the base of the Class A LTMA is problematic, as it is only after passing BNN that a climb into CAS can usually be co-ordinated, as occurred here so the Board welcomed the additional advice given to controllers on this topic. Nevertheless, the controller had demonstrated good judgement and flexibility. On this topic a controller advised that flights routeing IFR through the TMA into Luton from airfields in the S normally had to route via LOREL, hence the VFR option was seen by some (but not necessarily by the FA20 crew here) as a quicker option. The HQ STC member cautioned that with so much traffic operating outside CAS not fitted with a transponder, thereby rendering TCAS 'blind' to a large number of unseen ac of all kinds, it was essential for pilots to keep their eyes 'out of the cockpit'. Here both pilots were able to spot each other's ac, but it was not clear if the FA20 crew had managed to take effective avoiding action on the subject C152 in the very short time after they had spotted it and in limited airspace available to them bearing in mind the other traffic in the vicinity. Whilst the contacts of the C152 and FA20 had merged and the recorded data confirmed broadly the geometry of the encounter, the C152 pilot had reported the vertical separation was 100ft. But it was not entirely clear that the FA20 pilot's same assessment during the fleeting encounter was against the subject C152. Whereas the separation had been minimal by all accounts, a collision had been narrowly averted, but the Board agreed unanimously, that the safety of the ac involved here had not been assured by any means.

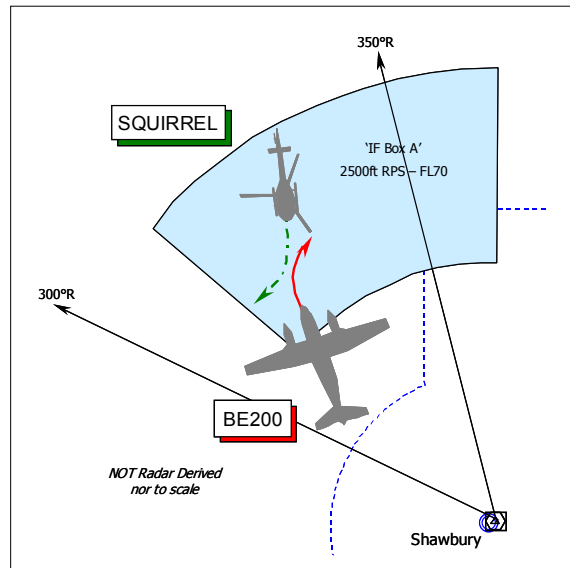
PART C: ASSESSMENT OF CAUSE AND RISK

Cause:Late sighting by both pilots close to the base of the LTMA.

Degree of Risk: B.

AIRPROX REPORT NO 053/04

Date/Time: 20 Apr 1049
Position: 5255N 0250W (9½nm NW of Shawbury - elev 249ft)
Airspace: Shawbury AIAA (Class: G)
Reporting Ac Reported Ac
Type: Squirrel Beech 200
Operator: HQ PTC Civ Exec
Alt/FL: 2800ft↑ 3500ft↓
(RPS 996mb) (QFE 992mb)
Weather VMC CLOC VMC below cloud
Visibility: 10km+ 10km+
Reported Separation:
Nil H/100ft V 100m H/100ft V
Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL PILOT, a QHI instructing a student, reports his helicopter has a black/yellow colour-scheme and the HISL was on whilst conducting an instrument-training sortie in VMC. He was in receipt of a RIS from Shawbury on a ‘quiet’ frequency and squawking the assigned code of A0230 with Mode C; neither TCAS nor any other form of CWS is fitted.

He was just commencing an instrument training recovery from ‘IF (Instrument Flying) Box A’, positioning for an SRA into Shawbury and heading S at 70kt climbing to 3000ft BARNESLEY RPS (996mb) in accordance with local procedures. Whilst climbing through 2700-2800ft a twin engined ac was spotted in his 12 o’clock heading towards his helicopter. The other ac - a white low-wing twin - was first sighted by the Squirrel crew apparently leaving cloud some 1000-1500m away and slightly high but descending towards his helicopter on a reciprocal heading. To avoid the other ac – the BE200 - he pulled up as the other ac descended (from being slightly above at first sighting) and he also commenced a R turn from his original 70kt climb; the other ac passed 100ft directly below with a “very high” risk of a collision and no discernible avoiding action by its pilot, he thought. He reported the Airprox on RT to Shawbury on 315.4MHz and asked if they had the twin on radar. The controller confirmed they now had the ac in contact and the BE200 appeared as though it had descended from slightly above his helicopter. No prior notification about the traffic had been received from Shawbury RADAR under the RIS.

UKAB Note (1): The Shawbury AIAA is promulgated within the UK AIP at ENR 5-2-3, as permanently active from 0700 to 0130 UTC Mon - Thur in winter from the surface to FL70. Civilian “pilots are strongly recommended to avoid this area; if this is not possible a LARS is available from Shawbury ATC on 120.775MHz”. Remarks: “Intense instrument flying and general handling training by large numbers of helicopters (including initial helicopter pilot training).....”.

THE BEECH BE200 PILOT reports that his ac has a white colour-scheme and the HISL was on whilst in transit from Denham to Hawarden. He was in receipt of a RIS from Shawbury ZONE on 120.77MHz and squawking the assigned code with Mode C; TCAS is not fitted.

Whilst descending below cloud passing about 3500ft Shawbury QFE (992mb) in the vicinity of the Shawbury overhead, heading about 350° (M) at 250kt, he first sighted the helicopter about 200m away passing through his level in a climb. To avoid the Squirrel he pushed the nose down and turned to the

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R as the helicopter passed 100m away to port and 100ft above his ac with a “high” risk of a collision. When ZONE passed traffic information about the Squirrel, the controller gave no indication that the helicopter was climbing towards his ac and omitted the Squirrel’s vertical profile in relation to his. The situation was made worse because he was transitioning from IMC to VMC at the time, resulting in the late sighting.

UKAB Note (2): In a later telephone call with UKAB staff, the BE200 pilot explained that he had been IMC whilst descending through cloud just before the Airprox occurred. He cited the omission by ZONE of the vertical element of traffic information as a relevant factor. He believed that when passed traffic information at “...12 o’clock, 2 miles, now manoeuvring indicated 2000ft below...”, with no indication to him that the helicopter was climbing, it was sufficient separation to enable him to continue his descent. He also mentioned that in future he would endeavour to avoid the Shawbury overhead.

THE SQUIRREL PILOT’S STATION comments that the Squirrel QHI was conducting instrument flying training in IF Box A to the west of Shawbury. Box A is a designated area of airspace extending from 2500ft amsl to FL70 in which ac from Shawbury conduct IF training and 1 of 4 such areas in the ‘Shawbury local flying area’. The Squirrel crew had just completed a recovery from an unusual attitude manoeuvre and were re-establishing the climb when the Airprox occurred. No traffic information was given to the Squirrel crew by Shawbury Radar under the RIS at all. The BE200 was under the control of Shawbury ZONE on a different VHF frequency and also in receipt of a RIS. The Beech pilot had received a warning and had confirmed visual contact with the Squirrel at ½nm range. On studying the transcripts it is apparent that there had been a risk of collision and the fact that the fixed wing was in visual contact with the helicopter did not mitigate this, due to the closure rate and late acquisition by the BE200 pilot of the helicopter. There is no doubt that under a RIS the Squirrel pilot should have been warned that there was traffic that could conflict with his flight path. It has long been recognised that the airspace used for helicopter training in the Shawbury area is congested and this incident highlights the need for the highest level of awareness by controllers and aircrew alike. To mitigate the risk of future occurrences, it was recommended that a trial be conducted to improve the conspicuity of the Squirrel and to fit a TCAS system to the training ac at Shawbury to ascertain if this would be of benefit.

UKAB Note (3): This Airprox is not shown on recorded radar as neither the Clee Hill nor the Great Dun Fell sources were operational during the period of this incident.

MIL ATC OPS reports that the Shawbury based Squirrel was receiving a RIS from Shawbury APPROACH (APP) whilst conducting a general handling sortie in IF Box A, situated 8-14 nm NW of Shawbury, operating from 2500ft BARNSELY RPS (996mb) to FL70. The Squirrel crew had previously received 4 calls from APP regarding conflicting traffic since entering IF Box A at 1042. Simultaneously, the BE200 was receiving a RIS from the Shawbury LARS/ZONE controller and had been identified at FL165 and placed under a RIS at 1040, ready for descent into Hawarden. The ac’s projected routeing took it directly through the Shawbury Radar overhead and it was subsequently given a procedural service in the descent to 4000ft on the Shawbury QFE (992mb) at 1046:12. The BE200 was re-identified leaving the overhead at 1048:10, whereupon conflicting traffic was immediately called in the ac’s “...12 o’clock, 6 miles, manoeuvring indicated 3, correction 1500ft below...”. The BE200 was subsequently instructed to descend to 2500ft QFE and the conflicting Squirrel recalled at “...12 o’clock, 2 miles, now manoeuvring indicated 2000ft below...”. The Squirrel was called again at 1049:30, “...12 o’clock half a mile tracking south indicating 400ft below”, whereupon the BE200 pilot responded with “...just got him”. At 1049:40, The Squirrel declared to APP “...we’ve just had an Airmiss with a twin, he’s heading north...2500ft”. APP responded “[C/S]...roger, [C/S], [C/S]... er roger, the aircraft is, er, just got a squawk on him but I’ve got no primary at all” a conversation then ensued between APP and the Squirrel pilot about the details pertaining to the Airprox. The BE200 pilot switched from the ZONE frequency at 1050.

Instrument Flying Box A, within which the Squirrel was operating, is an area bounded by the following:

"Shawbury VOR 315° radial - Shawbury VOR 005° radial; Shawbury DME 8nm arc - Shawbury DME 14 nm arc; Base 2500ft (Barnsley RPS) Top F 070."

It is one of 4 IF Boxes that are used by Shawbury helicopters. The Squirrel had been identified and placed under a RIS, by APP, and flew into Box A at 2500ft QFE. The Shawbury Flying Order Book (FOB) states that:

"Areas of Poor Radar Performance. Radar services to Shawbury aircraft are deemed to be limited in the following areas due to poor performance or ground masking:

300 - 350 radial, 7 - 15 nm up to 3000ft.

140 - 170 radial, 10 - 20 nm up to 2500ft.

The Shawbury radar overhead within 5nm of RAF Shawbury."

At the time of the Airprox, taking into account both the pilots' position reports, the Squirrel was deemed to be under a limited RIS from APP due to the ac's position and altitude.

Whilst transiting from SE to NW with its projected track taking it through the Shawbury Radar overhead, the BE200 pilot had initiated a descent from FL165 ultimately to 2500ft Shawbury QFE. ZONE placed the BE200 under a procedural service when radar contact was lost as it flew into the radar overhead. ZONE regained radar contact and identified the BE 200 at 1048:10, although the type of service was not reiterated. Traffic, which was believed to be the Squirrel, was called in his *"...12 o'clock, 6 miles manoeuvring, indicated 3, correction 1500ft below"*. This traffic was called on 2 further occasions, 53sec later and a further 27sec later, at ranges of 2nm and ½nm respectively; level information was passed with both transmissions, contrary to the BE200 pilot's report. The BE200 pilot reported visual with the conflicting traffic after the third transmission.

Although the BE200 had been painting on the radar display, for at least 1½min before the Airprox occurred, APP had not passed traffic information about it to the Squirrel crew. APP's workload was described as *"light"* with 3 Shawbury based ac in separate IF boxes to the N, E and S of Shawbury. But immediately prior to the Airprox, APP's concentration was focused on the IF area to the S and the controller says that he did not see the BE200 depart from the radar overhead and first became aware of the other ac's presence when the Squirrel reported the Airprox. ZONE's workload was described as *"medium to high"* and the controller should be commended for continuing to update the traffic information, including the height information to the BE 200 until he became visual. Appropriate action has been taken by the Unit.

HQ PTC comments that although there is no radar corroboration of the proximity of the 2 ac, the 2 pilots' reports chime well enough together to indicate that, without their respective actions, a collision would have been very close. We are disappointed to conclude that the Airprox could have been avoided by the exercise of a bit more common-sense by the controllers involved. Given that the BE200 had recently passed through the radar overhead and was heading into an area of poor cover, it might have been more prudent procedurally to restrict its descent until such time as he was seen to be clear of the Squirrel. Both pilots were under a RIS and it can be argued that ZONE fully fulfilled the requirement to pass traffic information to the BE200 and there was no regulatory requirement for co-ordination with APP. Equally, had the BE200 pilot elected for a more appropriate type of service (RAS) for an IMC descent then the 2 controllers might have handled the matter differently. But, in the round, RIS does not seem to be serving us too well as a means of preventing such incidents.

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 reports from the appropriate ATC and operating authority.

Many pilot members echoed the sage words of the Command's view and were concerned at the application of the RIS provided by APP to the Squirrel pilot and the overall ATS from these two controllers working alongside one another in the same Approach Room. Notwithstanding the caveat within the regulations for a RIS that each pilot was "...*wholly responsible for maintaining separation from other ac whether or not the controller has passed traffic information*", it was evident that ZONE had conscientiously passed traffic information to the BE200 pilot, and had continued to do so when it was apparent that the helicopter continued to pose a hazard. But in trying to paint the picture the controller had omitted the important factor that the Squirrel was climbing up toward the Beech in the critical stages of the encounter. The BE200 pilot had commented about this and other pilot members agreed that the inclusion of the climb 'sense' was crucial in this situation to painting the 'whole picture'. Although it was not feasible to determine the level of the BE200 or Squirrel when given traffic information, the first two transmissions from ZONE gave the impression that the traffic was receding "...12 o'clock 6 miles...1500ft below..."; the next "...12 o'clock 2 miles now manoeuvring indicated 2000ft below..."; whereas the last must have been an unpleasant surprise "...12 o'clock half a mile tracking south indicating 400ft below", suggesting that vertical separation had rapidly reduced by 1600ft in the space of about 1½nm. Thus members had sympathy with the BE200 pilot who had been constructing his mental air picture of what lay ahead, based solely on what information ZONE was giving at the time. It must have appeared that the separation between the two ac had increased before dramatically reducing to the reported 400ft. In attempting to provide a good picture, ZONE had added the "*manoeuvring*" caveat, but, "*climbing*" would have been a more descriptive and useful addition at close quarters. This is highlighted to controllers at JSP552 Article 235.140:

"In all cases...the information passed to the pilot should be relevant to his situation and circumstances at the time; the transmission should also contain sufficient information to accurately paint the traffic picture, as available to the controller."

The Mil ATC Ops report made it plain that APP was operating under a light traffic loading at the time and though his attention was focused to the S and it was technically a 'limited' service, controller members were concerned that he had not called the BE200. Furthermore, there was no indication within the Mil ATC Ops report that any traffic information had been passed between the two controllers; it was accepted that theoretically neither was compelled to co-ordinate at all under the terms of the RIS provided. Nevertheless, each controller had information about his respective ac but had not apparently passed it on to his colleague, which in the Board's view, was indicative of a lapse in teamwork within the Approach Control Room at the time. Although no recorded radar data was available the BE200 had reportedly flown through the radar overhead and the tape transcript had reflected that the ac had been conscientiously re-identified by ZONE when it cleared the overhead to the NW and its pilot immediately given traffic information about the helicopter. Therefore, both ac were painting on the Shawbury SRE before the Airprox had occurred. 'Best Practice' suggested that there might have been scope for ZONE either to pass traffic information to APP about the twin at some stage before the Airprox occurred or even just point it out. This would have alerted his colleague working the helicopter to the presence of the Beech passing through the overhead 'dark area' in case he did not spot it in time – as subsequently was the case. In the Board's opinion the omission of traffic information by APP to the reporting Squirrel pilot about the BE200 was undoubtedly a significant contributory factor to the outcome of this Airprox.

Here the BE200 pilot had complied with the advice contained in the AIP and conscientiously called Shawbury for a radar service. Some members thought it was unfortunate that ZONE had not gone that one step further and de-conflicted the two ac by momentarily stopping off the twin above the helicopter's operating block thereby assisting the latter's pilot with his instructional task - as the terms of a RIS permit

and thereby delaying the BE200's descent very little. Nevertheless, the Mil ATC Ops advisor noted that there was a requirement to get the twin down to levels which would ensure clearance below CAS as it flew on toward Hawarden. Civilian controller members emphasised that if pilots wanted ATC to afford separation they must ask for a suitable ATS themselves - e.g. RAS. However, pilot members agreed with the HQ PTC input and were also critical of the BE200 pilot's airmanship for not informing ZONE that he was IMC. It was not clear if he had been in cloud for a significant portion of his descent or whether it was just before the Airprox had occurred, but nonetheless, if he had informed the controller of this significant information ZONE might well have acted differently. In any event there was little merit continuing with a RIS when IMC – pilots could not acquire traffic having been given traffic information by ATC.

Inescapably, both pilots ultimately remained responsible for separation against other ac under the RIS. The Squirrel pilot did well to sight the twin ($\frac{1}{2}$ - $\frac{3}{4}$ nm away) as it broke cloud and take avoiding action by pulling up into a R turn. With the benefit of traffic information, the BE200 pilot sighted the helicopter, but only 200m away and probably after the latter's pilot had seen his ac. His own avoiding action, however helped by turning R and pushing down. Both pilots agreed that their combined actions had achieved a mere 100ft of vertical separation while the Beech pilot was able to see from below that some lateral separation also existed as their tracks crossed. Thus the Board concluded that this conflict in the Shawbury AIAA was resolved by both pilots. In doing so, it was also clear that while safety had not been assured by any means, they had done just enough to remove the actual risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict resolved by both pilots.

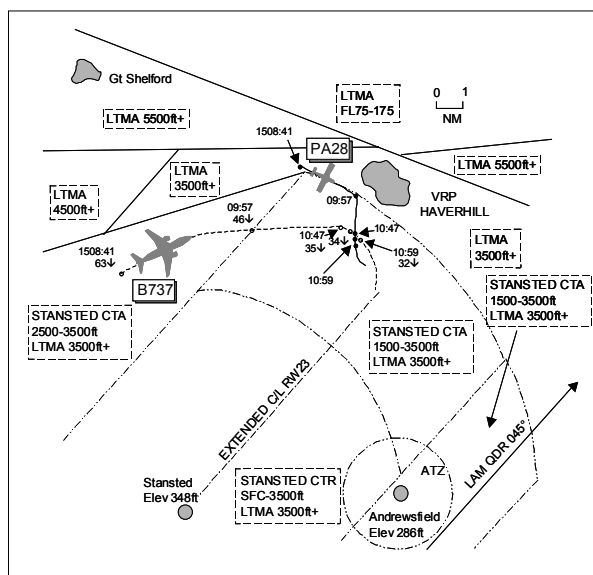
Degree of Risk: B.

Contributory Factors: Lack of traffic information from Shawbury APP to the Squirrel crew about the BE200.

AIRPROX REPORT No 055/04

AIRPROX REPORT NO 055/04

Date/Time: 23 Apr 1511
Position: 5203N 00024 E
(11nm NE Stansted - elev 348 ft)
Airspace: LTMA/CTA (Class: A/D)
Reporting Ac **Reported Ac**
Type: B737-300 PA28
Operator: CAT Civ Pte
Alt/FL: 3500ft↓ 3200ft
(QNH 1025mb) (QNH 1027mb)
Weather VMC CLNC VMC CLOC
Visibility: 10km >10km
Reported Separation:
300ft V 1nm H 1000-1200ft V
Recorded Separation:
0.25nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying inbound to Stansted IFR and in receipt of a RCS from Stansted DIRECTOR on 126.95MHz squawking an assigned code with Mode C. Whilst descending to 2000ft QNH in a R turn onto heading 190° to intercept the ILS LLZ for RW23 at 180kt in VMC, a light ac was spotted about 3nm ahead moving L to R tracking S, initially at the same level, 3500ft. The traffic passed 300ft above them and 1nm clear to their R, he thought, and was identified as a PA28 coloured white with a dark blue stripe. The ac was not squawking so no TCAS alerts/warnings were received. No avoiding action was taken but the other traffic's presence was reported to the Stansted Director. He assessed the risk of collision as medium.

THE PA28 PILOT reports flying with a passenger from Fowlmere, intending to land at Andrewsfield and flying at 3200ft QNH 1027mb and 100kt. The transponder was set to 7000 but had been inadvertently left on standby. The visibility was >10km clear of cloud in VMC and the ac was coloured white/burgundy with strobe lights switched on. He had previously flown around the NE side of the Stansted CTR on a number of occasions and had landed at Andrewsfield 5 times in the previous 4-5yr. On those previous occasions, he had approached from the SW from overhead the LAM VOR: this time he had aimed to intercept the QDR 045° from LAM and then descend to below 2000ft before turning R for Andrewsfield. On course from Great Shelford railway junction tracking 113° to pass over Haverhill (S side), he changed frequency from Duxford to Andrewsfield but did not establish contact with them. Whilst attempting to obtain a reliable VOR indication, he saw a large low wing twin engined ac 1000-1200ft below, overtaking him on a similar south-easterly track, and then saw that it was turning R. He assumed the ac had approached him from behind and below. Disconcerted that his involvement with the VOR may have led him to drift into CAS at his altitude, he turned L to head NE to make the quickest exit followed by a quick descent to below 1500ft, just in case he had mistaken Haverhill. On second sighting he felt sure of his position and at 1300ft, after cross checking his DI and compass and finding it needed resetting, he resumed his previous track, heading 113° whilst looking for the 045° VOR radial on which to turn. Having started the flight later than originally planned and conscious of his passenger's later engagement, he abandoned the idea of continuing to Andrewsfield and turned L onto 310° towards Cambridge, later climbing to 2600ft to avoid the ATZ. He routed to N side of the city back to Fowlmere, contacting Duxford en route. If he had drifted just into CAS, he regretted any such inadvertent incursion and any concern caused to the other crew.

ATSI comments that the Airprox occurred within CAS where the base is 1500ft. The Stansted Final Director (FIN DIR) would have no reason to suspect that the primary only contact (the PA28) had entered CAS. The B737 was flying about 2000ft above the base level at the time. No apparent ATC causal factors.

UKAB Note (1): The London and Stansted QNH was 1025mb.

UKAB Note (2): Analysis of the Stansted and Debden radar recordings at 1508:41 shows the B737 9nm NNW of Stansted tracking 065° descending through 6300ft QNH 1025mb with a primary only return, believed to be the subject PA28, 3nm W of Haverhill VRP in its 12 o'clock range 7.7nm tracking 120°. Just over 1min later at 1509:46 the B737 is steady tracking 090° descending through 4600ft QNH following vectors from the Stansted FIN DIR whilst the PA28 has commenced a R turn 1nm SW of Haverhill VRP on the boundary of the Stansted CTA, rolling out onto a track of 180° 18sec later. The B737 commences a R turn at 1510:47 descending through 3500ft QNH with the PA28 0.6nm to its ESE still tracking 180°. The next radar sweep shows the B737 indicating 3400ft QNH 0.33nm NW of the PA28. The CPA occurs on the next sweep at 1510:59 with the B737 turning R through 120° at 3200ft QNH 0.25nm NE of the PA28. The radius of turn executed by the B737 means that the subject ac diverge for the next 18sec before the B737 crosses ahead of the PA28 which is seen to commence a L turn away from the Stansted FAT.

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 NATS Advisor informed members that an internal operations group within NATS had recently formed to study airspace infringements. During the initial meeting it had been agreed that as CAA already had an ongoing confidential infringement project, 'On Track', NATS would proactively support this initiative and produce internal publicity to encourage constructive reporting of incidents.

Members agreed that the PA28 pilot had been unwise to plan to fly so close to the Stansted CTA (S side of Haverhill VRP) leaving himself no room for error: normal good practice is to plan a track remaining 2nm clear of CAS. It was clear that the cause of the Airprox had been an unauthorised penetration of CAS by the PA28 pilot who flew into conflict with the B737. Although the PA28 pilot had inadvertently not switched on his transponder, it was not known whether Mode C was carried which would have revealed the ac's level to ATC. The Stansted FIN DIR had been oblivious to the PA28's entry into CAS as the ac had been a primary-only return in an area where the CTA base level is 1500ft. The PA28 pilot had only seen the B737 as it passed underneath, he thought by at least 1000ft, on a similar track and having approached from behind. Fortunately the B737 crew had visually acquired the PA28 about 3nm ahead on a crossing track L to R at the same level and had continued their R turn and descent whilst they monitored its course and watched it pass 300ft above and 1nm clear to their R. The recorded radar shows the B737 passing 0.25nm NE of the PA28 at the CPA during the overtake situation. Nevertheless, the B737 crew were always in the position to manoeuvre their ac further to avoid the PA28, had the situation deteriorated, which led the Board to conclude that safety had been assured during the encounter.

PART C: SSESMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of CAS by the PA28 pilot who flew into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT No 056/04

AIRPROX REPORT NO 056/04

Date/Time: 25 Apr 1041 (Sunday)

Position: 5349N 00304W (3nm NW Blackpool - elev 34ft)

Airspace: FIR (Class: G)

	<u>Reporting Ac</u>	<u>Reported Ac1</u>	<u>Reported Ac2</u>
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<u>Type:</u>	DHC8	TB20	PA28
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<u>Operator:</u>	CAT	Civ Pte	Civ Trg
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<u>Alt/FL:</u>	2000ft	1700ft↑	NR
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	(QNH 1027mb)	(QNH 1027mb)	NR
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<u>Weather</u>	VMC CLBC	VMC CAVOK	VMC
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<u>Visibility:</u>	15km	15km	NR
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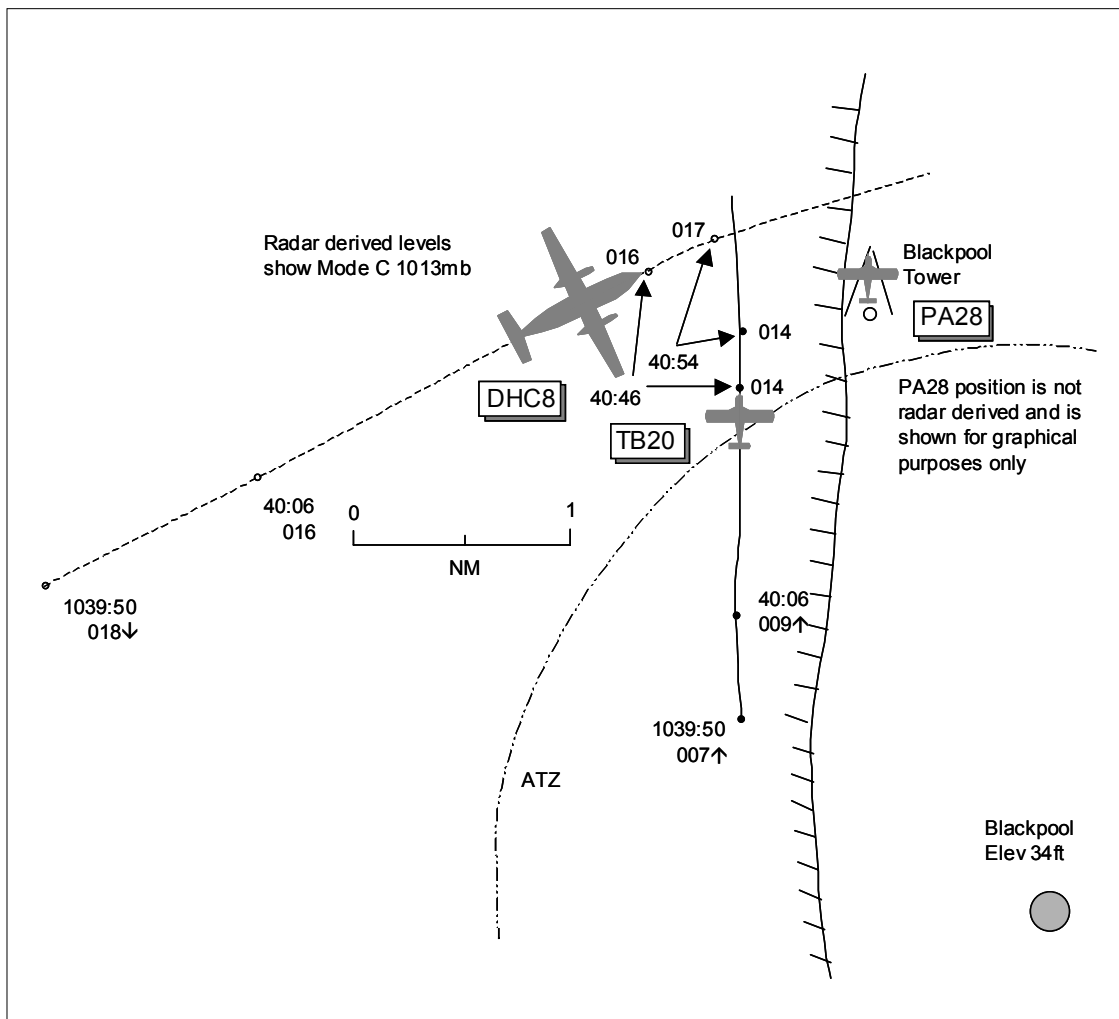
Reported Separation:

TB20 300ft V 0.5nm H	500ft V 1000m H	not seen
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PA28 200ft V NR H		
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Recorded Separation:

TB20 300ft V 0.45nm H	PA28 NR
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PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports inbound to Blackpool IFR and in receipt of an ATS from Blackpool Approach squawking 1231 with Mode C. About 3nm NW of Blackpool during vectors to a RH downwind for RW28 heading ENE descending to 2000ft and 190kt, they saw an ac about 0.75nm away to their R heading N. ATC told them of this traffic, a TB10 he thought, whilst simultaneously TCAS annunciated "*monitor vertical speed*" with a 'do not descend' red arc. This was quickly followed by a "*climb*" RA. As this was being actioned, the FO, PNF, looked forward and up to see a white/blue PA28 about 0.5nm ahead and 200ft above, also heading N - he could read the ac's registration. The PA28 was not showing on TCAS. The RA was ignored and the ac was manoeuvred visually to avoid both ac, the TB10 passing 0.5nm to their R and the PA28 200ft above - the TCAS RA would have directed them towards a midair collision. He thought that both ac had just departed Blackpool and were in the process of checking in with the Approach/Departure controller.

THE TB20 PILOT reports outbound from Blackpool VFR heading N at 90kt squawking 7000 with Mode C. The visibility was 15km in CAVOK and the ac was coloured white/blue with strobe lights switched on. He had been cleared for take-off and had been advised of various parachuting sites being active in the local area. On clearing the cct to the N - 1.5nm NW - he requested a frequency change to Approach on 119.65MHz. He reported clearing to the N and passing 1700ft for FL50 and was immediately told to "*climb not above 1700ft*" and was made aware of inbound IFR traffic. He levelled his ac and became visual with a DHC8 in his 10 o'clock range 1nm crossing L to R 500ft above: he turned L to ensure that he would pass behind and reported "*visual*". The DHC8 passed about 1000m ahead and 500ft above. During his departure phase, he was aware of another ac, a PA28, which at this time was in his 2 o'clock range 1000m just overhead the Blackpool Tower onshore, above him and climbing, but he had not been given any information on its height or track from ATC. He heard the DHC8 crew report a TCAS RA but did not recall hearing the PA28 pilot on the frequency. He estimated the PA28 passed 2-300ft above the DHC8.

THE PA28 PILOT reports flying on a solo student cross country flight from Blackpool VFR and in communication with TOWER on 118.4MHz then APPROACH on 119.95MHz; no transponder was fitted. He had climbed out, setting course for Carnforth, High Bentham and Skipton and had not seen the reporting ac nor had he been passed any special instructions by ATC.

THE BLACKPOOL APPROACH RADAR CONTROLLER reports acting as mentor to an experienced APP rated trainee who had only recently gained an APR rating. The DHC8 was inbound to Blackpool leaving the airway system via WAL and ESTRY. The weather was good and the unit had been busy for the previous hour or so with VFR traffic. Unknown traffic operating to the S of the aerodrome precluded vectors to a downwind LH pattern for RW28 ILS so the DHC8 was vectored to the W of the aerodrome to position RH for the ILS or a visual approach. VFR traffic inbound from the N that requested to join was either held off or instructed to route inbound not above 1000ft. He expected the DHC8 crew to request a visual approach so he descended the flight to 2000ft whilst W of the aerodrome. He told his trainee to inform the ADC that the intention was to vector the flight to about a 5nm final but the message became slightly altered which led the ADC to understand that the DHC8 would join visually downwind. The ADC could not accept this owing to workload and asked for the flight to do a full procedure. As the ADC was obviously busy, he did not ring him back to explain his intentions and continued vectoring for the ILS, the DHC8 now being level at 2000ft. Normally he descended ac to 3000ft or above when using a RH pattern - to stay above the climb out area - but he could not explain why he did not impose a level restriction on departing northbound traffic. The ADC continued to allow VFR departures to the N which resulted in 2 ac, a PA28 and a TB20, coming into close proximity to the DHC8 as it crossed the coast 3nm N of the aerodrome.

UKAB Note (1): The Blackpool METAR shows EGNH 1020Z 29005KT 9999 FEW030 14/09 Q1027= and 1050Z 28004 9999 FEW030 15/09 Q1027=

AIRPROX REPORT No 056/04

ATSI reports that at the time of the Airprox, the DHC8 and TB20 were under the control of Blackpool APR whilst the PA28 was in the process of changing frequency from the Blackpool ADC's frequency to that of the APR. During the course of the investigation, it was revealed that the RT recording was 65sec ahead of UTC so all timings in the report have been adjusted accordingly.

The ADC was operating with an assistant whilst a mentor and trainee manned approach/approach radar. There is no assistant provided in the approach room. The mentor reported that the trainee was a qualified and experienced approach controller but had only recently completed his approach radar course. He had undergone some 25hr of training and was, therefore, being monitored closely. The normal time taken to attain competence level at the unit is typically 200hr.

The mentor explained that the combination of approach and approach radar is normal. However, when radar is not available due to lack of qualified staff or equipment problems, the normal technique is to operate with separate aerodrome and approach positions occupied. It was this latter combination that should have been in place at the time of the Airprox. The mentor had however noted that the DHC8 was pending and, as it was the only scheduled IFR inbound for some 3hr, he decided that it would be of benefit for the trainee to handle the flight as a radar training exercise.

The DHC8 crew established communications with the APR at 1034:15, and reported descending to FL50 direct to ESTRY (a position approximately 9nm SW of Blackpool aerodrome). The crew were informed that they would be placed under a RAS on leaving CAS and that they could expect to receive vectors for a RH cct to the RW28 ILS at Blackpool. Subsequent descent to 3000ft was given at 1036:20, and the crew were instructed to leave ESTRY heading 010°. Some 90sec later the flight was instructed to descend to 2000ft and then turned right onto 070°. The controller advised the crew, at 1038:55, that they were 6.6nm to the W of Blackpool being positioned RH for a 7nm final.

Blackpool airport is situated in Class G airspace. The mentor explained that traffic leaving airways is frequently routed WAL to Blackpool via ESTRY. This ensures that such flights are kept clear of the Woodvale aerodrome overhead, as well as local traffic from Blackpool operating S of the airfield. The plan was to vector the DHC8 on this routeing and position it wide downwind RH for, hopefully, a visual approach onto RW28. This would ensure it remained clear of any cct traffic operating within and adjacent to the ATZ.

Meanwhile, two VFR departures to the N had taken off from RW28 and, having reported clear of the cct, requested a frequency change to 119.95MHz (Blackpool Approach). The ADC responded, in both cases "(c/s) to radar bye bye". Just before 1040:30, the TB20 pilot established communications with the APR and reported passing 1700ft for FL50 and requested a RIS. The other departure, the PA28, was in the process of changing frequency to contact the APR but was not yet in two-way communication. The APR immediately instructed the TB20 pilot to stop his climb at 1700ft and passed TI on the DHC8 and the pilot reported "...visual". The APR then passed TI to the DHC8 crew which was met with a "...standby..." and then the crew transmitted "And tower (sic) from DHC8 c/s we had a TCAS RA and an Airprox there we were in between two but we visually manoeuvred". At 1042:15, the other VFR departure, the PA28, established two-way communications with the APR.

[UKAB Note (2): The Blackpool RT transcript at 1041:25 reveals that shortly after receiving a heading change from the APR after his previous 'TCAS' transmission, the DHC8 crew transmitted "*er Blackpool we had the traffic off to our right it was like a Piper Warrior or something just above us about I think he was about two thousand one hundred two thousand two hundred feet*". After acknowledgement by the APR, the DHC8 crew continued "*yeah we had a TCAS RA climb but we couldn't climb because he was in the way*".]

Prior to the Airprox, the ADC was instructing inbound VFR traffic to join overhead the aerodrome at 2000ft, for traffic reasons, and had coordinated this with the APR. A strip was displayed on the APR's flight progress board to serve as a reminder that 2000ft was in use by ADC. The ADC cleared the PA28

pilot for take off at 1037:25, at which time the DHC8 was approaching ESTRY. Shortly after this, at 1038:05, the APR instructed the DHC8 crew to descend to 2000ft which was approximately the same time as the ADC cleared the TB20 pilot to take off. The MATS Part 2, page 4/4, states: *'After APR have given a 20nm range check on inbound traffic, ADC will restrict conflicting VFR traffic to not above 1000 feet QNH and transfer it to APR for further climb'*. Both the PA28 and TB20 had been cleared for take off prior to APR notifying ADC about the inbound DHC8. Therefore, in the ADC's mind, there was no reason to restrict these VFR flights.

The Blackpool MATS Part 2, on page 1/3, states: *'VFR flights should depart and arrive on tracks to or from the VRPs'*. VRPs are established to the S, SE, E, ENE, NE and N of the aerodrome. The Mentor advised that it is common practice to route inbounds via such VRPs but this does not apply to outbound flights. If they are routing to the N, from RW28, then it will simply be a R turn after departure. When a pilot books out for a VFR flight, two strips are produced. One is retained in the tower whilst the other is passed down to the approach room. Such strips do not contain any detail relating to the direction of flight nor the requested level. As mentioned previously, there is no assistant in the approach room and so all communication is with the APP or APR. Accordingly, airborne times on such flights are not passed from tower to approach, and so the ac simply call on frequency once instructed by ADC to contact APR.

At 1038:25 the APR trainee, having been prompted by his Mentor, called the ADC and advised *"OK DHC8 c/s is on his way he is just to the south west of the field going right hand for about a five mile visual if that's OK"*. The ADC responded: *"Ahh could you take him for the full procedure please"* and the APR replied: *"Full ILS yeah?"* which the ADC confirmed. The Mentor advised that he was a little taken back by this response, as the trainee had not fully conveyed the message intended. It was clear that the ADC was busy and so rather than calling him back the Mentor decided to stay with the coordination agreed. He went on to say that he was convinced he had requested that all departures be restricted to 'not above 1500ft', however, analysis of the RT recordings shows this not to have been the case. There is no procedure at the unit for placing a 'reminder strip' on the APR's strip display when such a restriction is applied. The ADC later advised that he was under the impression that radar was not available at the time and so, to facilitate traffic, he had requested that the DHC8 carry out the full procedural ILS procedure. (Note: *The commencement altitude for this approach is 3000 feet*). This would ensure that the DHC8 was above and clear of the ADC's traffic that was joining overhead at 2000ft. Once again, this reinforced his view that traffic routing from the SW to the overhead at 3000ft or above would not be a potential conflict with traffic departing RW28 making a R turn towards the N. Given that ADC believed that a non-radar service was being provided, it has not been possible to establish why both departures were told *"...to radar..."* when changing frequency.

At 1038:45, the APR instructed the DHC8 to turn R onto 070° and advised the crew *"DHC8 c/s you're currently six and a half miles to the west of Blackpool be taking you right hand for about a seven mile final for the ILS"*. At 1040:15, the TB20 pilot requested to change frequency and this was approved, and 15sec later the PA28 pilot was instructed likewise. The ADC later advised that he could not account for why they had been transferred in 'reverse order' i.e. second to depart transferred first, however, he believed that perhaps he had moved the strips into top RH section of his strip display and they might not have been in the correct time order. Additionally, it was the pilot of the second ac to depart (the TB20) who made the first request to change frequency. As soon as the TB20 pilot established communications with him, the APR recognised the possibility of a conflict and instructed the flight to maintain its present level. The Mentor advised that the conflict would not have been apparent on radar earlier since such departures are not visible on the display until they are completely clear of the cct. Due to the presence of the local Pleasure Beach, traffic frequently flies rather wide ccts to encompass this and Blackpool Tower (338° at a range of 2.6nm). By the time the TB20 pilot had called, the Airprox was already taking place. The TB20 was transponder equipped but the PA28 was not, so the crew of the DHC8 were only alerted to the presence of the former by TCAS. Fortuitously, the crew of the DHC8 acquired both ac visually and were able to manoeuvre accordingly.

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The mentor advised that it was the responsibility of ADC to identify potential conflicts between IFR arrivals and VFR departures, although common practice was for the APR to request that ADC apply a restriction to conflicting departures. However, on this occasion ADC was unaware of the inbound traffic until after both VFR departures had taken off. ADC also believed that the DHC8 would be carrying out a procedural ILS approach, which would mean that it would route to the overhead at 3000ft before heading out to the E as part of the notified procedure. Therefore, in the ADC's mind, there was no potential conflict between the DHC8 and the two VFR departures. It is clear that the present MATS Part 2 procedures are insufficiently robust in respect of such flights, however. The unit advised that a review and a rewrite of the present procedures were being undertaken as a direct result of this Airprox.

The decision to descend the DHC8 was taken by the trainee. However, the mentor commented that with IFR traffic, common practice was that if it was probable crews would be able to effect a visual approach, descent to 2000ft was normal, otherwise the minimum would have been 3000ft. As this Airprox occurred in Class G airspace between an IFR flight and two operating under VFR, the responsibility of ATC was to pass TI and instructions to flights in order to prevent collisions and maintain a safe, orderly and expeditious flow of traffic. Given that the APR had been advised that 2000ft was being used by the ADC, the use of the same level close to the aerodrome by the APR for IFR traffic was not a prudent one.

UKAB Note (3): Analysis of the Great Dun Fell radar recording at 1039:50 shows the DHC8 4.75nm WNW of Blackpool Airport tracking 065° squawking 1231 indicating FL018 (2220ft QNH 1027mb) descending. Simultaneously, a 7000 squawk is seen, believed to be the TB20, 1.75nm NW of Blackpool tracking 360° indicating FL007 (1120ft QNH) climbing in its 1.30 position range 3-2nm. Sixteen seconds later as the DHC8 is seen to level at FL016 (2020ft QNH) the TB20 is climbing through FL009 (1320ft QNH). The DHC8 and TB20 continue to converge, the TB20 is seen to stop climb at 1040:46 at FL014 (1820ft QNH) with the DHC8 in its 1030 position range 0.6nm 200ft above. The CPA occurs just after the next radar sweep 8sec later, the DHC8 crossing through the TB20's 12 o'clock range 0.45nm indicating FL017, 300ft above it. The non-squawking PA28 is not seen at all and its position on the diagram above is taken from the diagram and narrative reported by the TB20 pilot.

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 video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The ATSI Advisor informed members that Blackpool ATC had completed its review of procedures. It was clear that both the ADC and the APR had different understandings of the traffic situation following coordination 'agreed'. The APR had called the Tower informing the ADC that the inbound DHC8 was "*just south west of the field going right hand...*", whether this call satisfied the 20nm range check requirements of the MATS Part 2, extant at the time, was open to debate. The ADC had appeared to be somewhat surprised by this call but had asked for the DHC8 to carry out 'the full procedure', believing the flight would route via the overhead not below 3000ft for a procedural ILS and therefore not in conflict with the departing PA28 and TB20. These 2 VFR flights had been released without any level restriction. The ADC had been unaware whether the DHC8 was operating under a radar or non-radar service, the APP/APR function being carried out from the APP room, out of sight from the ADC. The APR mentor had erroneously thought that he had told the ADC to restrict all northbound departures to not above 1500ft and had allowed his trainee to descend the DHC8 to 2000ft to the W and NW of Blackpool. He had no idea of the PA28 and TB20 departing VFR unrestricted to the N, so that any level chosen for the DHC8 positioning RH downwind would have been unsafe. Members agreed that this coordination had been ineffective and inaccurate, following which the Blackpool APR had vectored the DHC8 into conflict with the 2 departing ac which had caused the Airprox.

The APR quickly became aware of a potential conflict when the TB20 pilot called on frequency: he was told to level-off immediately at 1700ft. However, the controller was unaware of the PA28 whose pilot was in the process of changing frequency. The TB20 pilot had reacted swiftly to the instruction and, following TI, had visually acquired the DHC8 in his 10 o'clock range 1 nm and turned L to ensure that he passed behind it as it crossed 1000m ahead and 500ft above. The DHC8 crew had visually acquired the northbound TB20 to their R, received TI and then TCAS gave an RA warning of "monitor vertical speed" followed by a "climb" command. Whilst actioning the TCAS guidance against the TB20, the DHC8's FO had, fortuitously, caught sight of the northbound PA28, 0.5nm ahead 200ft above crossing R to L. The PA28 was non-squawking and therefore was undetected by TCAS, its pilot being unaware of the TB20 and DHC8's proximity. The TCAS guidance was ignored and visual separation was taken on both light ac. Although the DHC8 crew's actions had been effective in removing the actual risk of collision, the Board agreed that the subject ac had passed in such close proximity to the extent that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

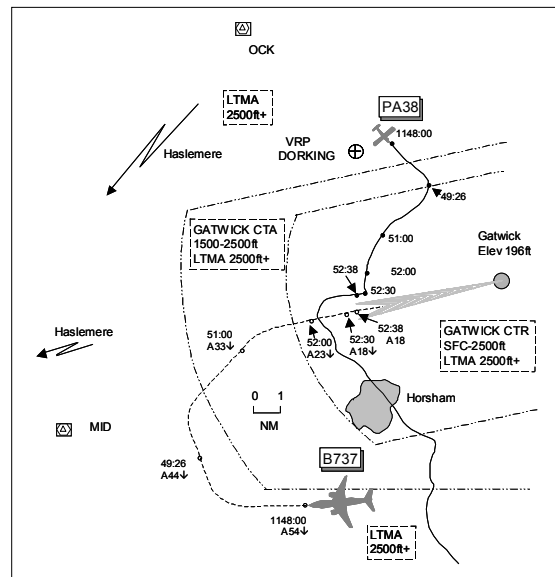
Cause: Following ineffective and inaccurate coordination, the Blackpool APR vectored the DHC8 into conflict with the 2 departing ac.

Degree of Risk: B.

AIRPROX REPORT No 057/04

AIRPROX REPORT NO 057/04

Date/Time: 25 Apr 1152 (Sunday)
Position: 5108N 00020W
(5nm W Gatwick - elev 196ft)
Airspace: CTR (Class: D)
Reporting Ac Reported Ac
Type: B737-500 PA38
Operator: CAT Civ Trg
Alt/FL: 1500ft↓ 2300ft
(QNH 1026mb) (QNH)
Weather VMC CLBC VMC HAZE
Visibility: >10km NR
Reported Separation:
nil V 0.5nm H not seen
Recorded Separation:
0.6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Gatwick on the ILS to RW08R at 135kt and in receipt of an ATS from Gatwick TOWER. Descending through 2000ft, ATC advised “unidentified traffic at 10 o’clock”. At approx 1500ft he became visual with traffic in his 10 o’clock <1nm tracking S bound at 1500-1800ft which then turned sharply away onto a westerly heading passing 0.5nm clear to his L. It was a single-engine light ac, possibly a Mooney, coloured white with blue markings. During the encounter, TCAS had given a TA alert and he assessed the risk of collision as medium.

THE PA38 PILOT reports flying at 90kt on his student solo qualifying cross-country flight on the leg from Fairoaks to Lydd via Haslemere, Littlehampton and Bexhill and in receipt of a FIS from Farnborough on 125.25MHz. The weather was VMC and the ac was coloured white with blue stripes and the strobe lights were switched on. After departing Fairoaks and reaching OCK at 1400ft, he turned on heading for Haslemere and climbed to 2300ft, he thought. Five minutes later he contacted Farnborough for a FIS, no squawk code was issued. As he progressed along his route, he became concerned about the poor visibility: it was becoming very hazy, to the point where he considered turning back to OCK and returning to Biggin Hill, his original aerodrome of departure. At the allotted time according to his Pilot’s Log (PLOG) he saw what he thought was Haslemere, called Farnborough and gave his height and position. He did not observe any other ac at this time. Approaching the coast, the visibility improved so he carried on towards Lydd with flight conditions remaining fair for the remainder of the flight.

THE TC GATWICK INTERMEDIATE DIRECTOR (INT DIR) reports that having just coordinated a task with Gatwick Tower, he noticed a 7000 squawk 4nm NW of Gatwick. As the subject B737 had just been transferred to Tower frequency 124.22MHz, he immediately telephoned the Tower controller, stating the unknown ac’s position and potential route southbound through the ILS. The B737 continued its approach and the conflicting traffic was seen to turn away about 0.25nm N of it and route to the W. The following inbound ac, another B737, was positioned onto the ILS and TI was passed. The conflicting ac turned S so further TI was given and it was seen to pass ahead of the second B737 which continued its approach.

THE GATWICK ADC reports that he was alerted by the TC INT DIR to unknown traffic approaching the FAT. He passed TI immediately to the subject B737 crew, who were already on his frequency, and, after updating the TI once more, the crew reported the traffic in sight. The unknown ac, sighted as a low wing

single engine type, turned away from the B737 to the W, then S, passing behind the first B737 and in front of the next ac on final approach.

UKAB Note: Met Office archive data shows the Gatwick METAR as EGKK 1150Z VRB02KT 9999 SCT040 19/08 Q1026=

ATSI reports that the pilot of the PA38 established contact with the Farnborough LARS controller shortly after 1145:30. The pilot reported overhead Ockham, routing from Fair Oaks to Littlehampton via Haslemere at 2300ft and requested a FIS. This was provided and the controller requested that the pilot report passing Haslemere. However, there is no evidence that this report was made and no further transmissions from the PA38 pilot are evident on the RT recording.

Shortly before 1152, after the B737 inbound to RW08R at Gatwick had been transferred from the Gatwick INT DIR's frequency to that of the Gatwick ADC, the DIR saw a 7000 squawk, with NMC, approx 4nm NW of Gatwick. He immediately contacted the Aerodrome controller and advised him of the unknown ac. MATS Part 1, Section 1, Chapter 5, Page 13, states that within Class D airspace, if an unknown ac is observed, a controller will: *'Pass traffic information unless the primary function of sequencing and separating IFR flights is likely to be compromised. If a pilot requests avoiding action it shall be provided to the extent determined by the radar controller. Give avoiding action if radar derived or other information indicates that an aircraft is lost, has experienced a radio failure, or has made an unauthorised penetration of the airspace'*. As the ac was clearly within the lateral confines of the CTR, this latter requirement applied.

The radar recording shows that a 7000 squawk entered the Gatwick CTR at 1149:26, on a south-westerly track. At approximately 1151, the ac turned L onto a southerly track, which took it towards the FAT.

At 1152:00, the ADC passed TI to the crew of the first B737 who, at 1152:30, reported the ac in sight and that it was turning away. However, this was fortuitous and it is assessed that the INT DIR, via the ADC, should have taken positive action at an earlier stage to prevent the ac getting into such close proximity.

Minimum separation occurred after the light ac had turned R to pass through the 9 o'clock position of the B737, at a range of 0.6nm. The ac then turned sharp L behind the first B737, passing 2.2nm ahead of the next inbound ac on the ILS. The light ac then continued to track S and away from the Gatwick final approach before finally leaving CAS.

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 the PA38 student pilot had been flying solo 'in command', members agreed that overall responsibility for the flight had initially rested with the instructor who had authorised the qualifying cross-country sortie. The onus had been on the instructor to ensure that the student could complete the flight safely after assessing his ability and that the weather conditions were – and would continue to be – suitable over the whole of the intended route. For whatever reason, the PA38 pilot had not flown the planned route correctly which led to an unauthorised penetration of Class D airspace and a subsequent flight path conflict with the B737. This had caused the Airprox. ATCOs were concerned that the Gatwick FIN DIR had only noticed the 'intruder' ac after he had transferred the B737 and although he had telephoned the ADC asking him to relay TI to the B737 crew, the FIN DIR had not given avoiding action instructions. It was considered that this had contributed to the incident. The B737 crew saw the

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conflicting PA38 after receiving TI again in his 10 o'clock <1nm away at about the same level which then was seen to turn to the W passing 0.5nm clear on their LHS. Members could not reconcile the PA38 pilot's unexplained hard R turn, immediately prior to the CPA as the student pilot had reported not seeing any conflicting ac on this leg of his flight. This raised doubts, as this turn may have been purely coincidental with the airliner truly going unsighted to the PA38 pilot. This led the Board to conclude that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

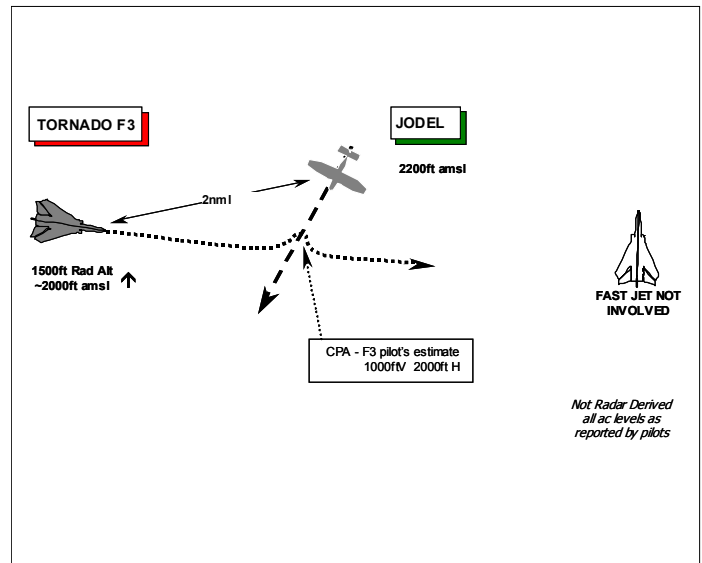
Cause: Unauthorised penetration of Class D airspace by the PA38 pilot who flew into conflict with the B737.

Degree of Risk: B.

Contributory Factor: The Gatwick INT DIR did not issue avoiding action to the B737 crew.

AIRPROX REPORT NO 058/04

Date/Time: 22 Apr 1625
Position: 5629N 00318W (Perth 030/3.8nm elev 397ft)
Airspace: Scottish FIR/LFA14 (Class: G)
Reporting Ac Reported Ac
Type: Jodel D150 Tornado F3
Operator: Civ Club HQ STC
Alt/FL: 2200ft 1500ft
 (QNH1013mb) (Rad Alt)
Weather VMC CLBC VMC CLBC
Visibility: >10km >10km
Reported Separation:
 NR 2000ft H 1000ft V
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE JODEL D150 PILOT reports flying a white ac with a blue/black stripe on a local sortie from Perth, squawking 7000 but with no Mode C fitted and not in communication with any unit since Perth A/G service had closed approx 20min before. The weather was good with scattered cloud several thousand feet above and the visibility was generally 20-30km although there were some rain showers 10km to the W. While heading 210° at 100kt and at 2200ft (on QNH 1013), returning to the field, he blind-called at about 10nm to the NNE. His call was answered by a flying instructor who had just landed who passed the QFE and R/W in use (27). He continued towards the overhead, keeping a good lookout, and adjusted the altimeter to the QFE (1000mb).

The Jodel pilot looked to the R and saw nothing so then looked to the L and within 2sec heard the roar of a jet engine pass very quickly somewhere behind his head. He looked back to the R and saw nothing then back to the L and saw in his 8 o'clock position the rear end view of a Tornado about 200-400 metres away, banked to the R at an angle of approx 120° and climbing rapidly. The Tornado pilot continued a rolling manoeuvre with the apogee approx 5-700ft above the Jodel's level and approx 1000m to the E of him. The Tornado pilot also rocked his wings during this manoeuvre. How great the separation was he does not know but it must have been close for him to hear it above the noise of his engine whilst wearing a good set of headphones.

He thought that the Tornado had come from the direction of the showers which was also into sun.

He noted his position, height, heading, time etc and then changed to Leuchars frequency and enquired if they had any ac in his area that had reported an Airprox but the controller stated that he had no Tornados on frequency at that time. He returned to the Perth frequency and completed the usual circuit calls and landed at 1630Z. He then called Leuchars ATC and enquired about the Tornado but they said that they only had 2 ac flying at the time and both were over the North Sea.

The pilot attached a map of the area of the incident. He understood that he was in class G airspace, that both ac had an equal right to be there and that 'see and avoid' was the sole means of separation. He felt however, that it was grossly irresponsible for the Tornado crew to plan and fly a route that passed so close to a busy airfield, 3nm at the closest point, at a height typically used by light ac when not in

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receipt of an ATC service. At the range that the Airprox took place ac, inbound to Perth would be on the A/G frequency and would not have the benefit of radar to warn of any conflict.

He did not assess the degree of risk.

UKAB Note (1): A very detailed map was provided by the Jodel pilot which was drawn on the day of the event. It showed the incident as occurring about 4nm NNE of Perth. Both the written report and the diagrams of the event indicate that he did not see the Tornado until 200m after their tracks had crossed.

THE TORNADO PILOT provided a brief report stating that he was flying a singleton sortie in a grey ac squawking Mode C but with no CWS fitted. While heading 100° at 420kt and at 1500ft Rad Alt and climbing out from low level, he saw a white light ac at a range of 2nm in his 11 o'clock slightly below his flight path. He did not file an Airprox since he saw it early enough to avoid it by a good margin, sufficient to ensure that there was no risk of collision. After crossing he rolled R to maintain visual contact with it but noted no reaction from the light ac. He spoke to the pilot later who said that he did not see the Tornado until after they had passed. At the time he was also visual with and avoiding another military fast-jet ac 5nm further E, heading N.

THE TORNADO STATION comments that their report has been raised in response to an Airprox submitted by the pilot of the light ac who appeared neither to have seen nor reacted to the Tornado. The Tornado pilot did not consider that there was a risk of collision as he saw and avoided the ac in plenty of time and therefore did not consider raising a report. In this case the pilot had, as required, maintained a good lookout and in addition to seeing the potential for a military-on-military conflict, cleared his immediate flight path ahead and saw, and avoided, the light ac. The lesson remains the same – maintain a constant lookout; in this case the maxim is particularly true in light of the proximity to the civilian aerodrome at Dundee.

UKAB Note (2): The Tornado pilot was traced and contacted 2 weeks after the event. He provided a report with a map but it showed the incident as taking place at 5632N 00258W which is 5nm NNE of Dundee and about 10nm ENE of the position reported by the Jodel pilot. It also showed his track (extended behind) as passing 5.5nm to the N of Perth on a heading of 100°.

UKAB Note (3): The incident was not recorded on radar so the position and geometry could not be verified.

HQ STC comments that 'see and avoid' prevailed in this case and it appears that there was never any risk of collision once the Tornado F3 pilot had spotted the Jodel whilst flying in the busy area near Perth. Both ac's lack of conspicuity relative to their background probably played a role in this encounter: the grey Tornado coming from the direction of grey shower-clouds, out of sun, would have been difficult to acquire and similarly the white Jodel against a scattered cloud background. All pilots should note that ac often appear unexpectedly from the side that is difficult to look at: their lookout scan should be adjusted accordingly, a lesson learned by some RAF fighter pilots during the Battle of Britain by not looking into sun. In this instance, it would appear that the Tornado pilot acted in accordance with Rule 17 of the Rules of the Air which states that 'the commander of an aircraft [shall] take all possible measures to ensure that his aircraft does not collide with any other aircraft'. The Jodel pilot was however not able to implement the other part of Rule 17 'the aircraft which has the other on its right shall give way' since he did not see the Tornado approaching.

It is not surprising that the Tornado pilot's recollection of the exact location of the incident differed slightly from the Jodel pilot's, since the former's report was completed a fortnight after the occurrence. It may be indicative that the encounter was reasonably close for the pilot to have recalled the event at all. Although this is confirmed by the Jodel pilot hearing the Tornado from inside his wood and fabric ac, it

would be also consistent with a miss-distance of 1-2000ft (as reported by the Tornado pilot) or even more. However, since no buffet was reported and the fact that the Tornado surprised the Jodel pilot, we believe that the Tornado pilot's estimate of the miss-distance was accurate.

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 Tornado operating authority.

The Board was informed that since the Tornado was not Leuchars-based, the station would not have had any record of its presence or intentions.

The Board thought that the solo Jodel pilot must have been very alarmed by the Tornado, having heard it before he saw it. There was discussion regarding the margin by which the Tornado had avoided the Jodel, but the Board accepted that it could have been some distance away and still be heard over the engine noise of the Jodel even with its pilot wearing headphones. The Tornado pilot had seen the Jodel at a distance commensurate with its size, the ac colour and the background, at about 2nm (about 15 sec to CPA) and he avoided it both vertically and horizontally by a margin he considered to be safe. He was not unduly concerned and had time to waggle his wings as the ac passed. Since the Jodel pilot did not see the Tornado until after the event he was unable to report a miss-distance. In the absence of any radar or other information the Board considered the miss-distance reported by the Tornado pilot to be the best estimate.

The Board was not persuaded by the Jodel pilot's argument that the Tornado was too close to Perth airfield. He had avoided the ATZ by about 2nm and had not flown through the approach to the runway; also since it was late in the day and the A/G station was therefore closed and there was only one other ac on frequency (that ac having just landed), it would have been unlikely that the airfield was busy. There was also discussion regarding the differing positions of the Airprox as reported by the respective pilots. The Board concluded that since the Jodel pilot completed his report shortly after the event it was probably the more accurate. However, since he did not see the Tornado until after it had passed, there could have been a slight delay in his noting the position and the distance to the North of Perth would be greater than reported and nearer to the track marked on the Tornado pilot's map which showed that he had planned to avoid the airfield by about 4nm. Since the Jodel pilot was familiar with the area, was inbound to Perth and the Tornado pilot did not note the position until 2 weeks after the event, the actual position was thought more likely to be NNE of Perth rather than the Tornado pilot's estimate of 10nm further to the E. Notwithstanding the uncertainty over the position, the Board considered that the Tor

The Board noted and concurred HQ STC comments regarding the relative conspicuity of both ac.

Members determined that the incident had taken place in Class G Airspace and the exact position was largely irrelevant. The Tornado pilot had, to as large an extent as practicable, fulfilled his obligation to see and avoid and, for whatever reason, the Jodel pilot had not seen the Tornado and was therefore not able to take any avoiding action. Fortunately in the circumstances, this had not mattered since the Tornado pilot's avoiding action had assured that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

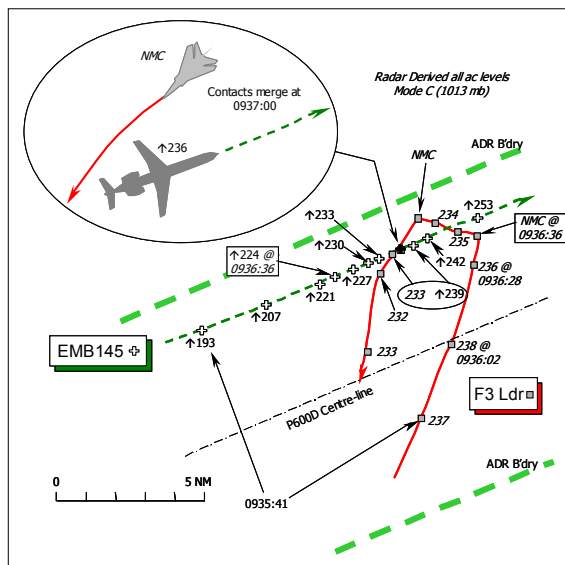
Cause: Conflict in Class G airspace resolved by the Tornado pilot.

Degree of Risk: C.

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Date/Time: 28 Apr 0937
Position: 5740N 00050W (50nm NE ADN)
Airspace: ADR P600D (Class: F)
Reporting Ac *Reported Ac*
Type: EMB145 Tornado F3
Operator: CAT HQ STC
Alt/FL: FL230↑ 23297ft
Orkney RPS
(1014mb)
Weather NR VMC NR
Visibility: NR Good
Reported Separation:
<600ft V/400m H Not seen
Recorded Separation:
Contacts merged



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMB145 PILOT reports he was outbound from Aberdeen for Esbjerg routing ADR P600D heading 065° en-route to FORTY at 230kt. They had been cleared by Scottish CONTROL to climb to FL370 and advised of military traffic that was already displayed on TCAS. The other ac – he believed correctly it was a grey Tornado - was sighted by the co-pilot - the PF - before he saw it himself, so he then turned on their landing lights when the jet was about 10nm away to assist their own visual conspicuity. Scottish instructed them to “maintain a good rate of climb” so they maintained 3000ft/min. The military jet was then seen turning and, he thought, diving towards his ac. They prepared for a “TCAS alert” and a TA was enunciated “TRAFFIC TRAFFIC” followed by an RA “MAINTAIN VERTICAL SPEED”, with which his co-pilot complied. He watched the Tornado descend towards them from ahead, passing under the wing as it flew about 400m down the port side. TCAS then enunciated “CLEAR OF TRAFFIC”.

It was emphasised that he was visual with the Tornado throughout, because ATC had identified the jet to them and had asked them to maintain a good ROC. He stressed that if the Tornado pilot had pulled up, there would have been a definite risk of collision, which is why he had filed the Airprox.

THE TORNADO F3 PILOT reports his ac has a grey air defence camouflage scheme, but the HISL was on whilst flying in VMC with an in-flight visibility of >10nm. He was operating under an ADIS from CRC Neatishead [NEAT FC] conducting practice intercepts (PI) at 23000ft, whilst flying at Mach 0.62 [about 375kt]. A squawk of A2411 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

Whilst outbound heading 020° to set up for the next PI, Neatishead reported traffic to the NW, heading NE at 18000ft and climbing. He had been “cleared in the full height block” [but did not explain what it was] so turned L inbound at about 072° ADN 50nm onto a heading of 215° for the intercept. Neatishead then advised of stranger traffic 5nm away, followed by the controller requesting confirmation that he was visual with the reported ac, which he was not.

THE ScACC MORAY SECTOR TACTICAL & PLANNER CONTROLLER (MORAY SC) reports that CRC Neatishead called to ask the flight profile of the EMB145 so he advised the ac was climbing high level toward FORTY. The controller advised that the F3 would be clear by 1000ft below on Mode C and he would call the traffic. He advised the EMB145 crew about the military ac who confirmed that they

had detected the F3 on TCAS, so he told him to keep the ac in sight. As the situation continued to develop, the military jet appeared not to be complying with the co-ordination [as he apparently understood it]. He phoned Neatishead and asked for the controller of the F3. The assistant replied and he asked for the controller NOW! When the NEAT FC answered he asked what the F3 was doing and was told he was turning S. When he asked if the F3 crew was visual with the EMB145 he was told they were not. The EMB145 crew then advised that the F3 was clear of them.

THE CRC NEATISHEAD FIGHTER CONTROLLER'S MENTOR was supervising the U/T controller [NEAT FC] conducting 1v1 intercepts to the E of Aberdeen between 8000ft ALT and FL350. At about 0925, he observed an Aberdeen departure climbing out on a A6233 squawk – the EMB145 - tracking about 070°. At 0928 his student saw the same traffic and immediately called ScACC for co-ordination/information: this call was initially connected to the wrong ScACC Sector and the MORAY controller was requested, who picked up the line very shortly afterwards. The trainee identified the traffic he was requesting information on – the EMB145 - and was told it was in the climb to FL330. His student then identified his traffic, the F3 squawking A2411, and stated that whilst the fighter traffic was below FL245 the FC will call the EMB145 in under the ADIS, but when the F3 was above FL245 would maintain 1000ft below the EMB145's climbing Mode C indication, unless clear in plan. Before NEAT FC could state his actions above FL290 the MORAY SC interjected that he was happy with this course of action. Because he knew that the lead F3 would not be above FL290 whilst the EMB145 was in the vicinity, he felt no need to re-contact the MORAY SC to confirm their actions above FL290. At about 0931, the U/T controller imposed the restriction “not above FL245” to the lead F3 and then called in the climbing EMB145, giving bearing, range and height from the F3. In the call the U/T controller stated that the airliner was climbing through about 17000ft - continuing to FL330. At 0933, the F3 crew advised they were ready for the PI and the lead F3 as target turned himself inbound through W onto a southerly heading. During the turn the EMB145 was called in a second time and with about 5nm separation the MORAY SC tried to re-establish landline communications with the U/T controller. This call was initially picked up by the NEAT FC's U/T assistant as the U/T controller was transmitting to his ac at the time. When the U/T controller picked up the line both ac were already merging in plan with the lead F3 turning to clear to the SW. At the request of the MORAY SC they asked again if the lead F3 crew was visual the traffic; the response was negative. The EMB145 continued towards FORTY and the lead F3 continued to clear SW. At no time during the incident did the lead F3 climb above FL238.

ScACC ATCI reports that at 0930:10, the EMB145 crew first called on the MORAY Sector frequency climbing through FL90. The flight was identified by the controller who was operating the Sector with both TACTICAL & PLANNER combined on one operating position. Although the EMB145 crew had flight-planned a cruising level of FL370, the ac was climbed initially to FL250 by the SC. The pilot asked “*are the military active, do you know?*” adding “*...if we could route direct VAXIT [in the Copenhagen UIR] ...we'd be happy with radar information if er military would let us*”. However, the controller instructed the EMB145 crew to route towards FORTY as the Danger Area complex S of P600D - EGD613 - was active. Just after 0931:10, the EMB145 crew was cleared for a further climb to FL290, which was acknowledged. At 0933:00, the SC instructed the crew after FORTY to route direct to VAXIT.

Just before 0933:20, MORAY responded to a call from Neatishead for co-ordination. CRC Neatishead Controller 1 (NEAT FC) requested traffic information on MORAY's A6233 squawk - the EMB145 – whereupon MORAY advised that the EMB145 was “*...continuing on that route to FORTY in the climb*” then turning SE, before adding that the airliner was climbing to “[FL] 330 at the moment”. NEAT FC then gave details of his military ac squawking A2411 – the lead F3 - which the MORAY SC confirmed he could see on radar some 30nm SE of the EMB145. NEAT FC co-ordinated this traffic, saying from just before 0934:10, “*..I'm on an information service below 245 and I'll call you in when you're in the er when I'm in the upper air I'll maintain a thousand below your climbing charlie*”. To which MORAY SC replied, “*okay no problem*”. Thus co-ordination was agreed between the two controllers.

The EMB145 crew was cleared to climb to FL370 and at 0935:17, the MORAY SC requested the pilot to “*give me a good rate of climb through FL320 please*”. MORAY immediately followed this up with traffic

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information on the F3 at about 0935:30, saying *"I've got military traffic in your 2 o'clock at a range of 10 miles showing 230 descending you got him in sight?"* The EMB145 crew replied *"Got it on TCAS er looking"*. MORAY added moments later at 0935:40, *"he said he was gonna take 5 miles from you but at the moment he is converging with you 235 unverified"*. [UKAB Note (1): These codes are assigned to CRC Neatishead within the UK SSR Code Assignment Plan notified in the UK AIP at ENR 1.6.2.4, and extant at the time of the Airprox, but they are not annotated as unverified. The information available to ScACC controllers about verified/unverified codes has now been corrected.] As the EMB145 was climbing through FL197, after a few seconds the crew confirmed *"got him visual"*, to which MORAY SC responded *"OK, keep your eye on him please"* to which the crew replied *"wilco"*. The radar recording reflects a range of 7nm between the ac at this point, on slow convergence.

Moments later at 0936:04, when the EMB145 was passing FL207 and the F3 was indicating FL238 just 6½nm away and still converging [within Class F airspace], MORAY initiated contact with NEAT FC on the landline. The call was answered by the CRC FIGHTER MARSHAL's ASSISTANT, whereupon MORAY SC asked for the controller working the A2411 squawk. The call was then picked up by the NEAT FC's assistant before the NEAT FC himself came on the line. This internal transfer within the CRC meant that it took a total of 32sec before controller-to-controller communication was established. While waiting for the response, the NEAT FC can be heard in the background giving traffic information to the F3 crew. Just after 0936:40, MORAY SC queried *"your 2411 [the lead F3] what's he doing?"* As he spoke the recording shows the F3 turned sharply L, passing FL235 in descent towards the airliner at a range of 3.2nm and closing head-on against the EMB145, which was climbing through FL230. The Neatishead trainee controller then replied erroneously *"he's maintaining not below FL245"*. A voice was heard in the background at the CRC correcting the NEAT FC [probably the FC's mentor], who then said *"..he's in a left hand turn on to south he's not **above** 245"*. Whereupon, the MORAY SC asked the FC *"can't you see my traffic"* NEAT FC is then heard asking the F3 crew, *"are you visual with the stranger northwest of you?"* The two ac are shown on the Scottish radar recording approaching head on, the EMB145 climbing through FL233 Mode C, and the F3 at FL234 descending at a range of 2nm. The Neatishead controller then replied to MORAY that the F3 crew was *"...not visual, he's maintaining southwest"*, though on radar the Tornado can be seen having turned NW and descended before turning SW bound. The MORAY SC commented *"Well, I'm not impressed, I'll speak to you later"* and ended the call.

[UKAB Note (2): Meanwhile, the next transmission to or from the EMB145 was at 0937:10, when the crew reported the *"..military traffic now passed behind"*, the MORAY SC did not respond until a further call from the EMB145 crew just after 0937:30, the SC saying *"do you see that traffic"*. The EMB145 crew advised, *"yeah we did TCAS RA on that so we'll..have to be putting in..an..RA..report on that but..we're visual throughout"*. Some time later when the EMB145 crew queried the location of the F3's base and whether there was any RT contact with the jet from ScACC, the SC added that *"no he was working Neatishead Radar the defence radar and I did co-ordinate it and they assure me he would maintain 1 thousand feet and 5 miles when I tried to speak to him the controller (NEAT FC) then said they did not have you in sight"*.]

The EMB145 was climbing on Advisory Route P600D under a RAS although this was not explicitly stated by the MORAY SC. However, in requesting a routeing direct to VAXIT and saying that he would accept a RIS on that track, the pilot exhibited a knowledge of the conditions for provision of off-ADR service and it is judged that he was aware that he was receiving a RAS whilst on P600D.

Under a RAS, the ScACC MATS Part 2, Section 5, para 1.4.1 states that the controller:

"shall....pass to the pilot the bearing, distance and, if known, level of conflicting non-participating traffic [the F3], together with advice on action necessary to resolve the confliction."

Controllers shall pass avoiding action instructions to resolve a confliction with non-participating traffic and, wherever possible, shall seek to achieve separation which is not less than 5 nm or 3000 feet,

except when specified otherwise by the CAA. However, it is recognised that in the event of the sudden appearance of unknown traffic, and when unknown aircraft make unpredictable changes in flight path, it is not always possible to achieve these minima.

Controllers shall continue to provide information on conflicting traffic until the confliction is resolved.”

In handling this incident the civil controller correctly provided the EMB145 crew with traffic information on the converging F3. MORAY SC established that the EMB145 crew had spotted the other ac on TCAS and visually, instructing the pilot to keep it in sight. On its original steady course the F3 was seen to be going to pass a bare 5nm ahead of the EMB145 on a crossing track, and it was only when the MORAY SC was on the phone to Neatishead (to confirm that the original co-ordination was being acted upon) that the F3 was seen to turn suddenly L towards the EMB145. At that point it was too late for the SC to give any effective avoiding action. Minimum separation as recorded by SMF shows 130ft V at a range of 1.4nm, before it increased to 400ft V at 0.23nm H.

It was noted that at 0936:04, with the civil and military ac converging, it took 32sec for the MORAY SC to establish contact with the FC controlling the F3, because the call was passed through two assistants before reaching the specific controller concerned. Since civil controllers will normally only initiate contact with CRC Neatishead to resolve a potential conflict, such a delay gives some concern. It is recommended that this concern be raised with MoD with a view to establishing if the connection time to the right controller can be reduced in the interests of safety. During the telephone co-ordination between units, the [trainee] NEAT FC's phraseology was less than fluid and in the landline recording he appears under some pressure. He made an error regarding the Tornado's level and was heard being corrected by another controller. It is noted that a controller check was in progress and it would be helpful to know at what point during such a check the Mentor is required to step in.

ASACS SSU comments with RT audio recordings & landline transcript that the subject Tornado was the leader of a pair of F3s that was conducting an AD training sortie to the E of Aberdeen operating in an altitude block from 8000ft up to FL350 under an ADIS [in the lower & middle airspace] which had been limited due to equipment unserviceabilities and a RCS in the upper airspace. The School of Fighter Control (SFC) U/T controller at Neatishead (NEAT FC) observed the EMB145 climbing out of Aberdeen, squawking A6233 and initiated a call to the ScACC MORAY SC at 0932:55, which was answered initially by another Sector Controller. NEAT FC asked for *“Moray Sector please”*. The answering SC responded *“MORAY was that standby sorry they're on the other side of the room we're just going to shout to them”*. Some 21secs after the call was initiated Moray SC came on the line at 0933:16. After the NEAT SC had elicited traffic information about the EMB145, the F3 was identified to the MORAY controller thus: *“regarding my 2411 [the F3] south-east of your traffic [the EMB145] by 30, heading northeast.”* Whereupon the trainee NEAT FC proposed co-ordination, *“I'm on an information service below 245 and I'll call you in when you're in the er when I'm in the upper air I'll maintain a thousand below your climbing Charlie.”* To which the MORAY SC replied *“OK no problem.”* Although the co-ordination did not include the requirements above FL290 and the phraseology was less than ideal, the agreement was apparently understood. The instructor screening the FC and the supervising FA, who checked, also understood the terms of the agreement.

At 0934:55, the FC limited the F3 to not above FL245, which was acknowledged by the crew. Shortly afterwards the FC issued the first 'stranger' warning to the F3 crew [under the ADIS]. *“[C/S] stranger bra [compass bearing to the other ac & range in nm] 300/15 heading north east climbing through 18 thousand to flight level 330. You will have the full block on the inbound run”*. At 0936:02, the lead F3 crew called ready for the inbound run as the target ac; the NEAT FC passed target information to the No2 at 0936:13, *“NEAT picture 2 Groups. First group hostile group Bull 320/47 24000”* coupled with a further stranger warning at 0936:26, *“Second group, stranger, bull 315/52 22 thousand heading northeast” – referring to the EMB145*. This was not specific to the lead F3 crew, but should have supplemented the first actual warning about the EMB145. At **0936:33**, a further 'stranger' warning was passed directly to the lead F3 crew, *“[C/S] previous called stranger is bra 250/5 heading northwest,*

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FL225 climbing". Between the target information and coupled stranger warning the FC's assistant can be heard picking up the call from the NEAT FIGHTER MARSHALLER subsequent to the MORAY SC's return call to the NEAT FC to ascertain what the lead F3's intentions were. The reason that the NEAT FC did not pick up the call immediately is clear from the RT recording in that he was speaking to the ac on RT and passing traffic information to the lead F3 crew about the EMB145. The trainee FC replied erroneously "*he's maintaining not below FL245, in the left hand turn onto south*". This statement was incorrect, as the F3 crew had been limited to not above FL245. The ScACC controller was obviously concerned and asked if the F3 crew was visual with his traffic. It was subsequently established that the F3 crew did not have visual contact with the EMB145.

The crew of the EMB145 was visual with the lead F3, in addition the information was supplemented by TCAS so the reported separation of 600ft vertical and 400m horizontal might well be accurate. The trainee NEAT FC co-ordinated the lead F3 with the MORAY SC, which, whilst not textbook, was apparently understood by both parties and traffic information on the EMB145 called to the lead F3 crew under the terms of the Limited ADIS and the co-ordination agreed. It was unfortunate that the crew of the F3 turned into confliction with the EMB145 despite traffic information being passed on three separate occasions by the WC. However, another factor in ASACS view was that the MORAY SC did not apply the RAS correctly to the EMB145 crew.

ATSI comments that it would appear that the MORAY SC either did not fully hear, or understand the implications of, the co-ordination with the NEAT FC, insofar as the military controller would only be providing a RIS to the Tornado below FL245, the airspace in which the Airprox occurred. In accordance with MATS Part 1, the civil controller should have provided a readback to the military controller of the co-ordination agreed. Had he done so it would have allowed any misunderstanding to be addressed.

HQ STC comments that there are a number of Human Factors apparent in this Airprox affecting all involved. Following analysis of the actual voice recordings between the Tornado crew, the NEAT FC and the MORAY SC the situation has been clarified. It has also highlighted the risks of misinterpretation if relying on the transcribed evidence. From the voice recordings it would appear that the MORAY SC was busy and his initial conversation regarding the co-ordination plan would appear strained. The trainee NEAT FC stumbled slightly with his co-ordination agreement, but believed he got most of the information across. The quick, and apparently terse, reply of "*OK, no problem, many thanks...*" from the MORAY SC would seem to imply that the SC was busy. The trainee NEAT FC now started to build 'the picture' for both Tornados and described the now known civil traffic routeing in the ADR as a 'stranger'. He reported the EMB145's position with reference to 'bullseye' [a tactical reference point] and also using the BRA [bearing & range] format. This was an error of judgment and the trainee NEAT FC would have been better placed in describing the Embraer as 'Civil Traffic' and its position and routeing with reference to the ADR. This would have alerted the lead Tornado crew of the Embraer's presence and intended routeing, who were planning to make an, albeit misguided, decision to do a high-energy manoeuvring turn in the ADR.

The difficulty that the MORAY SC experienced in contacting the NEAT FC almost certainly played a part in the next error of judgment. The MORAY SC began to realise in good time that a potential confliction was developing. His call to NEAT FC was delayed by having to go through the FIGHTER MARSHALLER, then UT NEAT FC's Assistant and then finally to the trainee NEAT FC. During this period, MORAY SC had time to apply avoiding action under his obligations when providing a RAS to the EMB145 crew. At this point, action - rather than a request for information - would have been preferable. Furthermore, he would appear to have been distracted by the amount of time that it has taken to talk to the trainee NEAT FC; who at the moment-critique has been delivering updated traffic information to the lead F3 crew. Within this information call a critical single error is made by reporting the Embraer's heading as "*northwest*" rather than the northeast'ly heading that it was flying. This error of detail was made as the trainee NEAT FC realised that the MORAY SC was waiting to speak to him on the landline. But the lead F3 crew was unlikely to regard the EMB145 as a potential confliction on a NW heading, as this might have suggested it was flying away from them at a range of 5nm so they continued their L turn.

The trainee NEAT FC realised the problem and took action at this point. The lead F3 crew were misguided in deciding to execute their turn in through the ADR. Whilst this was perfectly legitimate in Class F airspace it was ill advised, even in good VMC. Although they did complete a 'belly check' after the first 90° of their 180° about turn, analysis of the radar recording suggests that the EMB145 probably lay behind the canopy rail as they rolled out after the first 90° and then remained under the rail for the remainder of the turn. From the picture that the lead F3 crew had received from the trainee NEAT FC, it is unlikely that their situational awareness was high enough to know that P600D had an airliner climbing within it.

It was recommended that ASACS management should review the impact that their lengthy communication chain has on outside ATSU's trying to coordinate with them; review the supervision given and whether trainee Controllers and Assistants should work on console together; review the need for human factors training and investigate their transcription production validation and checking procedures. Moreover, ASACS should take steps to ensure that the safety of all ac under their control is achieved whilst exercising a controller's best judgement of not only where it is safe to operate, but also by paying due regard to the needs of other airspace users.

It is surprising that the EMB145 crew saw the Tornado 10nm away and then elected to continue flying to the CPA that they reported themselves as <600ft and 400m. However, the EMB145 crew was not aware of what coordination had been actually been agreed between the MORAY SC and the NEAT FC, only what the MORAY SC erroneously thought had been agreed. From the civil perspective, it is hoped that the human factors lessons learned here are incorporated into future ATC training packages.

Finally, the voice inflexion and inference revealed only by the audio recordings has been key to this investigation. Therefore, the UKAB may want to consider the utility of transcribed evidence vice the use of audio clips containing the actual voice conversations.

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, AD, and ac operating authorities.

The assessment of this Airprox had been somewhat protracted insofar as the incident was initially assessed and a cause and risk duly determined. Furthermore, the Board was also minded to make a Safety Recommendation. However, further investigation of an anomaly within the Neatishead RT transcript brought to light an error in the transcribed NEAT FC's RT dialogue with the F3 crews, which regrettably had not been apparent before the Board's original determination. Consequently, as has become the Board's practise when an error of fact is revealed, this Airprox was re-examined by the Board who also considered a revised comment from HQ STC. A civilian controller Member was opposed to this approach and opined that the Command's comments had now benefited from the views of other Members and Advisors as expressed at the first discussion. However, an overwhelming majority view prevailed which accepted that these new facts were entirely relevant and to ignore them would be most unwise: the incorrect CRC RT transcript had unwittingly materially affected the Board's assessment of the cause. Audio recordings of the landline co-ordination and the Neatishead RT dialogue were, therefore, played to the Board Members. Audio recordings from ScACC were also made available. A civilian controller Member was also concerned that no field investigation had been conducted by ATSI. However, ScACC had provided the unit account that had been judged to be appropriate at the time. This summary is, therefore, a distillation of the various views expressed over two Board meetings about this very complex occurrence.

The ASACS Advisor's view was that this was a less than ideal performance from the CRC Mentor and his trainee the NEAT FC. Under the ADIS that applied in the 'contract' between the NEAT FC and the

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F3 crews, strictly there was no compunction to separate these fighters from other ac within the Class F/G Middle Airspace (MAS). More experienced controllers might not have allowed the F3 to extend the opening PI 'set-up' into Class F airspace toward the EMB145. A southerly turn-about short of the ADR, turning the F3 inbound a little earlier for the PI, or instructing the F3 crew to turn R away from the EMB145 could have forestalled the whole situation. A willingness to exercise more positive control over and above the basic requirements of the radar service, which had been alluded to by HQ STC in their comments, had formed the basis of the STC recommendations to ASACS. Reinforcing that the other ac was civilian ADR traffic on a steady climb through the F3's level would have given added insight to the F3 crew and might have given added impetus to turn about earlier, whether or not they could see the EMB145.

The Board was briefed that this was a validation sortie for the trainee FC, where he would have been expected to stay closely within the extant rules and procedures to achieve qualification. There was a fine line to be drawn over how far a qualified Mentor can allow a trainee to go without having to interject, which is purely a matter of individual judgement in the circumstances at the time. Nevertheless, in the Board's view the Mentor should not have permitted the PI set-up to penetrate an ADR in this manner. The lesson was clear that in seeking to prevent a recurrence of this close quarters situation, ASACS controllers should abide by the spirit of Class F airspace and either effect positive separation from traffic on the ADR or not conduct PI setups within it. A Member who was uniquely qualified as a civilian ATCO and also a reservist fighter controller endorsed this view, stressing that due regard must be given to the needs of other airspace users so that all may operate together with safety.

It was apparent that the catalyst to this Airprox was the co-ordination initiated by the NEAT FC with the MORAY SC. ATSI had highlighted that the MORAY SC either did not fully hear or understand the implications of what the NEAT FC had told him in the first instance and that the civilian controller's understanding of the NEAT FC's intent was wrong. NEAT FC had said from just before 0934:10, (just under 3min before the Airprox occurred) *"..I'm on an information service below 245 and I'll call you in...when I'm in the upper air I'll maintain a thousand below your climbing Charlie"*. To some controller Members it was clear that whilst the FC was providing an ADIS (equating to a RIS) in the MAS – which is where the Airprox occurred - his intent was entirely in accord with his responsibilities under the radar service he was providing. These responsibilities were to pass traffic information to the F3 crews when operating in the MAS below FL245, initiating positive action to effect separation only when a 'Control' service applied in the UAS (FL245 and above). Thus there was never any intention on the part of the NEAT FC - under supervision from his Mentor - to enforce separation in the MAS between the F3 and the EMB145. Some Members asked if the MORAY SC should have agreed to this co-ordination as it made it difficult for him to comply with his responsibilities under the RAS. Here was another of the intricacies of this Airprox, insofar as the MORAY SC had not actually offered or specified that he was providing a RAS to the EMB145 crew, nor had the latter asked for or queried the ATS provided. A civilian controller Member opined that the service actually provided was commensurate with a civil 'Advisory Service' rather than a RAS. The ScACC report had covered this point and it was deemed that the SC was providing a RAS: indeed, the ATSI Advisor stressed that the MORAY SC had himself reported that this was the service being provided, which was accepted by the Members. A civilian ATCO Member opined that not specifying the ATS provided was a common omission amongst controllers; the ATS must be emphasised more, so that each was aware of exactly what was expected, as it was tantamount to a 'contract' between the pilot and controller. Such emphasis would thereby remove any area of doubt and reduce the potential for any recurrence of what happened here.

Turning to the NEAT FC, civilian controller Members were of the opinion that the meaning conveyed to the MORAY SC during the initial co-ordination was not clear-cut. They questioned the FC's use of the phrase *"...and I'll call you in..."* which to them and other CAT pilot Members was not self-evident. Military controller Members took a contrary view and reminded the Board of a recent Airprox assessment (Airprox 39/04) that also involved difficulties over a co-ordination agreement. This prompted a wide-ranging discussion where civilian controller Members opined that the phraseology used by military controllers when effecting co-ordination was at times confusing and too verbose; a

civilian area controller Member implored military controllers to keep any co-ordination dialogue short and simple. There was in some Member's view an incumbency on the MORAY SC to provide a more positive 'read-back' to the co-ordination to which he had agreed - as highlighted by ATSI and not merely "*okay no problem*" – for if he had done so his misunderstanding might have been made plain earlier and forestalled the subsequent close quarters situation. The STC Member thought this reply rather dismissive of the NEAT FC, the audio recording having clearly evinced a somewhat underconfident tone from the trainee FC (perhaps understandably whilst under close scrutiny). The STC Member thought that this was a good example of 'Human Factors' in play. He also thought that this was an opportunity missed by the Mentor to reinforce what his trainee had undertaken to do, but it would appear that the Mentor was content that his trainee had 'got his message across' to the SC. It was suggested that it might be beneficial if both CRC Neatishead and ScACC revisit the Team Resource Management (TRM) [Human Factors] aspects during training sessions. The NATS Advisor thought it was not particularly helpful or relevant to try to examine Human Factors issues so long after the event. The STC Member nevertheless contended that advice was sought when investigating accidents from human factors experts sometimes many months after an incident. Whilst a human factors analysis had not been conducted at ScACC for this Airprox, the Board was briefed that NATS was about to roll out a very extensive TRM [Human Factors] training package across the whole company, which was encouraging.

Returning to the read-back issue, another controller Member thought this requirement too unwieldy even though it was standard practise as stipulated in the MATS Pt 1. Another controller Member summed up a possible reason for the misunderstanding, insofar as the MORAY SC was not apparently concentrating on what he was being told in the beginning – referring to the actions in the MAS – but heard the last part of the co-ordination agreement when in the UAS and perceived that the NEAT FC would effect separation regardless, otherwise why would he have said 'thank you'. However, this was not entirely convincing. The ScACC ATCI report had said that the SC was seeking to achieve separation of not less than 5nm or 3000ft Mode C against the non-participating F3. From the traffic information transmitted by the MORAY SC at 0935:40, he clearly believed before the Airprox that the NEAT FC "... *was gonna take 5 miles from..*" the EMB145, which was reinforced after the event by saying to the EMB145 crew that the NEAT FC "... *would maintain 1 thousand feet and 5 miles*" from the airliner with the lead F3. This was clearly not the intent of the NEAT FC who had no implicit responsibility to effect separation against the EMB145 in the MAS and had moreover conveyed this within the co-ordination message. To some Members the MORAY SC's misunderstanding of the co-ordination was fundamental to the cause of the Airprox, others disagreed and by a narrow majority it was deemed only to be a contributory factor. The Board's recent Safety Recommendation to the MOD on a very similar topic was still fresh in the minds of Members subsequent to their assessment of Airprox 039/04. (This Safety Recommendation proposed a review of the applicable instructions and procedures for military ATC and ASACS controllers, when effecting co-ordination, to establish whether a requirement to give/obtain a 'readback' is warranted at the conclusion of such agreements with the aim of ensuring compatibility with promulgated civilian procedures and a unified joint procedure for use by all controllers who interact with one another in UK airspace). A majority view during this assessment also prompted a further Safety Recommendation, over and above that for 39/04: to review the terminology used by Air Defence and Air Traffic controllers when effecting co-ordination with other military and/or civilian ATSU's, the aim being usage of a standardised form of phraseology which minimises the potential for any misunderstanding. Moreover, as civilian and military ATCOs were directly involved as potentially the other half of any co-ordination agreement, a civilian controller's input was considered essential during this review, so it was decided that this Safety Recommendation should be directed jointly to both the MOD and the CAA.

It was apparent to the Board that standard horizontal separation was just barely achieved up until the point that the lead F3 turned L, NW to cross ahead of the EMB145 from R – L. In the mistaken belief that the NEAT FC would direct the lead F3 away from the airliner, such that standard separation would be maintained without the SC having to deviate the EMB145 from its course or climb toward VAXIT, the SC had not taken any pre-emptive action. A civilian controller Member pointed out that the EMB145 would not have been able to outrun the F3 nor would the SC have been able to effect any turn to remain clear of the F3. Indeed, in his view any avoiding action might have confused the situation. It was argued

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that with the Danger Area complex to the S of the ADR the EMB145 could not be turned R astern of the F3 albeit that the EMB145 was well N of the ADR axis. A L turn would not have helped either and might indeed have unsighted the airliner crew. The EMB145 pilot had reported that he was climbing his ac at a 'good rate' of 3000ft/min, in response to the SC's instruction, probably with the intention of climbing the airliner into the relative sanctuary of the UAS as quickly as possible. Indeed the subsequent TCAS RA probably required the crew to actually "MONITOR VERTICAL SPEED", not MAINTAIN as reported. Other Members contended that there was an opportunity to stop the EMB145's climb below the F3 and take positive action in that way whilst still at the same time calling the CRC to check what was going on, although clearly the time taken to contact the FC was less than satisfactory. The radar recording indicated that the F3 had broadly maintained FL235 +/- 300ft in the latter stages of the encounter, whereas the reporting EMB145 pilot had said that the F3 had descended down towards them from ahead. This erroneous impression might have been derived from his interpretation of the TCAS display, but it was clear that the airliner had in fact climbed up steadily toward the F3 at a closing speed in the order of 600kt during the latter stages. So a temporary stop-off below the fighter, whilst not necessarily achieving separation of 3000ft, might have afforded in the order of 1000ft and a bit more room for manoeuvre, considering also that the EMB145 crew was visual with the fighter throughout and also had the benefit of TCAS. However, it was emphasised that although the F3 had AI radar, it was not fitted with TCAS so any RA was very much an un-coordinated event. Consequently, the EMB145 crew continued their climb at a good rate up toward the other ac having been given misleading traffic information about the F3 at a range of 10nm and then been told at 0935:40, just under 1½min before the CPA that "...he was gonna take 5 miles from you but at the moment he is converging with you 235", when the airliner was climbing through FL193, over 4000ft below the F3. So whilst the EMB145 crew was aware of the F3's proximity, could see it and had the jet displayed to them on TCAS, they had been misled into believing that the fighter would steer away from them, unaware that the F3 crew were apparently oblivious to their ac. The F3 turned L close across the EMB145's nose and it was at this point, a CAT pilot Member contended, that the EMB145 crew would have become concerned as the fighter turned onto a conflicting closing track. The TCAS RA was then enunciated at close quarters, which commanded them to carrying on climbing at a good rate, to pass above the other ac as they closed horizontally.

From the NEAT FC's perspective he had transmitted traffic information to the lead F3 crew twice and given a broadcast call to the fighter pair, which in the Board's view should have been sufficient to alert them to the conflict, but Members were concerned that this traffic information had not painted the correct picture of where the EMB145 was in relation to the fighter's level on the last occasion. Members agreed with the Command's uneasiness about this slightly misleading transmission when the FC said within the last iteration of traffic information at 0936:33. It was originally believed that the traffic information transmitted had included an incorrect level and also that it had been transmitted before the lead F3 crew turned L onto NW part way through their turn-about inbound for the PI. This was subsequently proved to be wrong and the NEAT FC had faithfully reported the airliner's correct level passing (about 1000ft below the fighter) just as the F3 was turning according to the radar recording. This was correctly reflected in the audio recording that the EMB145 was "250/5 heading **northwest**, FL225 climbing". Evidently the EMB145 was not heading NW but once the lead F3 crew had been advised that the airliner was heading NW the F3 crew might have discounted the EMB145 as a confliction, no longer of any relevance to them and were thus content to turn in for the PI. The STC Member suggested that the trainee NEAT FC simply made a mistake with the transmission whilst under some considerable pressure, knowing that the MORAY SC was waiting to speak to him further. It was not clear if this element of the traffic information transmitted led the F3 crew to believe, erroneously, that the EMB145 was clear of them. But it seemed to some civilian pilot Members almost inconceivable that another ac could pass this close without being spotted in the prevailing conditions. The Command had postulated how this might have occurred. Nevertheless, the F3 crew had not seen the EMB145 at all as it approached from the W and remained oblivious to its close proximity as they turned across its nose, then SW, not seeing the EMB145 as it passed by on their port side climbing through their level. It was unfortunate that the fighter's Mode C could not be determined at the CPA from the radar recording: nevertheless, the contacts had merged, evincing the closeness of the encounter. After a vote the Board

concluded, therefore, that this Airprox had resulted because, the F3 crew had turned into conflict with the EMB145, which they did not see. At these close quarters in a climb-through situation and with only one crew sighted and responding as best they could to the TCAS RA, the Board concluded that safety of the ac involved had not been assured during this entirely avoidable Airprox.

[Post Meeting Note: HQ STC Flight Safety has produced a poster reminding crews of the likelihood of encountering CAT ac in Class F airspace, and advising against manoeuvring in ADRs. These have now been sent to fast jet squadrons, ATC, and ASACS units. The final Airprox report will be highlighted to all fast jet squadrons. Furthermore, work is under way regarding a potential policy revision whereby military crews would fly by reference to the SAS of 1013mb (rather than the RPS) when operating above a base height of 5000ft, which will assist with co-ordination with other ATSU's. The Chairman requested that the Board be kept apprised of the outcome of these reviews.]

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The F3 crew turned into conflict with the EMB145, which they did not see.

Degree of Risk: B.

Contributory Factors: The MORAY SC's misunderstanding of the co-ordination that he had agreed.

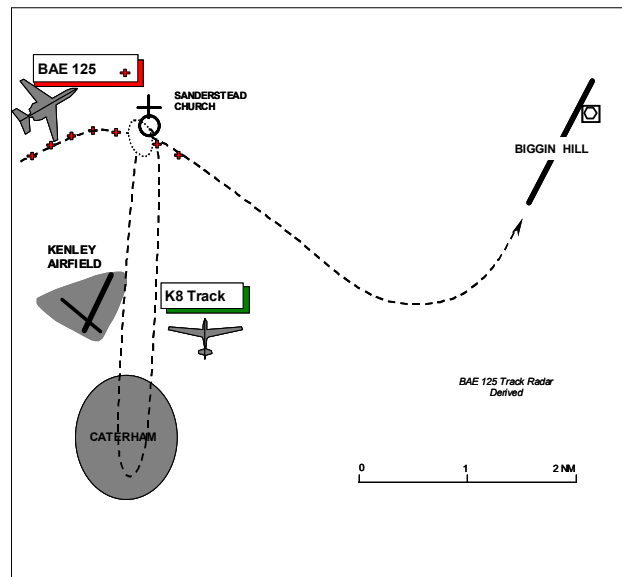
Recommendation: The MOD and CAA should jointly review the terminology used by Air Defence and Air Traffic controllers when effecting co-ordination with other military and/or civilian ATSU's, the aim being usage of a standardised form of phraseology which minimises the potential for any misunderstanding.

Post Meeting Note: Subsequent to the Board's final assessment of this Airprox, representations were made by a civilian controller Member of the Board who was concerned that this report did not fully reflect his views expressed at the various discussions. He argued that another RT transmission from an unrelated flight was made at the time the landline co-ordination discussion was taking place. The Member contended that this might have distracted the MORAY SC and been the cause of his misunderstanding of the co-ordination agreement because he was assimilating the information and then replying to the co-ordination while the other unrelated flight was transmitting a message reporting crossing the FIR boundary. The Director and UKAB secretariat discussed with him and considered the Member's concerns at great length. His assertions were referred directly to the Head of ATSI, SRG, and another complete RT transcript of the Sector frequency was produced by SRG Transcription Unit of the appropriate period overlapping the landline co-ordination discussion. Head of ATSI reports that the extra transcript, together with the specific seconds timings produced by the Transcription Unit, allow a definitive answer as to when the RT call, made by the unrelated flight was received during the telephone call with the NEAT FC. This other flight started its transmission at 0934:12. At this time the coordination message had virtually been passed in its entirety, only the last word "charlie" would have been simultaneous with the other flight's RT call. Consequently, in Head of ATSI's opinion it is not considered that this RT call should have presented sufficient distraction to have prevented the MORAY SC from hearing the proposed coordination. Whilst it is understandable that concern has been expressed that an RT call might contribute to a misunderstanding of co-ordination, this problem would be overcome by ensuring that a readback of the perceived co-ordination was given/obtained.

AIRPROX REPORT No 060/04

AIRPROX REPORT NO 060/04

Date/Time: 23 Apr 1650
Position: 5119N 00005W (1½nm N of Kenley Airfield - elev 566ft)
Airspace: London FIR (Class: G)
Reporting Ac *Reported Ac*
Type: K8 Glider BAE125
Operator: Civ Club Civ Comm
Alt/FL: 1900ft 2100ft
(QFE) (QNH)
Weather VMC CLOC VMC CAVOK
Visibility: 50km NR
Reported Separation:
50ft V 0 H NR
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE K8 GLIDER PILOT reports flying an orange and white glider on a local soaring sortie from Kenley. He had been soaring for about an hour and for the last 15min he had been flying back and forth between Caterham and Sanderstead Church. While ½nm N of the airfield heading N/NW at 45kt at about 1900ft agl he saw the twin-engine jet coming towards him on what he considered to be a collision course. He had been constantly looking out because of the proximity of Biggin Hill Aerodrome and the amount of air traffic it creates and at the time of the incident he had just visually swept the area towards Biggin Hill and just started to look towards Purley when he saw the ac. He immediately took evasive action in the form of a sharp dive and heard the jet go past; when he had a chance to look back it seemed to be flying on its original course. Although he could not say positively whether or not the pilot saw him or how far away it was, he thought that if he had not seen it and taken avoiding action there would have been a collision.

THE BAE125 PILOT reports flying a white ac with strobes and landing lights selected on, on a VFR approach to Biggin Hill from Epsom. He was on an E heading at 180kt and at 2100ft on the QNH and planning to join Biggin Hill on a R base for R/W21 and passed just to the N of Kenley, as the duty R/W at Biggin was changed to 03. They then turned for downwind 03 while maintaining a good lookout for circuit traffic. No other ac were seen.

UKAB Note (1): Although the BAE125 paints on the Heathrow radar throughout at FL021, the glider is not seen until after the event, when it pops up behind it at 1653:53; the actual Airprox therefore was not recorded on radar. The track of the BAE125 however could be verified from the radar recording and it passed of the order of 1.5nm to the N of the Kenley Airfield datum at approx 1652:43 before turning R to intercept the RW03 centreline for Biggin Hill. Consequently, at the time of the Airprox the glider would have been almost head on to the BAE125. The BAE125 was showing a mode C of FL021 throughout the transit to the N of Kenley. The Biggin Hill QNH at the time of the incident was 1025mb; therefore the BAE125 was at an alt of 2460ft amsl, 40ft below the base of the London TCA. The K8 pilot reported that he was at 1900ft agl which equates to 2466ft amsl and also just below the base of the TCA but his diagram shows the BAE125 as passing above him. Assuming both figures to be reasonably accurate, and since the glider pilot avoided the BAE125 by making a steep dive, it is probable that the last minute diving manoeuvre by the glider pilot provided some, albeit minimal, vertical separation.

UKAB Note (2): The recording of the Biggin Hill RT shows at 1652:50:

Biggin *“Callsign XXX rog continue a left base runway 03”*

BAE125 *“Yeah we’re just going round the back of Kenley now coming round for a left Base 03”*

UKAB Note (3): Kenley is promulgated in the UK AIP ENR 5-5-1-3 as a Glider Launching Site up to 1700ft agl (2266ft amsl) daily from sunrise to sunset.

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 photographs/video recordings.

This incident took place in very congested airspace confined laterally and vertically by CAS and by Kenley itself; both pilots were aware of this and adjusted their lookout accordingly. The pilot of the BAE125 was aware of his position relative to Kenley and ensured that he avoided the airfield by as large a margin as he could. Although the R/W change at Biggin Hill would have added to the workload of the BAE125 crew, thereby possibly degrading their lookout, it had not contributed to the incident in any other way since the ac ground track leading up to the incident was as planned. Members questioned the speed of the BAE125 but were reassured that it was reasonable with the radar recording showing it as being 180kt initially, reducing to 160kt.

The BGA representative provided the Board with a most helpful written comment stating the K8 pilot did well to spot the BAE125, aided by its landing lights, and took correct avoiding action. He opined that there may have been a degree of luck involved and that the K8 pilot was probably experienced and had more time than the average K8 ab-initio pilot to assess and manage the situation.

The BAE125 pilot had not seen the glider; the K8 pilot on the other hand did see the BAE125 and took avoiding action which in all probability had been sufficient to prevent a collision between the ac. The Board were unanimous in their opinion however, that due to the small margin reported by the glider pilot, safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

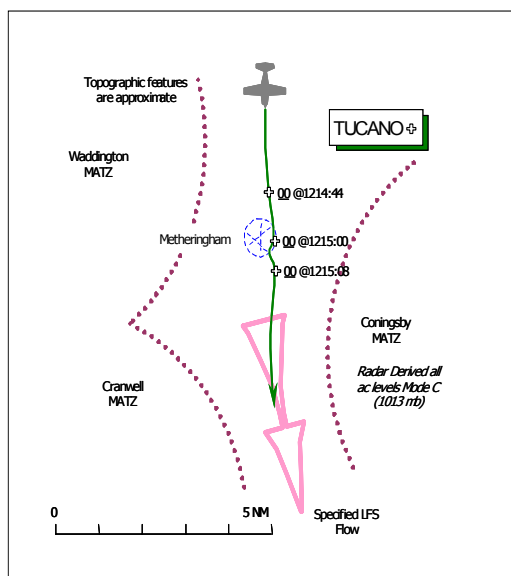
Cause: A non-sighting by the BAE125 pilot and a late sighting by the glider pilot.

Degree of Risk: B.

AIRPROX REPORT No 62/04

AIRPROX REPORT NO 62/04

Date/Time: 23 Apr 1215
Position: 5308N 0021W
(Metheringham - elev about 50ft)
Airspace: UKDLFS-LFA11 (Class: G)
Reporting Ac Reported Ac
Type: Tucano T Mk1 Model ac
Operator: HQ PTC NK
Alt/FL: 250ft NR
(agl)
Weather VMC NR NK
Visibility: 10km+ into sun NR
Reported Separation:
50m H/nil V NR
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO PILOT, a Qualified Pilot Navigator Instructor (QPNI), reports his ac has a black colour scheme, the HISL and all other ac lighting was on whilst conducting an instructional low-level sortie. He was in receipt of a FIS from Waddington and squawking A7000 with Mode C, but neither TCAS nor any other form of CWS is fitted.

Heading S through the flowed gap between Waddington/Cranwell & Coningsby at 250ft agl at 210kt, he spotted an ac in his 11 o'clock and slightly high at an indeterminate range but far enough away he thought not to cause an immediate concern. However, the range closed very rapidly. As he broke R away from what he considered to be a very high risk of collision he recognised the object as a model aeroplane, which passed at the same height at an estimated horizontal separation of 50m. As he reversed the turn he saw a group of model aeroplanes on the ground at a disused aerodrome [Metheringham]. He added that the model flying activity had not been the subject of a NOTAM. Furthermore, the site is at a busy low-flying choke point.

AIS (MIL) reports that a model-flying group operates from a site at Metheringham disused aerodrome in the immediate vicinity of the location reported by the Tucano pilot. The group was approached regarding the Airprox and although unable to confirm whether one of their members was actually flying the re

A MODEL AEROPLANE ENTHUSIAST comments that the group of model aeroplane fliers that operates at Metheringham is not constituted as a club but just a group of like-minded individuals. The group have been established at the site at Metheringham for about 12 years, with a membership restricted to 35 of which there is a core of keen enthusiasts who number about 8. Unless it is raining or the wind is in excess of 20mph model flying will invariably be taking place at the site which is available to them from dawn to dusk, 365 days a year, without restriction. The flying site is about 90yd square and is closely mown grass and the models flown there vary in wingspan from 4-8ft and from 3-12lb in weight. Most are single engined, but there are one or two multi-engined examples. The models are flown within a radius of about 200 yards from the launch point up to a maximum height of about 150ft. Potential applicants to the group must demonstrate that they are safe and responsible model flyers over a considerable period before they accepted into the group and all are very much aware of the dangers to low flying full sized ac and for this reason everyone keeps a sharp lookout. Tucano ac always approach from the N and fly directly over their site. They normally have their landing lights on which

makes them somewhat easier to spot, but the perimeter of the disused aerodrome to the N is bounded by trees 60ft high and about 1mile away. He thought that a Tucano from first sighting to overflight can cover this distance in about 15sec [about 17sec at 210kt] and the group members response is to shout to the active fliers to warn them, whereupon they will descend their model aeroplanes immediately and without question to a height of about 30ft until the overflying ac has passed. Members are so used to the Tucanos flying over the site on an almost daily basis that they do not regard one day as being different from any other.

A daily record of attendance is not maintained; he has questioned all the individuals who would most likely have been there at the time of the reported Airprox, but none of them can remember anything out of the ordinary or hazardous.

THE TUCANO PILOT'S STATION comments that a good lookout followed by prompt and corrective action by the pilot prevented this incident from becoming a very serious one. Had the Tucano collided with the model ac, serious damage to the airframe or engine may have resulted, endangering the lives of not only the crew but personnel on the ground as well. A salutary lesson to all of us, even though the NOTAMS were thoroughly checked before flight, there are many hazards at low level not necessarily notified. The lesson is clear; a good lookout is essential during low-level operations.

MIL ATC OPS reports that the Tucano pilot called Waddington APPROACH and advised, "*...just about a mile north of my current position, there's a disused airfield got model aircraft at the minute...they are up to 3 or 400 feet*". APPROACH acknowledged the call and passed the information to subsequent ac operating in the vicinity.

MILITARY LOW FLYING OPS confirmed that no Y series NOTAM had been issued for this activity at Metheringham but commented that notification of model ac flying to the Low Flying Booking Cell is available to model flyers in accordance with AIC 55/2001 (Yellow 52). A warning status Y Series NOTAM will be distributed to military aircrew for activity occurring below 1000ft by 5 or more ac. There are currently no permanent model ac flying sites listed in the Military AIP although this situation is currently under review. In the meantime, model ac operators are being encouraged to make use of the Freephone and Freefax facility.

UKAB Note (1): 'The Air Navigation Order 2000', at article 87 (2), specifies that "*the person in charge of a small ac which weighs more than 7kg [without fuel] ...shall not fly such ac:...*

(d) at a height exceeding 400ft above the surface....;

Article 129 (1), specifies that:

'Small aircraft' means any unmanned aircraft, other than a balloon or a kite, weighing not more than 20kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight;

UKAB Note (2): The UK MIL AIP at Vol III Pt 1-2-11-2 - 3b. (3), specifies that when flying in conformity with low-level flying regulations through the Cranwell/Coningsby gap, military crews are only to fly in a southerly direction.

UKAB Note (3): From Meteorological Office archive data the 1150UTC Waddington weather was 230/9kt; CAVOK; QNH: 1025mb; CC: BLUE; NOSIG. The Barnsley RPS 12-1300 UTC was 1020mb.

UKAB Note (4): This Airprox is not shown on recorded radar. However the Tucano is shown southbound in accordance with the specified UKDLFS unidirectional flow approaching Metheringham at 1214:44, indicating 0ft Mode C (1013mb). The Tucano tracks just marginally to the E of the disused aerodrome and is shown making a sharp R turn at 1215:00, (about 5min prior to the reported Airprox

AIRPROX REPORT No 62/04

time but at the stated location), still indicating 0ft Mode C (1013mb), which may be indicative of the avoiding action break reported by the pilot. The ac then continues S. Given the Waddington actual QNH of 1025mb, 0ft Mode C (1013mb) equates to 360ft amsl. The elevation of Metheringham is about 50ft, suggesting that the Tucano passed at a height of about 310ft agl.

HQ PTC comments that there are too many uncertainties surrounding this encounter to be sure what really happened and what might need to be done to prevent a recurrence. Was the Tucano pilot's perception tricked by the model ac's small dimension into believing that it was higher/closer than it actually was? How do model fliers know what height their models are flying at? Certainly, an activity like this within a busy choke point should not go uninvestigated, to discover the reality of the matter. If it proves significant, then NOTAM action might be appropriate. But that could spawn a whole rash more of NOTAMs.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of the Tucano and the model flying group, transcripts of the relevant RT frequencies, radar video recordings and reports from the appropriate ATC and operating authorities.

It was explained to the Board that in this very congested area a considerable amount of military low-flying activity takes place. It was evident to pilot members that the Tucano pilot was flying in conformity with the established LFS flow regulations as he overflew Metheringham - at about 310ft agl according to the recorded radar data. This was significantly higher than the maximum height that the model ac flyers operated - as suggested by one of their number here. However, there is apparently no accurate method for the average model flyer either to establish the height of a model or ensure that it does not fly above the legislated maximum of 400ft. Whilst this was still well above the lowest height of 250ft msd/agl permitted by military crews through this vicinity, it would seem that if the untraced operator's model ac was between 300-400ft as the Tucano pilot reported on RT, the model ac operator was indeed operating legitimately and the Board recognised that he had every right to fly his model at this height. Nevertheless, in flight safety terms the members questioned whether it was either necessary or wise to do so, conscious that emergencies and radio failures can occur with model ac as with their full size counterparts and that the potential for loss of control must inevitably be ever present. Since it had not been possible to trace the model ac operator, neither the size nor weight of the actual model involved could be determined. The Board did not question the veracity of the Tucano pilot's report, but his Command had raised a valid point and members recognised it was impossible either to verify the Tucano pilot's perception of the separation that actually pertained or his assessment of the risk. Clearly he had seen the model in time and taken appropriate avoiding action, but without more information it was impossible to be more definitive. The Board could only conclude, therefore, that this Airprox had resulted from a conflict with an untraced model ac, which had been resolved by the Tucano pilot, but that insufficient information was available to determine the risk involved.

Any information that might help to advertise the aerial activity at any location can only be in the interests of flight safety and the Mil Low-Flying Ops advisor explained that if the Metheringham group contacted the Low Flying Booking Cell then a NOTAM could be issued warning of their activity at this location. This facility is available to model flyers through the LATCC (Mil) Low Flying Booking Cell on Freefone 0800 515544. Any activity so notified would be afforded a 'warning' status to all military pilots – not a mandatory avoidance. Generally, a minimum of 4 hours notice is helpful and would enable the information to reach the crews in time to be useful. Furthermore, as crews engaged in 'low-flying' through the LFS are required to call Waddington when in transit through this area, it was also suggested that the model flyers might call Waddington ATC switchboard by telephone (01522 727451) to advise them when they were actually flying at Metheringham, thereby enabling a precise warning to be given to military crews on RT. [Post Meeting Note: SATCO Waddington suggested that a call at the commencement of model flying and on completion would be helpful]. On a different tack, the LF Ops

advisor believed it was somewhat impractical to mark all the model flying sites (many of which like the Metheringham group here are not used by officially constituted clubs) on the military low-flying charts as this might obscure more important information. Nonetheless, in view of this particular model flying activity at Metheringham that occurs precisely at this flowed location, which could potentially affect military low-flying ac, he undertook to liaise with the Metheringham model ac group with a view to placing an entry within the LFA11 brief in the Mil AIP warning crews of the model flying. A GA member with contacts in the model ac flying world also undertook to see what could be done through specialist hobby magazines to disseminate the lessons learned further.

PART C: ASSESSMENT OF CAUSE AND RISK

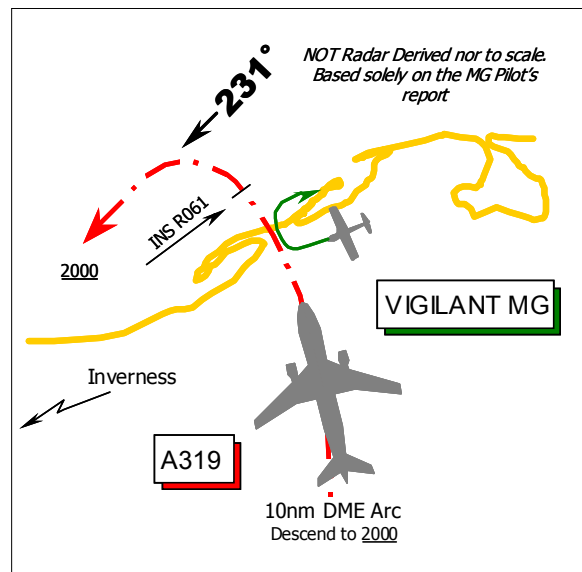
Cause: Conflict with an untraced model ac resolved by the Tucano pilot.

Degree of Risk: D.

AIRPROX REPORT No 063/04

AIRPROX REPORT NO 063/04

Date/Time: 1 May 1209 (Saturday)
Position: 5737N 00348W
(8nm W of Kinloss - elev 22ft)
Airspace: Kinloss AIAA (Class: G)
Reporting Ac Reported Ac
Type: Vigilant M/Glider Airbus A319
Operator: HQ PTC CAT
Alt/FL: 3900ft ↓ on TAP
(QNH 1010mb) (QNH 1011mb)
Weather VMC HAZE IMC NK
Visibility: 18km NK
Reported Separation:
200m H Not seen
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT MOTOR GLIDER (MG) PILOT reports he had departed from Kinloss and was conducting an instructional sortie in VMC whilst flying under a FIS from Kinloss on 122.1MHz. A squawk of A7000 was selected with Mode C and the HISL on. Flying in level cruise at an altitude of 3900ft QNH (1010mb), a haze obscured the horizon, but the visibility was about 18km.

Passing overhead Culbin Forest - about 8nm W of Kinloss - heading 240° at 60kt slightly inshore of the coast he spotted a dark blue twin engine airliner at 10 o'clock crossing obliquely from L to R [he did not specify the range] at a slightly higher altitude some 200ft above his motor-glider (MG), but descending. To avoid the airliner he commenced an immediate hard R turn through 180° as the other ac passed astern and apparently descended through his altitude below his ac as it was next seen low to the L of the Vigilant. He estimated the minimum horizontal separation to be about "two football pitches" [about 200m] after he had completed his R turn and added that the crew of the airliner did not appear to take any avoiding action, but subsequently turned L apparently onto the approach for RW24 at Inverness. He perceived a "serious risk of collision" and reported the Airprox to the duty instructor at Glider control after landing.

THE AIRBUS A319 PILOT reports he was unaware of any Airprox situation until his company's operations department advised him later that day of the Airprox reported by the MG pilot. His ac has a blue & white livery and all the ac's lighting was on whilst inbound to Inverness for a VOR/DME procedural approach to RW24 at 220kt. He reported the type of ATS to be "radio/information" from Inverness APPROACH (APP) on 122.6MHz and was squawking A7000 with Mode C.

They had been cleared by APP for the VOR/DME procedural approach from DAVOT via the 10nm DME Arc to RW24 and flew the entire procedure observing all altitudes/tracks. The DME arc was flown with landing lights on at 220kt reducing to 140kt at 7nm DME on finals. Scattered cloud and haze made visibility difficult, but the instrument approach was converted into a visual approach at 5nm from touchdown. Although TCAS is fitted, neither a TA nor RA was enunciated. At no time did either he or his co-pilot see, or were they aware of, any other ac.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar.

UKAB Note (2): The Inverness Direct Arrivals VOR/DME TAP requires pilots to “...establish on the INS DME 10 arc anticlockwise. When established, descend along the arc not below 2000ft (QNH), from the lead VOR INS R061 turn left onto extended FAT.”

UKAB Note (3): A review of the Inverness RT transcript, revealed that the A319 crew reported crossing the 130 radial at 1206:40, after being instructed to descend with the arc procedure to RW24. The crew advised APP at 1209:00, that they would be turning finals in one min.

UKAB Note (4): The MIL AIP at ENR 5-2-3, 3.2, states that the Kinloss/Lossiemouth AIAA (sfc – FL150) is “*permanently active*”, which is not replicated in the equivalent civilian UK AIP at 5-2-2. However, both documents relate that peak periods of activity occur 0800-2359 Mon – Thur 0800-1800 Fri.

MIL ATC OPS had nothing to add.

ATSI had nothing to add.

THE VIGILANT MOTOR GLIDER PILOT'S STATION comments that both ac were operating in Class G airspace where “see and avoid” prevailed. The Vigilant was receiving a FIS from Kinloss TOWER on VHF although this might only provide information on traffic known to TOWER. At weekends – the Airprox occurred on a Saturday - Lossiemouth ATC is not contractually obliged to provide an ATS to CAT ac inbound or outbound from Inverness. Here the Airbus was operating under a procedural APPROACH service with Inverness on a published VOR/DME procedure for RW24, and the Vigilant was carrying out a GH with Kinloss TOWER. Neither of these ATSUs have any requirement to routinely co-ordinate with each other. Following discussions with OC of the VGS, a new procedure will be adopted; if Vigilant MGs plan to operate within 15nm of Inverness airport and are not receiving an ATS from Lossiemouth, the pilot of the Vigilant will contact Inverness direct on VHF for traffic advice. Additionally, OC VGS will ensure that all Vigilant pilots are regularly briefed on the published approach procedures for Inverness to help maintain situational awareness of the airspace they are operating in.

HQ PTC comments that as the A319 crew did not see the Vigilant, we are solely reliant on the latter pilot's judgement of the separation distance. However, as the A319 reports no kind of TCAS alert at all we must conclude that they were probably not close enough to cause any real concern. We have consulted the ACO and agree with them that this could easily be avoided by a bit more liaison between Inverness and Kinloss ATC. Perhaps the LOA between them and Lossiemouth needs to be revised to cover the peripheral operating hours better.

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 and reports from the appropriate ATC and operating authorities.

At face value this Airprox appeared to the Board to be a conflict between VFR traffic and GAT executing an IFR approach in the ‘see and avoid’ environment of Class G airspace. Impractical as it may have been, the onus was on the A319 crew airliner to ‘give way’ to the Vigilant under the ‘Rules of the Air’, but impossible to apply if the other ac had not been spotted. Whilst engaged in their IFR VOR/DME procedure, the Airbus pilot had reported that neither he nor his co-pilot had detected the presence of the Vigilant as they flew around the 10nm DME arc. Some CAT pilot members thought this understandable as the view out from the Airbus's flight deck (or any other airliner for that matter), was not necessarily conducive to a good all round visual scan. However, as the MG was reportedly transponding it was surprising that TCAS had not detected and displayed the Vigilant to the A319 crew, although this was entirely dependant on what the crew had selected. From the Vigilant pilot's report it would appear that the Airprox occurred just before the A319 crew picked up the VOR INS lead radial and turned L onto the extended FAT when the airliner was descending some 200ft above his MG. Members noted an anomaly

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here between the altitude that the MG pilot reported flying at - 3900ft QNH (1010mb) – and that of the Airbus, which was following the DME arc procedure that required descent to no lower than 2000ft QNH (1011mb). The Board was unable to reconcile this aspect though the HQ PTC member stressed that the MG pilot was somewhat inexperienced. Whilst not impossible by any means, it seemed improbable to CAT pilot members that the A319 would be descending through an altitude of about 4100ft this close to the Airport and well in excess of the ideal profile. But without the benefit of a radar recording that would have shown not only the airliner's vertical profile but also the actual vertical separation that pertained this could not be independently resolved. Clearly the Vigilant pilot – the only pilot to actually witness this occurrence - had perceived the airliner was very close as it descended toward his MG and he had elected to turn away from it achieving he assessed in the order of 200m separation. The Board concluded, therefore, that this Airprox had resulted from a conflict in Class G airspace resolved by the Vigilant pilot. However, with only the MG pilot's account of the event and without any independent corroboration, the Board concluded that there was insufficient information available upon which to determine an assessment of the risk involved here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the Vigilant motor glider pilot.

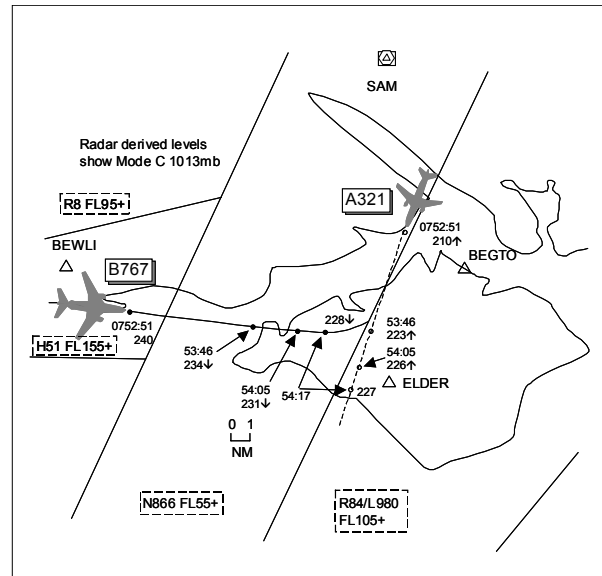
Degree of Risk: D.

AIRPROX REPORT NO 064/04

Date/Time: 21 Apr 0754
Position: 5041N 00125W (16nm S SAM)
Airspace: AWY R8/N866 (Class: A)
Reporter: LACC S19-21T

<u>First Ac</u>	<u>Second Ac</u>
<u>Type:</u> A321	B767-300
<u>Operator:</u> CAT	CAT
<u>Alt/FL:</u> FL225↑	FL230↓

Weather VMC CLOC VMC CLOC
Visibility: 50nm good
Reported Separation:
 NR NR
Recorded Separation:
 100ft V 3.4nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LACC SECTOR19-21 TACTICAL CONTROLLER (S19-21T) reports acting as a Mentor on the banded sector and taking over the RT from the trainee as a late call to hold traffic en route to Heathrow had been received from TC OCK via the S19-21 Planner (S19-21P). This immediately increased workload owing to the amount of traffic on airway R8. The outbound subject A321 was turned L early and climbed to FL270 but this was later amended to FL220 owing to the subject B767 at FL240: the B767 was subsequently descended to FL220. He noticed the A321 climb through FL220 which he queried with the crew who replied that they were cleared to FL260. Immediately he gave the B767 an avoiding action L turn and passed TI to the A321 crew as the B767 was already passing behind: during this second transmission STCA activated.

THE LACC SECTOR19-21 PLANNER CONTROLLER (S19-21P) reports that workload was high because of EATs at Heathrow and en route holding being initiated by TC. At the time of the incident, he was busy coordinating with TC the 'bringing off' of traffic from the BEWLI hold which had just been cleared to hold. The ac concerned, AC3, was being vectored towards BEWLI causing confusion and high workload for himself and the Tactical controller. In the meantime, the subject ac came into conflict, the S19-21T gave avoiding action and STCA then activated late. Approximately 5min previously he had requested the sector to be split but this did not help the situation because all of the traffic was on S20 where the sector teams were in place.

THE A321 PILOT reports not being informed at the time of the Airprox and completing the report form when contacted by the UKAB some 3 weeks post incident. He apologised for the vagueness of his information. The flight had been outbound from Gatwick to Spain and in the vicinity of BEGTO, the reported position of the Airprox, he had been climbing through FL225 and had seen a low wing twin engined ac to his R. He was not able to assess a distance and reports that the other ac was on a crossing track, R to L, at about the same level. No instructions were issued by ATC and no TCAS alerts were received.

THE B767 PILOT reports completing his report from memory 3 weeks after the event. Inbound to Gatwick from the USA, there was a loss of normal separation. The other ac was visually acquired and seen on TCAS which generated a TA alert. No RA was received but ATC gave a heading change which was flown immediately. As the ac was above FL100, the AOB selector was set to 25° from 15° (SOP

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setting), this not necessarily being user-friendly for traffic avoidance. The turn had been given in good time and an ASR was not considered necessary.

ATSI reports that the controller was operating as the S19-21 (Hurn) Tactical Controller in band-boxed configuration. He had been in position for about 20min prior to the incident. Initially, workload had been light but increased to high because of the complexity of the situation when enroute holding was instigated. When holding had become necessary, the S19-21 Planner had requested that the sectors be split: this had not taken place when the Airprox occurred. In any case, due to the distribution of the traffic, with all ac being the responsibility of S20, a split would not have assisted the situation. The Tactical Controller was monitoring a relatively inexperienced trainee although he had taken over the RT at the time of the incident. Pease Pottage radar was out of service but, according to the controller, this was not considered to be a contributory factor to the occurrence.

The crew of the B767, eastbound on UR8, established communication with the S19-21T at 0747, reporting heading 085°. The trainee instructed the flight to descend to FL230. At the time, the B767 was tracking S of, and parallel to, AC3, an inbound to Heathrow, which was also descending to FL230. Approximately 1min later, the A321 crew made its initial call on the frequency, climbing to FL150 on a radar heading of 255°. The flight was cleared, again by the trainee, to climb to FL190 and instructed to turn L heading 225°.

At 0949, the S19-21P was requested by TC, due to delays at Heathrow, to hold AC3 enroute. As soon as the Planner informed the Tactical Controller of the need to hold, the latter decided to take over the RT from his trainee. He commented that he decided to take this course of action because his trainee had not experienced enroute holding before. Consequently, he would have had to talk through any actions with the trainee, thereby increasing the workload considerably. He allowed his trainee to remain in position, annotating the Paper Flight Strips (PFSs), whilst he made the requisite RT transmissions.

The first action the mentor took was to instruct the B767 to stop its descent at FL250. This was to ensure separation from AC3, which was to hold at BEWLI at FL230. He commented that, as AC3 was only about 20nm from BEWLI and as, in his experience, this flight was not a regular user of this route, he decided to vector the ac into the hold. He then instructed the B767 crew to turn R heading 105°, a tactical adjustment to increase the lateral distance from AC3, allowing subsequent descent to take place earlier.

At 0750:57, when the subject ac were 36.3nm apart, the Tactical Controller instructed the A321 crew to climb to FL270 and to turn L heading 205°. The B767 crew were then cleared to descend to FL240. The Tactical Controller said that his plan had been to position the A321 on the eastern side of Airway N866. He estimated that this would ensure that the ac passed well in front of the B767, to allow the level change to take place. The B767 was restricted to FL240 to ensure that vertical separation still existed from AC3. In the event, shortly afterwards, as a precaution because separation might be lost between the A321 and AC3, he decided to stop the former's climb at FL220. However, the pilot reported, subsequently, that he had read back the instruction as "*stop climb flight level two six zero*". This erroneous read back went unchallenged by the controller. He said that he had been sure that, at the time, the pilot had read back the clearance correctly. The RT recording was checked and certainly, at first listening, the pilot appears to respond FL220.

For the next minute, the Tactical Controller was busy dealing with another ac having to hold at BEWLI, as well as vectoring AC3. Just as the latter was being turned onto a westerly heading, TC cancelled the requirement to hold, resulting in the assignment of a new heading of 085°. As the B767 was now laterally separated from AC3, it was instructed to descend (0752:50) to FL220 i.e. the same level to which the A321 had been cleared to (although it is now known that the flight was climbing to FL260). The Tactical controller explained that, because his trainee was still seated annotating the PFSs, from his position standing behind her, looking over her R shoulder, he was unable to see the bottom 4 PFSs. These included those relating to the subject ac. As a result, he was controlling these ac partly from

memory and partly from observing the radar display. When he cleared the B767 crew to descend to FL220, he had noticed that the A321's Mode C readout was showing FL210. Based on the fact that his usual operating technique, for ac on such routeings, was to clear those flights to FL210, to await the cross with traffic on Airway R8 descending to FL220, he made the erroneous assumption that FL210 was the A321's cleared level. Believing that the subject ac would be vertically separated, he turned his attention to other traffic.

Following a scan of the radar display, he noticed that the A321 was passing FL223. For the first time he looked at its PFS and, on realising that its cleared level was annotated as FL220, he immediately checked with the pilot to establish whether he was maintaining FL220. The pilot replied that he had read back clearance to FL260. By this time (0753:46), the radar recording shows that the A321, at FL223, was passing through the 12 o'clock of the B767, at FL234, at a range of 6.4nm. He issued the B767 crew with an 'avoiding action' L turn heading 060° and passed information to the A321 crew, about traffic passing 2nm behind. He said that he was restricted in being able to turn the A321 L because of other traffic approaching from the S. STCA activated at 0754:05, when the subject ac were 3.9nm apart, by which time their tracks were diverging. As their tracks continued to diverge, minimum separation (3.4nm/100ft) occurred, at 0754:17.

The controller commented that, with hindsight, he must have misjudged the effect of the strong SW wind when he adopted his initial plan of separating the subject ac horizontally during the level change. Thereafter, his inability to observe the PFS Board, greatly contributed to the incident. He added that, since this Airprox, in order to prevent such a situation occurring in future, he now ensures that the trainee does not remain in position once he has taken control of the RT. He mentioned that the trainee had been annotating the PFS correctly throughout but had not been able to assimilate the traffic situation and, consequently, could not warn him of 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.

The S19-21T's workload had undoubtedly increased when enroute holding was instigated. However when the S19-21T mentor took over the RT, leaving the trainee seated annotating the PFSs, he had made it difficult for himself to cross refer to the PFSs of the subject ac, instead relying on radar and his memory. He had then vectored AC3 towards BEWLI and built-in vertical separation between it and the B767 by stopping the descending B767 at FL240. Then, when the enroute hold for AC3 was cancelled, he had turned the B767 and descended it to FL220, forgetting that the A321 had been cleared to the same level. His normal 'modus operandii' was to stop traffic on this routeing (in this case the A321) at FL210 but he had not referred to the PFS, only the Mode C indicated on his radar display. Members agreed that during the busy traffic situation the S19-21T had vectored the B767 and A321 into conflict and this had caused the Airprox.

It was noted that the A321 crew had been told to stop their climb at FL220 but had read back the wrong level, FL260. Pilots commented that CRM procedures on the flight deck should have captured this through cross-checking between PF and PNF. The subsequent erroneous read back by the A321 crew had gone undetected by the S19-21T although this was understandable in light of the analysis of RT recording. Although this 'safety net' had broken down, ultimately it had not contributed to the incident. The S19-21T had noticed the A321 climbing through FL223 and, after then correlating this with the PFS, he asked the crew if they were maintaining FL220, as indicated on the PFS, their cleared level. It was then revealed that the A321 crew had earlier read back FL260 but, by this time, the A321 was crossing 6.4nm ahead of the B767 which was descending through FL234, 1100ft above. The controller gave the B767 crew an avoiding action L turn onto 060°, to increase separation, and then passed TI to the A321

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crew. STCA then activated but by now the subject acs' tracks were already rapidly diverging with CPA occurring 12sec later. During this period both crews had seen each other's ac and the B767 crew had received a TCAS TA alert. The radar recording shows that even if the A321 had maintained FL220, separation would still have been lost, although to a lesser extent. These elements were enough to persuade the Board that the encounter had been benign, resulting in a loss of separation after the potential for collision had passed, which led the Board to conclude that safety had been ensured during the encounter.

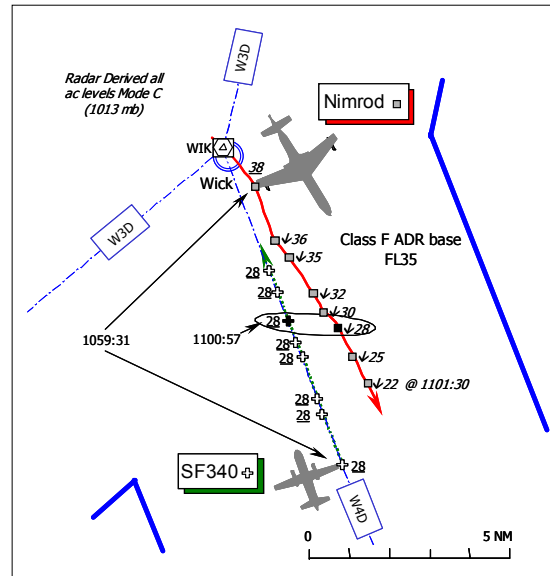
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In a busy traffic situation, the S19-21T vectored the B767 and A321 into conflict.

Degree of Risk: C.

AIRPROX REPORT NO 066/04

Date/Time: 27 Apr 1100
Position: 5823N 00300W
 (5nm SSE of Wick - elev 126ft)
Airspace: Scottish FIR (Class: G)
Reporting Ac **Reported Ac**
Type: SF340 Nimrod MR2
Operator: CAT HQ STC
Alt/FL: 3000ft ↓2000ft
 (QNH 1019mb) (QNH 1019mb)
Weather NR IMC HAZE
Visibility: 10km 10km
Reported Separation:
 Nil V/1.5nm H <2nm H
 [TCAS]
Recorded Separation:
 Nil V/1.2nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE SF340 PILOT reports that he was inbound to Wick from Edinburgh at 180kt and routeing ADR W4D at 3000ft QNH (1019mb) and in receipt of an ATS from Wick APPROACH (APP) who cleared him to join the WIK hold at 3000ft. A squawk of A7000 was selected with Mode C; TCAS is fitted. At the time, a Nimrod jet was conducting VOR/DME procedure training at Wick and had executed a missed approach procedure (MAP) from RW31 where the standard MAP altitude is 2000ft ALT. At some stage the Nimrod crew had requested a climb to 4000ft ALT for another approach and once outbound on the procedure the Nimrod crew commenced a descent to 1600ft ALT through his altitude (of 3000ft). About 4nm SE of Wick aerodrome he observed a TCAS contact (a blue diamond) in their 10'clock some 400ft above them and descending. This became a Traffic Advisory [probably proximate traffic] that remained as the Nimrod passed on their starboard beam descending through their level, whereupon the TCAS contact changed to a yellow diamond and "TRAFFIC" was enunciated. No avoiding action was taken, no RA enunciated and the Nimrod was not seen, but TCAS displayed the jet half way between their SF340 ac symbol and the 2nm radius circle on the display. Therefore, he estimated that the Nimrod passed, at most, 1.5nm away at the same altitude. He did not assess the inherent risk.

THE NIMROD MR2 PILOT reports that he was conducting a PR crew-training sortie in a Kinloss MR airframe, which involved an IFR VOR/DME procedure at Wick in IMC, whilst in receipt of a Procedural Approach Service from Wick APP. A squawk of A3702 was selected with Mode C but neither TCAS nor any other form of CWS is fitted.

After homing to Wick at 4000ft altitude and one turn in the WIK hold, he thought, at 4000ft QNH, they completed a VOR/DME procedure to RW31 followed by a pre-briefed go around. [UKAB Note (1): The Wick RT transcript reveals that the first hold was flown at 2000ft QNH] After climbing out, a return to the hold was commenced and they climbed to 4000ft QNH, as cleared by ATC for one turn in the hold, this time for the second pilot's training benefit, in accordance with their stated further intentions to ATC after the go-round. Although aware of the SF340 from the RT transmissions, as they were flying in IMC they had no visual corroboration of the other ac's position. Once they were cleared for the RW31 VOR/DME procedure a descent was established from the beacon on the published track, which took them away from W3D, inbound on the ADR. After leaving 4000ft, heading 152° at 200kt and passing 3000ft at a

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range of 5nm from the 'beacon', the SF340 pilot joining, he thought, from the advisory route W3D reported the conflict.

He thought, erroneously, that since the SF340 crew had been cleared to join the WIK hold via W3D at 3000ft (though the inbound ETA was unknown to him) they were on a divergent course so once they were on top of the beacon there was no apparent conflict. No avoiding action was taken as they had been IMC, unaware of the SF340's proximity below them.

When they were cleared for the procedure, since their altitude, intentions and position were known to Wick APPROACH, he assumed no conflict existed. Although the Saab was not seen at all he estimated the minimum horizontal separation would have been <2nm but assessed the risk as "unknown". He added that if TCAS had been fitted "we would have known otherwise".

THE WICK COMBINED AERODROME/APPROACH CONTROLLER (APP) reports that the Nimrod crew was carrying out a VOR/DME approach to RW31 under a procedural APPROACH control service and was cleared initially for a "low approach go around". He then received a telephone call on the external direct telephone line, which he answered. During the telephone conversation the Nimrod crew 'went around' and reported doing so, which he heard on the loud speaker. As the Nimrod crew made this report he told the person on the telephone to stand by and replaced his headset to acknowledge the 'go around', passing the Wick QNH (1019mb) in the erroneous belief that the standard missed approach was being carried out (a climb to 2000ft Wick QNH).

The SF340 crew then called inbound to Wick from the SE. At 25nm DME inbound, the SF340 crew was instructed initially to descend to 4000ft QNH (1019mb) and then subsequently to 3000ft QNH at 15nm DME. The Nimrod crew then reported joining the WIK hold and ready for a second VOR/DME approach to RW31 so he cleared the Nimrod for the approach and asked the crew to report "beacon outbound". The SF340 crew was asked to report joining the WIK hold and advised of a short delay before they could commence their approach. Following a telephone call to the ScACC MORAY Sector regarding traffic that would affect the Nimrod's departure back to Kinloss on completion of the go around, the SF340 crew advised him of a TCAS 'warning' on traffic 3 miles E of the SF340 at the same altitude. The SF340 pilot was advised that the only traffic [known] was the Nimrod at 2000ft and to put the SF340 pilot at his ease he asked the Nimrod crew to confirm their altitude, to which the pilot replied passing 2300ft in descent from 4000ft. He asked the Nimrod crew why he was at 4000ft and the pilot replied it was the altitude that he had requested on his initial go around, but the Nimrod pilot's request was neither heard nor approved by him and he stressed he had not passed a clearance to climb to 4000ft QNH. He assessed that the prescribed separation was eroded, at a minimum to 3nm at the same altitude

UKAB Note (1): The Wick METAR at 1050UTC: sfc wind of 020°/04kt; Vis. 9km in drizzle; BKN @ 120

ATSI reports that the Airprox occurred within Class G airspace, above the Wick ATZ (sfc - 2000ft aal elev: 126ft) and below the FL35 base of the Class F ADR - W4D. The WICK APP Controller said his workload and traffic loading were light at the time of the Airprox. In the period leading up to the incident there was only one other flight on frequency in addition to the subject ac so in accordance with normal operating procedures the controller was carrying out the combined duties of ADC and APP: there is no provision for an ATS Assistant at Wick Tower and surveillance radar is not installed.

The Nimrod crew established communication with Wick APP at 1029, reporting level at 4000ft, inbound for a VOR/DME approach. APP established that the flight was at a range of 25nm on the WIK 200° radial and cleared the flight to descend to 2000ft Wick QNH (1019mb). The pilot requested to join the hold at WIK for one holding pattern, followed by an 'overshoot' from RW31 for a second approach, before recovering to Kinloss. At 1036:30, the pilot reported joining the WIK hold and was subsequently cleared for the VOR/DME approach, reporting 'BASE TURN' complete at 1048:47. APP immediately cleared the Nimrod for a low approach and go around RW31, which was acknowledged. About 2min after clearing the Nimrod crew for the go around, the controller answered a telephone call, requesting

approval for a practice diversion (PD) later that afternoon. This telephone call was received via a handset situated to the L of the APP Controller's operating position i.e. not through the operational control panel. This necessitated the controller removing his headset to conduct the telephone call. It was whilst he was so engaged that the pilot of the Nimrod crew crucially reported at 1051:40, "**[C/S] on the go around climbing 4000 feet to return to the Whiskey India Kilo**". The controller said that he heard this call through the loudspeaker, replaced his headset and acknowledged the transmission with "[C/S] roger QNH 1019", before resuming the telephone conversation about the PD. He said that it had not registered in his mind that the Nimrod pilot had reported climbing to 4000ft after the go around. Although he had not cleared the flight for a standard MAP he believed, nevertheless, that the pilot would be carrying it out:

"climb straight ahead WIK VOR R306 to 2000 (1886) then turn right to VOR WIK enter the hold at 2000 or as directed".

As a result of this Airprox, the controller says that he now clears flights for a standard MAP to avoid any ambiguity. After the telephone call had finished the controller asked for confirmation from the Nimrod pilot that he intended carrying out one hold before commencing the next approach. This was confirmed. The controller explained that he was aware that the SF340 was inbound and estimating the WIK VOR at 1101. He added that if the Nimrod crew had intended to hold for longer than one pattern he would have afforded the SF340 priority over the training flight. The SF340 made its initial call at 1054:00, after transfer from ScACC. The pilot reported passing FL88, descending to FL65, 30nm from WIK. APP instructed the SF340 crew after passing 25nm DME to descend to 4000ft QNH (1019mb), above an unrelated helicopter, which was routeing between WIK and Aberdeen at 3000ft. The controller did not realise that the SF340 and Nimrod were now on potentially conflicting flight profiles.

At 1054:50, the Nimrod crew reported "**WICK [C/S] beacon joining 4000 feet**". APP acknowledged the call with "[C/S] roger", whereupon the pilot requested to return to Kinloss, after the procedure, climbing to FL60. The controller's view was that, again, he had not registered that the Nimrod crew had reported an altitude of 4000ft. He could not explain why he had again missed the level report on this occasion. Whereas, previously he had been engaged with the telephone call, as far as he could recollect there had been no distractions at the time, which could have explained the lapse. He opined that as he had no reason to believe that the Nimrod crew was not at the standard MAP altitude of 2000ft QNH, he did not note the significance of the altitude report.

At 1055:40, the SF340 reported at 25nm from WIK and descending to 4000ft. Subsequently, on passing 15nm, the SAAB crew was cleared to descend to 3000ft and to expect a short hold at the WIK. The Nimrod crew was cleared for the procedural approach and, at 1059:00, reported "[C/S] is beacon outbound". Exactly 2mins later, the pilot of the SF340 transmitted at 1101, "*...just to advise you..we very nearly got a...TCAS climb on that Nimrod who's quite close to us about three miles to our right*". APP replied that he had still believed that the Nimrod was at 2000ft but, to reassure the pilot of the SF340, he requested the jet's altitude. APP was surprised when the Nimrod pilot replied at 1101:30, "[C/S] we're descending through 2300ft we were overhead the beacon at 4000 [ft]". When APP asked why he was at 4000ft, the Nimrod pilot replied "[C/S]..that was the height [sic] requested and the height [sic] we were that we climbed to..apologise [sic] if there was a mistake". The RT transcript confirms that although no such request was made, the pilot clearly reported climbing to 4000ft on the RT at the time. The radar photograph timed at 1100:57, shows the two ac just passing each other starboard – starboard, 1-2nm apart on reciprocal tracks, both indicating FL028 (1013mb), which equates to 2960ft QNH (1019mb).

During the incident the controller was undoubtedly distracted by the telephone call about the PD. This was exacerbated by having to use a separate telephone handset, rather than being able to receive the call through his headset, which could explain why he missed the call, broadcast via the loudspeaker, after the go around, when the pilot of the Nimrod crew reported climbing to an altitude of 4000ft. This is one of two similar telephone lines within the Visual Control Room (VCR) at Wick, which terminate in separate telephone handsets. The one used on this occasion normally receives calls from certain

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operational units, e.g. ScACC, when there is a problem with the direct line, but is more often used by military units. But the other line is usually for less urgent, general requests for information and is often transferred to the VCR from the administration office following a call to Wick on the published Aerodrome Operator's telephone number. It is considered that this telephone arrangement increases the potential for RTF calls to be missed and, accordingly it was recommended that the aerodrome operator reviewed the telephone arrangements in the Wick VCR, with the aim of allowing all calls to be received by the controller through the headset.

During the course of the investigation, it also became apparent that an altitude - 4000ft - which is in excess of the published Transition Altitude of 3000ft, is regularly used at Wick. This is contrary to standard altimetry conventions as stated in the UK AIP and so this topic has been raised with the Regional Inspector of ATC.

THE NIMROD MR2 PILOT'S UNIT comments that the Nimrod crew did not see the Saab at all during this Airprox as they were flying in IMC and the ac is not fitted with TCAS.

The Nimrod Captain believed that he had been cleared by Wick ATC to climb to 4000ft (rather than the standard 2000ft MAP altitude) and then cleared to commence the procedure, which required a descent through 3000ft – the altitude of the SF340. The Nimrod pilot had not detected from the RT transmissions that a conflict might exist with the inbound Saab: it was presumed that deconfliction would be effected by Wick ATC. While this event demonstrated the dangers inherent in any modification to a standard procedure the Nimrod crew flew their ac as cleared by ATC and with regard to what they knew of the other traffic around them. The incident also clearly demonstrates the value of TCAS.

HQ STC comments that a significant chain of events had led to this Airprox: Firstly, the Nimrod crew's decision to 'step away from the norm' and fly the missed approach at an altitude higher than the published 2000ft, albeit tacitly approved by ATC, they thought. Secondly, the delay in the Nimrod MRA4 program, which is toted to be equipped with TCAS, had meant that Nimrod MR2 had remained unfunded and not fitted with TCAS. Thirdly, the controller did not register that the Nimrod was climbing to 4000ft, which was key. Finally, the mixing of flight levels and altitudes within this portion of procedural IFR airspace above the transition altitude was a recipe for disaster; either with or, in this case, without a suitable ATC radar picture.

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 comprehensive analysis from ATSI had laid bare the facts of this Airprox. From the RT transcript it was evident that the Nimrod pilot had clearly told APP that he was "...*on the go around climbing 4000 feet*", not to the standard MAP altitude of 2000ft and therefore climbing to an altitude above that of the SF340. CAT pilot Members were quick to point out that this was phrased more as a statement rather than the request that it should have been. Nevertheless, the pilot's report was unfortunately not picked up by the APP controller at the time and the ATSI report had suggested that he might have been distracted by the telephone call. Controller Members could understand why a controller might have misheard what a pilot said on one occasion but it was clear that the pilot had also reported joining the WIK beacon at 4000 ft – the second opportunity that presented itself for the controller to correct the Nimrod pilot's error, but this time there was no apparent distraction. It was not obvious why the Nimrod crew had climbed to 4000ft for the MAP: they had not been instructed to do so and their initial hold had been flown at 2000ft. As it was, neither of these transmissions from the Nimrod pilot apparently registered in the controller's mind. Consequently, when APP cleared the Nimrod pilot for the VOR/DME procedure he did so not realising that the Nimrod was above the SF340 and that by continuing on the

procedure the Nimrod would descend through the altitude of the SF340 and thereby into conflict with the airliner. APP was unaware of this until it was brought to his attention by the SF340 pilot's report. The alert SF340 crew detected the Nimrod descending through their altitude as a result of the TCAS TA. Once again this equipment had proved its worth, for without it the unsighted SF340 crew would have been oblivious to the whole event. Similarly, the Nimrod crew were following the azimuthal part of the procedure, descending in IMC and unaware of the airliner below them just off to starboard. From their report it seemed as though the Nimrod pilots might have believed that the SF340 was flying on W3D, which was clearly not the case. So with both opportunities missed to check the Nimrod pilots' non-standard climb, the Board concluded that this Airprox had resulted because the Nimrod pilots climbed above the standard altitude during the go-around, which was not detected by the APP controller who allowed the Nimrod to descend into conflict with the SF340.

With regard to risk, one controller Member suggested that as both crews were unsighted in the poor prevailing weather when the Nimrod descended through the altitude of the SF340 in this non-radar environment, then this was a risk-bearing encounter. However, this was a solitary view and an overwhelming majority disagreed. CAT pilot Members placed greater trust in the TCAS fitted in the SF340: although the Nimrod did not carry this equipment no RA was triggered onboard the SAAB. If the encounter had been that close then pilot Members were in no doubt whatsoever that TCAS would have enunciated an RA thereby commanding the SF340 crew to fly out of danger. As it was TCAS was not required to act and only a TA was given which, coupled with the minimum horizontal separation of 1.2nm – albeit slightly less than the SF340 pilot's estimate - convinced the Board that no actual risk of a collision had existed in the circumstances reported here.

Subsequent to ATSI's recommendation to the Wick Aerodrome operator about the telephone arrangements in the Wick VCR, the ATSI advisor briefed the Board that this review appears to have been carried out thoroughly. The Operator concluded that the current telephone arrangements are better than the alternative options considered. Additionally, a Supplementary Instruction (SI) was issued reminding controllers of their responsibility not to become distracted from their primary functions in the provision of an ATC service. As a small ATSU, the learning points from this Airprox have, no doubt, already been discussed between the operational staff. ATSI accepted the aerodrome operator's conclusions but, in conjunction with ATSSD, will continue to monitor the situation.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Nimrod pilots climbed above the standard altitude during the go-around, which was not detected by the APP controller who allowed the Nimrod to descend into conflict with the SF340.

Degree of Risk: C.

AIRPROX REPORT No 067/04

AIRPROX REPORT NO 067/04

Date/Time: 5 May 1635

Position: 5159N 00003W(BKY 262/5nm)

Airspace: London TMA (Class: A)

Reporting Ac Reported Ac

Type: B737 (A) B737 (B)

Operator: CAT CAT

Alt/FL: FL72 FL80

Weather VMC CLOC VMC

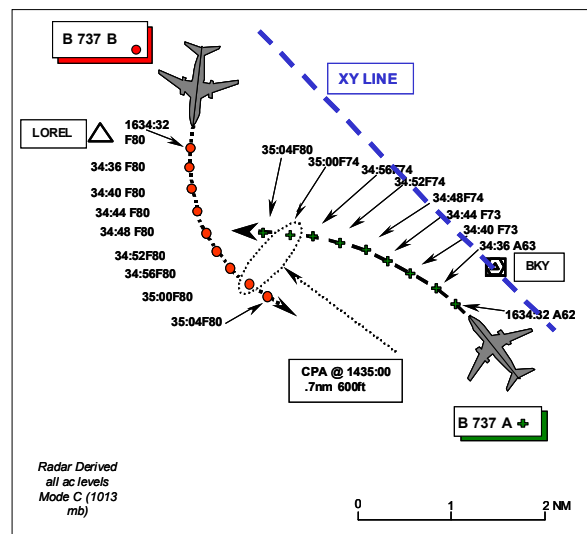
Visibility: 10km NR

Reported Separation:

<2nm H 600ft V 3nm H 700ft V

Recorded Separation:

0.7nm H 600ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT (A) reports on CPT3R departure from Stansted to Jerez squawking Mode C and in communication with Stansted Director (SS FIN DIR). Having just completed a L turn over the 262°R/5nm point, climbing as cleared by ATC at 1000ft/min and passing FL70 for FL80 at 250kts, he received a TCAS TA. B737 (B) was seen ahead, slightly R and above. The rate of climb was reduced to 300ft/min at FL72 as a RA 'Monitor Vertical Speed' was given so the ac was flown level manually until the conflict ended. The other ac was identified as B737 (B) and was estimated to be 2nm ahead and 600ft above at the closest point. ATC were informed of the TCAS descent but no R/T was heard from the other ac. He assessed the risk as low.

THE B737 PILOT (B) reports holding at BKY at FL80 and 210kt inbound Stansted from Newcastle in communication with Essex Radar when a TCAS RA was briefly triggered followed by the instruction to 'Monitor Vertical Speed'. The other ac was sighted passing behind them. ATC were not informed as the warning was momentary, there was no risk of collision, and at the time they were extremely busy with ac avoiding severe thunderstorms over Stansted. He assessed the risk as low.

THE ESSEX RADAR CONTROLLER reported that he was controlling B737 (B) inbound to Stansted and since there was a thunderstorm overhead the pilot elected to delay his approach. There were a number of other ac inbound including one approaching LOREL hold where the minimum holding level was FL90. To assist him with his traffic Stansted Final Director (SS FIN DIR) invited him to use FL80 to hold the B737, which he did. The ac was not using the LOREL HOLD but he was vectoring him around as he avoided weather and at one point he was about 10nms from LOREL. He then brought the B737 (B) back to LOREL to commence an approach. As he turned over LOREL towards BKY he saw B737 (A) in close proximity at FL73. By the time he saw the Red STCA indicated the incident was over and the ac had passed. The pilot then said he had had an RA which he acknowledged.

THE STANSTED FINAL DIRECTOR reported that there was a lot of poor weather over the airfield and that most of the inbounds had initially refused to make an approach. She offered the Essex RC FL80 for B737 (B) to help him out as a Luton inbound ac had called at the same level. Initially she heard B737 (B) refuse to make an approach and the Essex RC told him to take up a L hand orbit to the West, he thought, of the X-Y line. The inbounds started to make approaches, all non-standard to avoid weather, wanting to turn base at about 6nm and requesting headings. Departing ac had also been avoiding weather. About 10 minutes had elapsed before B737 (A), departing to CPT, got airborne. She climbed

it to FL80 unaware that the Essex RC had put B737 (B) to cross the X-Y line West then to turn back downwind: it was not until STCA triggered that it came to her attention. When B737 (B) declared an 'RA traffic at the same level' both she and the Essex RC realised what had happened: this was after the event. The traffic had built up dramatically in the time between co-ordination and the incident.

ATSI reported that they endorsed the NATS unit investigation that stated that this incident occurred at BKY at 1635 and the controllers involved were the Essex RC and the Stansted Final Director (SS FIN DIR). Traffic loading was medium to high but as ac were holding awaiting weather improvement and required vectoring around weather the controllers' workload and traffic complexity was high. There was significant bad weather in the area and all sectors had been experiencing problems. Essex had suffered weather avoidance at 1430 and at 1550 Heathrow had lightning strikes. This weather drifted NE and started to affect Stansted at 1620 when an ac had a go-around due to turbulence on short final.

At about 1610 the Essex RC had accepted a release for B737 (B) into LOREL at FL90. He had also accepted an uninvolved ac at FL90 into LOREL inbound Luton on the assumption that B737 (B) would be coming straight out of the holding pattern (this is common practice). B737 (B) first called as it approached BKY and the Essex RC instructed it to head 080° intending to vector it downwind for the ILS. The B737 (B) pilot replied that they were concerned about a large CB showing on radar overhead Stansted. As B737 (B) went through the X-Y line at 1615, the pilot reported that that he did not wish to make an approach until he had further information.

At 1616, when 737 (B) was 3nm E of the X-Y line, the Essex RC instructed the pilot to make a L-hand orbit.

[UKAB Note (1): The X-Y line: a line from Stansted through BKY to the edge of CAS to mark a division between the levels available to Essex Radar and SS FIN DIR. W of the line the minimum stack level at BKY is reserved for the use of SS FIN DIR: Essex Radar may not descend ac below minimum stack level plus one until E of the line.]

Soon after this the uninvolved ac called over BPK heading for LOREL descending to FL90. The SS FIN DIR, overhearing some of the Essex RC's R/T, realised that he had a problem with the 2 ac at FL90 so offered him the use of FL80 for the uninvolved ac. The initial MOR submitted by SS FIN DIR specifically states that "I offered INT [Essex RC] FL80 for C/S (B)" and it was in a subsequent report that this was changed to "I offered INT FL80 for the Luton inbound (the uninvolved ac)". The Essex RC reported that the only part of the conversation he heard was the offer of FL80. He decided to drop B737 (B) because to the E of the X-Y line minimum stack level (FL80 at the time) and below was his and to the W of the line it was allocated to SS FIN DIR for Stansted departures.

At 1617 an ac making an approach to Stansted abandoned the approach due to weather and succeeding Stansted inbound ac decided to hold to await an improvement in the weather. At 1620 B737 (B) pilot asked if they should hold somewhere and the response from the Essex RC was *"I'm happy if you just stay in the orbit, it'll save you going back to LOREL and getting in the way of the departures"* which indicates that he was aware that at FL80 B737 (B) would compromise departures if it went back to LOREL.

At 1625 all other ac inbound to Stansted were holding awaiting the result of the ac making a second approach to land. The workload was beginning to build on Essex RC and a support controller, although justified, had not been called for. At 1626 when the ac was 4nm on final approach, other ac decided that it was safe to continue but, because there was a line of weather on the final approach and to the W of it, initially only one ac at LORREL elected to make an approach. The Essex RC thus became involved in setting up a sequence of traffic from ABBOT which is 20nm E of LOREL.

The second ac made a normal ILS approach. However, the next ac advised that due to bad weather on the approach, they would like to parallel the approach down to 6nm and then join the ILS. At about this

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time B737 (B) pilot advised that they were ready to try an approach so they were turned onto a heading of 230° to position in a normal pattern for the sequence. The Essex RC then returned his attention to ABBOT to organise the sequence there. During this period there had been 2 Stansted departures via BKY that SS FIN DIR had climbed to FL80, knowing that B737 (B) was orbiting well NE of LOREL. Thus when B737 (A) departed from Stansted it was also climbed to FL80 and SS FIN DIR then returned her attention to the approach because the next ac in the sequence had also asked to follow the “offset approach” and she had to ensure that the descent and headings were exact for it to be able to complete an approach.

At 1634, when B737 (B) about 3nm NE of LOREL, just crossing the X-Y line Westbound, the Essex RC gave it a L turn onto 090° and then returned his attention to the sequence from ABBOT. At this time B737 (A) was climbing through 5800ft heading for BKY. The SS FIN DIR, unaware of a potential problem with B737 (A), was concentrating on the complicated approaches to Stansted.

When B737 (B) started the L turn just before LOREL, B737 (A) was 2nm S of BKY turning L towards BUZAD at FL74 climbing following the SID. Neither controller noticed the conflict but at about this time both ac received a TCAS RA and B737 (A) pilot levelled at FL74. At 1634:50 on the next radar sweep STCA activated white when the ac were 1.4nm and 600ft apart. On the subsequent sweep STCA went red with the ac 1nm and 600ft apart. Minimum separation of 0.7nm 600ft occurred on the next sweep at 1635:00 as the ac passed abeam each other with the labels overlapping. Neither controller was aware of the conflict until it was over and neither avoiding action nor TI was given. Only the pilot of B737 (A) reported to their controller that they had received a TCAS RA.

The origins of the incident lie in the original co-ordination about the use of FL80. It seems as though the Essex RC assumed that it was to allow him to descend B737 (B); whereas the SS FIN DIR is quite clear that it was to allow an early descent for the uninvolved ac. It would have made no sense for her to offer FL80 for B737 (B), as it was already E of the X-Y line and outside of her area of jurisdiction. Had he wished to do so, the Essex RC could have descended B737 (B) to FL80 without reference to SS FIN DIR. Having descended B737 (B) to FL80 the controller clearly at one stage recognised that it could not go back to LOREL without getting in the way of the outbounds. However, when B737 (B) pilot reported that he was ready to make an approach, he was put on a heading of 230° towards LOREL to start normal sequencing. The Essex RC thought that it is possible that he was confused about the Min Stack Level and he thought that at FL80 he was at min stack plus one. While this is possible it is more likely that he was focussed on working in the ABBOT area and allowed 737 (B) to penetrate W of the X-Y line without co-ordinating with SS FIN DIR.

It would have helped if a support controller had been put in place earlier. However, the traffic level built up very rapidly because of the refusal of ac to land at Stansted and the Group Supervisor was distracted negotiating a strategy for flow control with the Traffic Manager.

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 authorities.

A Member familiar with operations in the Stansted/Luton area explained that the Stansted Final Director often handled outbound traffic in order to equalise the workload between the position and that of the Essex Radar, both being located adjacent to one another at LTCC.

The Board noted that the adverse weather had caused a very difficult air traffic situation, at a very busy period, causing the system and the controllers to be working to near capacity. This had also caused the supervisors to be concentrating on devising a flow control plan rather than directly observing the co

Although there had been previous co-ordination with Stansted Fin Dir regarding 737(B), it had taken place over 20min before the incident and was, in the opinion of expert members, no longer valid and re

Members determined that, for whatever reason, the Essex Radar directed B737(B) to cross the X-Y line without co-ordinating this action with the Stansted Fin Dir. On trying to determine why this had happened, specialists thought it likely that the controller may have been concentrating on setting up a sequence of ac inbound from ABBOT and had allowed his attention to be diverted away from the situation of B737(B).

Members were concerned that neither controller involved was aware of the incident until after it had occurred. Although STCA did illuminate, it did not do so in time to give either controller time to issue avoiding action to their respective ac. Fortunately however, both pilots had received and reacted correctly to TCAS RAs in respect of the opposing ac, generating a vertical separation of 600ft. The horizontal separation of 0.7nm was purely a matter of happenstance. In the event however, TCAS and the inherent lateral separation had ensured that there was no risk that the ac would have collided.

The Board was informed that following this incident Stansted procedures have been reviewed by NATS.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: During a very complex and non-standard traffic situation caused by a bad weather, the Essex Radar Controller turned B737(B) into conflict with B737(A) without co-ordination.

Degree of Risk: C.

AIRPROX REPORT No 068/04

AIRPROX REPORT NO 068/04

Date/Time: 12 May 1555

Position: 5239N 00028W
(2½nm NNE Wittering)

Airspace: London FIR (Class: G)

Reporting Ac Reporting Ac

Type: KC-135R Harrier GR7

Operator: Foreign Mil HQ STC

Alt/FL: FL100 FL130

Weather VMC CLAC VMC CLAC

Visibility: >10km >10km

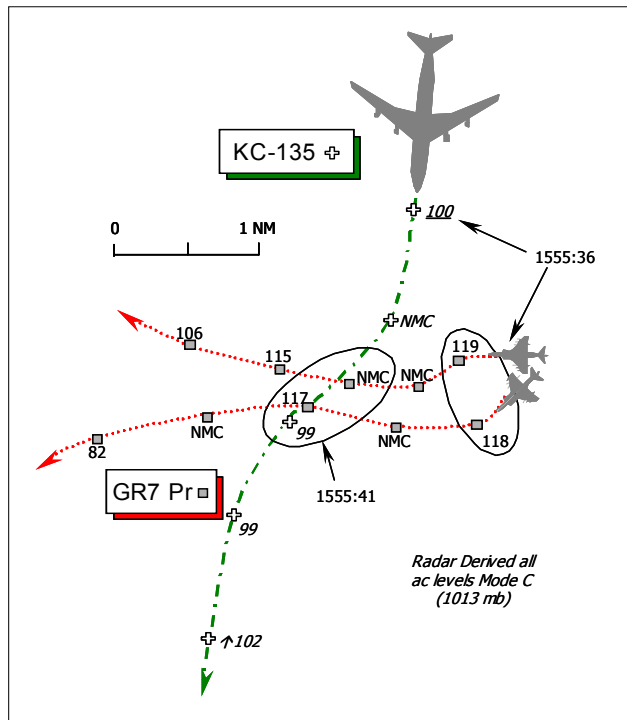
Reported Separation:

Not reported ½nm H/3000ft V

Recorded Separation:

0.16nm H astern/V 1800ft (closest GR7)

BOTH PILOTS FILED



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KC-135R PILOT reports his ac has a light grey camouflage scheme but the HISLs were on whilst outbound for the Daventry RC IFR, but flying in VMC some 5000ft above cloud and >10km visibility. Flying in level cruise at 400kt, he reports he was in receipt of either “a RIS or a RAS” from LATCC (Mil) and squawking the assigned code with Mode C; TCAS is fitted.

Whilst heading 185° toward the eastern end of the Daventry RC at FL100 LONDON MILITARY called traffic information on an ac at 11 o'clock -10nm manoeuvring at the same level - FL100. TCAS then enunciated an RA - “CLIMB CLIMB”. A crewmember located one ac at 11 o'clock slightly low then saw a second ac slightly high – both were fighter-sized jets, which he thought might have been Skyhawks [they were actually GR7s]. His ac was approximately 500ft from each at the time, so he disengaged the autopilot and manoeuvred rapidly to the R with initially 45° of bank, and then 60° to avoid them and deviating from his assigned level by “minus 300ft to plus 600ft”. His co-pilot reported “visual” with the two jets to ATC; one ac was “going vertical” as the second jet followed. They climbed approximately 600ft during the RA manoeuvre before TCAS issued a clear of contact, whereupon he returned to FL100 and informed London Mil of the Airprox. He assessed the risk of collision as “high”, adding that this encounter “had all five sets of eyes working on it!”

THE HARRIER GR7 PILOT reports he was leading a 2-ac formation of grey camouflaged GR7s conducting air combat training (ACT) overhead Wittering. They were operating in VMC some 9000ft above cloud and >10km visibility whilst in receipt of a RIS from Cottesmore on 376-575MHz. A squawk of A7000 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

Whilst engaged in dynamic manoeuvres Cottesmore ATC informed his formation of a contact closing from the N at 4nm but the controller did not specify the level. About 10sec later he spotted a “707” reversing he thought from a left turn into a right turn, flying towards him at the same level 1-1½nm away. He ceased dynamic manoeuvring in order to resolve any potential conflict on a heading of 280°, at

130kt. He immediately called a "knock it off" [an end to the ACM] and a "heavy between the two formation ac". To avoid the other ac he bunted to 1000ft below the KC-135 in a controlled manner. During this manoeuvre he estimated that the KC-135 passed about 600m/½nm away at the closest point. He opined that the flight paths were however diverging with level separation, which ensured there was no actual risk of a collision.

MIL ATC OPS reports that the timings of the LATCC (Mil) tape transcripts correlate accurately with the radar video recording. Unfortunately, Cottesmore ATC's involvement in this Airprox was not identified by this HQ until some time after the event: thus no RT transcripts were available, nor could the controller involved recollect many details pertaining to the incident.

The pair of Wittering based Harrier GR7s was carrying out an ACT sortie in the Wittering area under an ATS from Cottesmore RADAR. Cottesmore were operating without SSR [provided from the Cranwell SSR head] hence the GR7 pair was squawking A7000 with Mode C under a RIS. The KC-135 crew was under a RIS from LONDON MILITARY Console 14 (CON 14) maintaining FL100 routing toward the Daventry Radar Corridor (RC) for a crossing of CAS. The KC-135's service was immediately limited due to high traffic density. However, traffic information was passed to the KC-135 crew at 1553:50, "...traffic 12 o'clock 10 miles manoeuvring indicating FL100", whereupon the KC-135 pilot reported "...searching". The height information on the conflicting traffic was updated at 1554:12, "...now indicating FL200". The KC-135 pilot asked for clarification about the traffic information passed from CON 14 who advised, "...previously reported traffic now 12 o'clock, five miles indicating FL90." The KC-135 crew then reported "traffic in sight" and added "...the traffic in sight fast manoeuvrable aircraft in a vertical climb, two of them actually". After a brief break in the transmission CON 14 added "[C/S]...one indicating 130 now". At 1555:27, the KC-135 pilot reported "...in a right turn to avoid traffic" and subsequently called reporting an Airprox at 1556.

Analysis of the Claxby Radar recording shows the GR7 formation at 1554:11, manoeuvring 6nm NW of Wittering squawking A7000 with no Mode C with the KC-135 on the Wittering 010° radial 14nm - tracking 190° - indicating FL100; the relative distance between them is 10nm. The GR7s and the KC-135 continue to converge and at 1554:19, a Mode C indication of FL106 is evident from one of the Harriers. At 1554:37, both Harriers Mode C is displayed - one at FL90 and the other at FL119. The GR7s Mode C data then disappears for 4 sweeps and reappears at 1555:02, with one of the pair indicating FL134. When the KC-135 and the Harriers are 2nm apart, converging, the Mode C on the Harriers is indicating FL102 and FL117 respectively. When horizontal separation reduced to 1nm the Harriers indicated FL118 and FL100.

[UKAB Note (1): The KC-135 is shown in a R turn to SW at 1555:36, as the Harrier pair set course westbound indicating FL119 & FL118 respectively; it is not possible to determine which of the two A7000 squawks is the lead ac. No Mode C is evident on the next sweep, but at 1555:41, the closer of the two GR7s indicated FL117 as it passed 0.16nm astern of the Tanker and some 1800ft above it, whilst the KC135 reverses the turn back toward a southerly heading at FL99 Mode C. One of the GR7s then descends through the level of the tanker as the pair clears to the W. The KC135 then climbs – probably in response to the reported RA - but after the close quarters situation to FL104, before descending once more to regain its cruising level of FL100.]

The KC-135 was operating under a RIS, which had been 'limited' due to high traffic density. CON 14 had passed timely and relevant traffic information on the Harriers, at a range of 10nm, which included level information. However, no mention was made that the conflicting tracks were carrying out high-energy manoeuvres or that 2 contacts were shown. The conflicting ac were called again at 5nm, but the pilot of the KC-135 asked for the information to be repeated. After this the KC-135 pilot reported visual with the Harriers and stated that they were "...fast manoeuvrable traffic in a vertical climb...2 of them...". It is unfortunate that neither a tape transcript nor ATC report is available from Cottesmore, however, it would appear from the lead Harrier pilot's report that traffic information about the KC-135 was passed to the Harrier pilots at about 4nm.

AIRPROX REPORT No 068/04

HQ 3AF comments that this Airprox might have been avoided had either the GR7s been working London MILITARY or if Cottesmore ATC, notwithstanding the temporary failure of their SSR, had allocated them a discrete SSR code; indeed, the UK AIP stipulates that the conspicuity code should not be used above FL100 if under a radar service. In retrospect, the attempt by Cottesmore ATC to provide a service to ac carrying out ACT close to CAS and without the benefit of SSR would seem unwise. The 10nm warning to the KC-135 on the GR7s was reasonable but the 4nm warning given to the GR7s of the approach of the KC-135 was not. Subsequently, the avoiding action taken by the KC-135, in part prompted by TCAS, was made more challenging by the high energy manoeuvring of the GR7s and the uncertainty as to whether either or both had the KC-135 in sight.

HQ STC comments that although no ATC transcript from Cottesmore (COT) was available, Strike Flight Safety managed to secure the Head Up Display (HUD) tape from the lead GR7. This was comprehensively reviewed and offered a new slant on this occurrence:

At 1551:40 the GR7s turn away from each other to generate a 2 mile neutral split for ACT. Immediately, COT ATC call "[C/S]..traffic NW 5 miles". The GR7 formation leader asked "Was that for C/S?" and COT ATC retorts at 1551:42, "[C/S]..traffic NW 5 miles no height slow mover". The GR7 pilots probably looked in this direction, saw nothing and elected to continue (it might have been a light ac below the cloud but without SSR no height can be ascertained). The rapid manoeuvring begins very shortly after as the 2 GR7s merge within 1000ft of each other. At 1553:55, COT ATC called "[C/S]..traffic east 4 miles no height". To which the GR7 leader replied "roger" and continued (again this is either high level or low level traffic of no interest to the GR7s). At 1555:13, COT reported "[C/S]..traffic north 4 miles no height" - the KC135 - which was not acknowledged by the GR7 pilots so COT repeated "[C/S]..traffic north 2 miles no height". There is an immediate "[C/S]..knock it off" from the GR7 leader, the 2 pilots exchange rapid RT transmissions and avoided the KC-135.

From the Command viewpoint there seems to be 3 issues of note from this Airprox. Firstly, is the willingness of the KC-135 to route towards the high-energy manoeuvring traffic that was being called on the nose at 10 miles; with hindsight, it is suggested that it would have been prudent to route around this unknown traffic at range. Secondly, it would appear that the GR7 crews had become desensitised to ATCs traffic information calls - working without the use of SSR Mode C levels - during the previous 20min of ACT. The area around Wittering is busy with many GA ac that generated most of the previous traffic calls by COT ATC. With hindsight, the GR7s would have been better to transpond an autonomous Wittering Mode A squawk thus enabling the CON 14 to identify where this traffic was from and who was working it. This would have enabled LATCC (Mil) to co-ordinate with COT ATC to identify what the GR7s were doing.

Finally, this Airprox illustrates that the current TCAS procedures are potentially inappropriate for VFR flying in Class 'G'. From the KC-135 pilot's report it would appear that the RA "CLIMB CLIMB" was not followed until after some manoeuvre in azimuth had taken place. However, given that the GR7s were bracketing the KC-135 in height the RA advice would appear to be inappropriate by climbing the KC-135 into conflict with the second GR7 some 1700ft above it. Whilst TCAS was excellent in detecting the potential conflict, it would appear that it was struggling with the rapid manoeuvres of the GR7s - where climb rates can be in excess of 20,000ft/min.

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 KC-135 pilot had reported that he was flying IFR, but it had been established that he was in receipt of a RIS from London MILITARY whilst in transit through Class G airspace to the eastern end of the

Daventry RC. Some members questioned the wisdom of the provision of a RIS to a flight operating under IFR and wondered if the KC-135 pilot had actually intended to include this in his report as he appeared to be unsure of the form of ATS he was receiving. Under a RIS the KC-135 crew was entirely responsible for sighting and affording separation from reported traffic and some members wondered if this was fully appreciated by the pilots. It was worth repeating here that a RIS is essentially a VFR service whereby pilots are given traffic information on observed radar contacts to enable pilots to acquire the other ac visually and maintain their own separation as appropriate. No form of separation or avoiding action is proffered, unlike a RAS, where controllers will provide advisory avoiding action instructions necessary to achieve specified radar separation minima against observed traffic. The HQ 3AF advisor reaffirmed that UK-based USAFE crews were intimately familiar with the unique radar services provided in UK airspace, but he was unable to clarify this point further with those involved here as the pilots had returned to the USA. The Tanker crew was first informed about the Harriers at a range of 10nm and the STC member wondered if it would have been more appropriate for them to turn away at that stage to give the GR7s a wider berth. Whereas CON14 had conscientiously provided a good flow of traffic information to the KC-135 crew, some members thought the calls given might not have painted the complete picture to the tanker pilots. The Board agreed with the Mil ATC Ops advisor that as there were two jets shown this was significant, and as they were conducting high energy manoeuvres this was also very relevant. However, the Board was briefed that analysis of the radar recording had shown that the complex ACT manoeuvres flown by the Harrier pair were difficult to follow - especially their vertical profile – because of the rapidly changing Mode C. On this topic, the Board noted that Cottesmore ATC was unable to provide any level information at all as they were operating without SSR. Consequently, under the RIS provided to the Harrier pilots the traffic information was of limited value. The review of the HUD recording by HQ STC Flight Safety had provided some very useful information here. The STC fast-jet member contended that the Harrier pilots may have become overloaded with too much information from the Cottesmore controller who would not have been able to gauge the relevance of some of the observed traffic that might have been operating well above or below the jets. Without Mode C to indicate the other ac's level, the controller would not know which conflicting tracks were of specific interest to the formation leader so all the controller could do was faithfully call all of the ac that he could see in the vicinity, which in dense traffic conditions might be counter productive. Controller members opined that the Harrier pair might have been better served in this instance if they had obtained their RIS from London Military who, unlike most RAF terminal ATSUs, are not restricted to a single source of SSR. Given Cottesmore's lack of SSR, when operating in the middle airspace LATCC (MIL) might have been able to provide the GR7 pilots with a more comprehensive RIS (within the limits of the unit capacity and the relative priorities of service). Furthermore, a LATCC (Mil) controller might also have been more aware of the KC-135 crew's intentions from the flight data available within the operations room. Potentially, the frequency might also have been a little quieter allowing the pilots to concentrate on their manoeuvres. As it was, Cottesmore had apparently called the tanker at a range of 4nm to the GR7 formation pilots under the limited RIS, but without any height information. The GR7 leader reports that he saw the KC-135 and suspended the ACT whilst avoiding action was taken to resolve any potential confliction. This would have been just as the KC-135 pilot was energetically reversing from the R turn into a L turn – as shown on the radar recording. Thus both the controllers involved had transmitted traffic information – at least twice - about the other ac and each crew had spotted the other in time to take avoiding action and afford what separation they could in accord with their responsibilities and the nature of the ATS provided. Some thought that the GR7 leader might have spotted the tanker somewhat late but he had certainly acquired it in time to call the “knock it off” and thereby end the ACM to turn to pass astern of the heavy KC-135 in his nimble jet, affording some 1800ft of vertical separation as he did so against the closest of the formation ac. Although the KC-135 pilot had reported receiving an RA, it was clearly apparent from the radar recording that the tanker crew had not initiated any climb until after the pair of GR7s was crossing astern of and above the tanker, but the members were unable to reconcile a TCAS CLIMB RA with the GR7s flying above the tanker. From this wide-ranging discussion the Board concluded unanimously that this Airprox had resulted from a conflict in the FIR, resolved by both the KC-135 pilot and GR7 formation leader, where any risk of a collision had been removed.

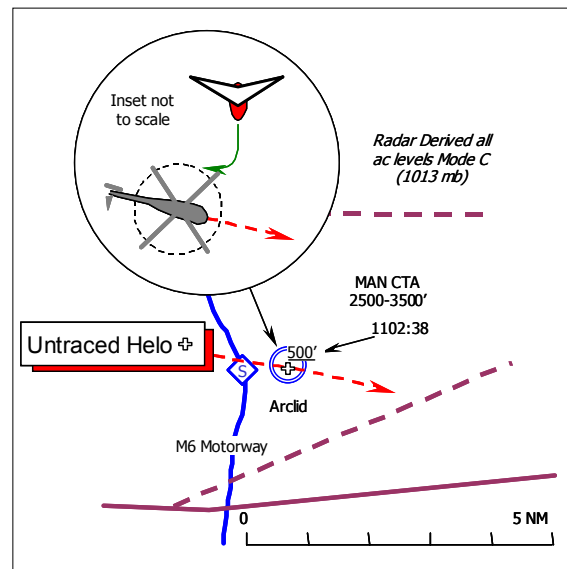
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the KC-135 pilot and GR7 formation leader.

Degree of Risk: C.

AIRPROX REPORT NO 069/04

Date/Time: 13 May 1102
Position: 5307N 00218W
(O/H Arclid microlight site elev 262ft)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: Microlight Untraced Helo
Operator: Civ Trg NK
Alt/FL: 500ft NR
agl
Weather VMC CLBC NR
Visibility: 10km NR
Reported Separation:
50ft V/100-150m H
Reported Separation:
NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE MAINAIR BLADE WEIGHTSHIFT MICROLIGHT PILOT reports he was instructing a student pilot in this 2-seat microlight, which is coloured white overwing, with red & gold underwing and a red fuselage. No radio is fitted.

Flying at 500ft agl overhead Arclid microlight site, heading S at 48kt on the downwind leg of a Cct, he sighted a large single rotor helicopter about 1/3nm away tracking from W – E, flying at 100kt+ on a converging track at about the same height. To avoid the dark green & blue helicopter he turned sharp R as it passed about 100-150m away in straight and level flight no more than 50ft above his microlight with a “medium” risk of collision but, he added, a “high risk of wake turbulence”. The helicopter pilot did not appear to take any action to avoid his ac.

AIS MIL reports that on this day the Clee Hill primary radar was out of service and thus only the SSR was available. Therefore, neither the microlight nor the Airprox are shown on the radar recording. The Claxby Radar was used to track the helicopter after it faded from Clee Hill SSR coverage, and was tracked from the Oulton Park area where it had first appeared to Duffield where it descended and faded from radar. However, despite exhaustive enquiries the identity of the reported helicopter remains unknown.

UKAB Note: The unidentified helicopter is shown transiting overhead Arclid at 1102:38, maintaining 500ft Mode C (1013mb), which, given the Manchester actual QNH of 1023mb would equate to a height of about 538ft above the site elevation of 262ft amsl.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report solely from the microlight pilot; radar video recordings, and a report from the appropriate ATC tracing authority.

It was unfortunate that despite their laudable efforts, AIS (Mil) had been unable to trace the pilot of the reported helicopter. Thus the only information available to the members was from the reporting microlight pilot himself, together with the data from the Clee Hill SSR. Whilst not an ideal situation, members nevertheless agreed that the inclusion of the radar recording gave sufficient data to enable

AIRPROX REPORT No 069/04

them to make an assessment in this instance. The Board was briefed that the position of Arclid microlight site is clearly marked on CAA VFR charts and its location should, therefore, have been readily apparent to the helicopter pilot. Whereas this site was situated in the Open FIR and the helicopter pilot was legitimately entitled to fly there, the radar recording showed that the helicopter had flown directly over Arclid. The microlight would have presented a very small cross-section indeed and when viewed 'across the cockpit' from the helicopter pilot's perspective at the same level, with little crossing motion to draw attention to the machine if it was on a collision course and therefore on a constant relative bearing, it would indeed have been difficult to spot. Nevertheless, in the Board's opinion, the helicopter pilot should have been able to see it and may have done so, but good airmanship would suggest that the notified site should have been given a somewhat wider berth.

For his part, the locally based microlight pilot who should have been very familiar with the local area reported sighting this helicopter 1/3nm away. The helicopter's reported speed of 100kt+ would have allowed the microlight instructor & student at most 10sec to effect an avoiding action manoeuvre against the other ac, as they were required to do under the 'Rules of the Air'. The Board concluded therefore that this Airprox had resulted from a conflict in Class G airspace with an untraced helicopter, which had been resolved by the microlight pilot. The avoiding action turn had clearly been effective and enabled them to achieve some 100-150m horizontal separation as the helicopter passed by - some 50ft above them, the microlight pilot reported. This estimate was broadly supported by the radar recording which, notwithstanding the tolerances applicable to Mode C data, showed that the helicopter had overflown Arclid at a height of about 538ft – some 38ft above the microlight flying in the Cct at 500ft. Whilst the avoiding action R turn had forestalled any actual risk of a collision, it was fortunate that the microlight pilot had spotted the helicopter when he did and in the Board's view, safety had not been assured by any means.

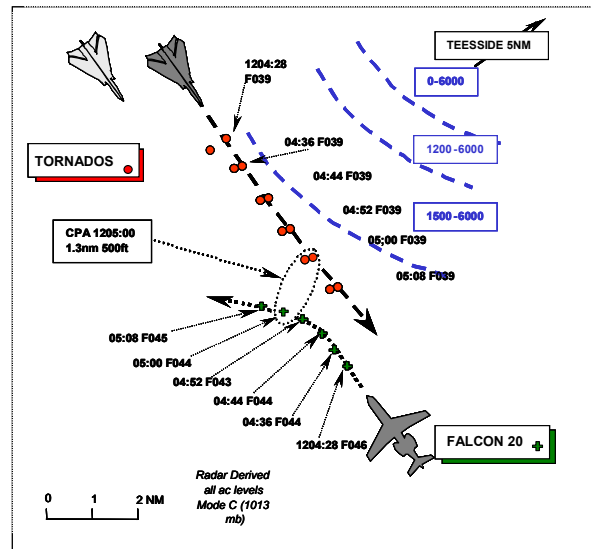
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace with an untraced helicopter, resolved by the microlight pilot.

Degree of Risk: B.

AIRPROX REPORT NO 070/04

Date/Time: 7 May 1205
Position: 5422N 00130W
 (10nm SW Teesside - elev 120ft)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: FA20 Tornado GR4
Operator: Civ Comm HQ STC
Alt/FL: 3900ft 3500ft
 (QNH 1004mb) (Rad Alt)
Weather VMC HAZE VMC CLOC
Visibility: 5km 10km
Reported Separation:
 1nm H 300ft V NR
Recorded Separation:
 ~1.3nm H 500ft V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE FA20 PILOT reports flying a blue ac with strobes and nav lights on, recovering to Teesside from Belgium, in receipt of a RAS from Teesside Radar and squawking with Mode C. He was heading 330° at 230kt passing 3900ft cleared to 3500ft on the Teesside QNH about 14nm SW of the airfield when he received a TCAS TA contact indicating 10nm on the nose at 3700ft which he reported to Radar who in turn gave an avoiding action R turn. They became visual with the traffic, turned hard L and followed RA climb. Two dark grey Tornado GR4 ac on an opposing heading went down the R side at about 1nm and 300ft below. He assessed that if he had not followed the TCAS RA the risk would have been very high.

THE TORNADO PILOT reports leading a pair of grey Tornado GR4 ac in 'fighting wing' formation climbing out from Low Level in receipt of a RIS from Leeming heading 140° at 300kt when he was instructed to stop his climb at FL40. Leeming then passed TI on traffic in their 11 o'clock at 5nm L to R at FL45. They saw traffic a short while later in their 1 o'clock going away and identified it as a Teesside based ac. Leeming then cleared them to climb to FL135. He considered the avoidance as routine and that there was no threat of collision as traffic was called, they became visual and were not conflicting with it.

THE TORNADO STATION comments that the sortie was planned and briefed as a 4-ship, to include a [weapons] Range detail, Low Level, Air-Air Refuelling, Electronic Warfare Training and Affiliation training with an external agency. Prior to the incident 2 formation members dropped out due to unservicabilities. The sortie was correctly authorised and constituted. The SFSO discussed the incident with the lead pilot and navigator and confirmed that at the time of the Airprox they were under a RIS from Leeming. He reviewed the audio tape for that time and noted that at 1204:30, Leeming informed the Tornado leader that the Falcon was at 11 o'clock, 5nm passing L to R at FL45. At this time the Tornado was heading 145°, 300kt at FL40. At 1204:54 the crew saw the Falcon in their 1 o'clock, going away. They were able to identify the ac. No avoiding action was taken, as none was deemed necessary. The Tornado was flying a speed of 300kt: the 24 sec elapsed from the first call from Leeming to the first sighting would give a miss- distance in excess of 2.5nm, with a height difference of 500ft. The crew were aware of the position of the Falcon and obtained visual contact. In the crew's view, concurred by the SFSO having reviewed the HUD tapes, there was no risk of collision and this would appear to be another TCAS derived Airprox. A copy of the route map and a tape containing the audio covering the time of the incident were provided: the Falcon was not visible on the HUD Video.

AIRPROX REPORT No 070/04

TEESSIDE SUPERVISOR (RAD MENTOR) reports that he was supervising a student on APR, vectoring a Falcon 20 right hand for RWY05. About 20nm S, they informed Leeming as per the Letter of Agreement and they replied that we could “have down to 3000ft – the MATZ”. Two 7001 squawks were then seen about 20nm WNW of Teesside showing 1100ft and 1300ft. He pointed these out to the student as a possible confliction and saw the squawks change to 0403 and 7403 [UKAB Note (1): Code 0403 is assigned to Leeming; code 7403 is listed as ‘UK domestic’ and it is possible that there was interference since the ac were in formation]. The Falcon was descended to 3500ft and the assistant was requested to contact Leeming and ascertain the intentions of the contacts. As the Falcon was passing about 5500ft QNH the 0403/7403 squawks commenced a climb and when they passed 10nm W of Teesside, the mentor took control of the RTF and turned the Falcon for avoiding action. The Falcon pilot reported a TCAS RA, he thought, and turned L for avoiding action and descended. The 2 contacts working Leeming turned out to be Tornado GR4’s climbing out from low level. Leeming ATC did not inform Teesside of the intentions of the GR4’s as per the Letter of Agreement.

ATSI reports that the timings on the RTF transcript were approximately 1 min 6sec slow. The staff at Teesside has addressed the problem, and has amended procedures to check that the digital visual display time remains true and accurate to the spoken time as required by CAP 670 (+/- 15sec).

Turning to the Airprox it would seem, from the MATS Part 2, that the Tornados were not in the general area covered by the LOA (i.e. the Leeming/Teesside Control Area) but just to the W of it [see UKAB Note (2)]. Nevertheless, the Teesside ATSA, at 1159, notified Leeming of the FA20’s arrival and identified it 10nm SE Topcliffe and Leeming agreed a descent to 3000ft. This telephone call followed the FA20, inbound on an IFR flight, contacting Teesside Approach (mentor and trainee) and it being identified 25nm SSE of Teesside. No type of ATC service was mentioned/agreed (contrary to MATS Part 1), although it would appear from their respective reports that both parties believed that a RAS was being provided. Subsequently, the FA20 was instructed to descend to 3500ft, whilst vectoring for an ILS approach to RW 05.

The APR Controller said that he had observed the Tornados 20nm WNW of Teesside at 1100/1300ft. The radar recording of the Claxby radar only shows the Tornados as they pass W of the airport at 1203:49. It was about this time that the ATSA telephoned Leeming to ask about the traffic. At 1204:19, APR asked the Leeming Zone Controller which way the Tornados were going and was told that they had been stopped off at FL40, having just pulled out of low level. The Leeming Zone Controller offered to take the traffic L into the CTR but no agreement was reached as Teesside APR said that the FA20 had a TCAS TA and he would call back.

Meanwhile, the FA20 pilot had reported traffic 'on the nose' at 3700ft and the mentor took over the RTF and issued an 'avoiding action' R turn. Although this turn was taking the ac towards the 'safety' of CAS, a L turn would probably have been more appropriate; as it was the pilot became visual with the traffic and elected to go L to avoid it and then received a TCAS RA.

UKAB Note (2): The LOA between Leeming and Teesside covers specifically operations in the Leeming-Teesside Control Area (LTCA). There is however an agreement at Para 20 (applicable to both units):

“All other traffic will be co-ordinated case by case by the controllers at both aerodromes in accordance with the priorities detailed in Para 23 below” (MATS Pt 1 priorities).

Further at Para 27a(2), (Leeming/Teesside ‘Gap’ Traffic):

“ ‘Gap’ traffic above 500ft agl is to be notified to Teesside Radar by traffic information message”.

Although this Airprox occurred outside the area covered by the LOA, it also states at Para 14 and 15:

“The ATSU at Teesside is to notify the ATSU at Leeming of any arriving, departing or transit traffic which due to routeing and traffic information already received, is likely to affect operations at Leeming”.

15 “In addition to ‘Gap’ traffic procedures set out in paragraph 27, the ATSU at Leeming is to notify the ATSU at Teesside of any arriving, departing or transit traffic which, due to routeing and traffic information already received, may affect operations at Teesside”.

UKAB Note (3): Although the Teesside (Mentor) Controller saw the Tornado contacts at Low Level 20nm WNW of Teesside some time earlier, they did not paint on the Claxby radar recording until 1203:49 squawking 0403 NMC (one contact only) while the Falcon was tracking 305° and passing FL52 in the descent about 12nm 190° from Teesside (2nm 010° Leeming). On the next sweep the Tornados showed FL32 and climbed to FL39 before levelling there until after the ac had passed.

UKAB Note (4) The transcript of the Teesside Radar Frequency, corrected to UTC, shows the following:

1200:36 Teesside *xxx descend altitude three thousand five hundred feet QNH one zero zero four*

Falcon *???? thousand five hundred feet one zero zero four xxx*

1201:06 Teesside *xxx continue present heading report your heading*

Falcon *Heading three zero five xxx*

1203:36 Teesside *xxx turn right heading three zero zero degrees*

Falcon *were heading three zero five*

Teesside *Three three xxx [C/S was an alpha numeric] three three zero degrees*

Falcon *right three three zero xxx*

1204:06 Falcon *xxx we've got a contact on the nose at three thousand seven hundred feet*

Teesside *xxx right heading zero two zero avoiding action*

1204:36 Falcon *Zero two zero avoiding action xxx ...tally a pair*

Falcon *We're going left to avoid*

Teesside *Understand you're going left*

Teesside *xxx that was military traffic just aborting out of low level er they were talking to Leeming they're going down your starboard side now*

Falcon *Tally a pair of GR fours there now.*

1205:06 Teesside *xxx just gone down your starboard side turn right heading er zero three zero close from the right report established.*

A transcript of Teesside landlines was not available.

MIL ATC OPS reports that due to the late notification of the Airprox, there were no voice recording transcripts available and the Controller's Reports were vague due to the time elapsed between incident and writing the report.

AIRPROX REPORT No 070/04

Leeming Zone (Zone) reports that before 1200:00 he was passed TI by the Teesside ATSA on a Falcon 20 (FA20) inbound to Teesside from SE of Leeming. After consulting with Leeming APP, Zone then informed the ATSA that Leeming had no outbound traffic and that the FA20 could descend to 3000ft in the Leeming MATZ. Zone then reported that a pair of Tornado GR4s, called on his frequency requesting a low-level climb-out and then a transit of the Leeming-Teesside gap. Zone passed a 0403 squawk and applied a FIS since the Tornados were below radar cover. Information derived from the Head up Display (HUD) recording from the GR4s shows that Zone placed them under a limited RIS while they were operating at the base of radar cover and asked them to "*expedite climb to FL70*" at 1203:50 but some 10sec later Zone stopped their climb at FL40 with no reason passed over the RT. Zone then passed TI to the Tornados at 1204:30 stating "*traffic left 11 o'clock, 5nm, indicating FL45 believed to be inbound to Teesside*"; the leader reported visual with the FA20 at 1204:55.

Examination of the Claxby radar recording at 1159:58 showed the FA20 17nm SE of Leeming, tracking NW, indicating FL101 and descending. At 1203:58 the Tornado formation was seen indicating FL32 13nm NNW of Leeming tracking SE and, at the same time, the FA20 was 2nm N of Leeming tracking NW. At 1204:21 the returns were 5.5nm apart on reciprocal tracks with the FA20 indicating FL47 and the Tornado Leader indicating FL40. The Tornado Leader then continued to show FL40 while at 1204:21 the FA20 indicated FL43 and the returns were 1.7nm apart still converging. At 1205:00 the Tornado leader indicated FL39 and the FA20 was 1.25nm away in his R 1 o'clock; the FA20 then started a L turn, climbing slightly to indicate FL45 and then, at 1205:22 when the returns had passed each other, recommenced a descent followed immediately by the Tornado formation recommencing a climb.

The area where the Tornados free called Zone is often used for low-level climb outs. Zone granted Teesside approval to transit the Leeming MATZ at 3000ft (unspecified pressure) with the FA20 inbound. However, this approval did not constitute co-ordination and any conflicting traffic would still have to be individually co-ordinated. When the Tornado Leader free called Zone the FA20 was in the Leeming radar overhead and was not showing on radar. Once the exact location of the Tornados formation was determined, Zone placed them under a service and climbed them to FL70, a level that was above the one cleared by Teesside for the descending FA20. However, after a period of time, Zone assessed that the formation's rate of climb was not good enough to get above the FA20 and stopped the Tornado formation's climb at FL40 which was below the indicated level of the FA20 which at the time was FL50 descending. Zone called the FA20 to the GR4s when they were separated by 5nm although he passed the TI as "*left eleven o'clock*" when the FA20 was actually in their R 1 o'clock. However, the GR4s called visual with the FA20 in their "*right 2 o'clock*" at 1204:55 when the tracks were separated by 2nm and the FA20 had initiated a hard L turn to track W. The GR4s then continued heading S and recommenced their climb. It is unfortunate that no landline transcripts, between Teesside and Zone, were available to ascertain any passing of TI or co-ordination that may have taken place between the agencies in accordance with the Letter of Agreement between RAF Leeming and Teesside (see UKAB Note (2)). Although it would appear from Zone's report that no TI on the Tornados was passed to Teesside; this may have been due to the Controller attempting to deconflict them from the FA 20 before attempting to pass TI.

HQ STC comments that the GR4s in all probability saw the FA20 as it began its avoiding turn. From the reports this can be estimated to have been in excess of 2nm and that the FA20 reported visual with the GR4s at a range in excess of 3nm. The recorded minimum separation distance of 500ft and 1.3nm could have been increased by the GR4. The conflict was in Class 'G' airspace, where see and avoid has primacy and has appeared to have worked in this case. Furthermore, it would appear that the issues already raised by ATSI and Mil ATC Ops may have compounded the conflict.

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.

Integration of IFR and VFR traffic in Class G airspace is often difficult where see and avoid is the prime means of collision avoidance. In this case both pilots requested a radar service to assist them in this obligation. Members were therefore disappointed that this had not prevented the Airprox due to small deficiencies in the respective services being provided. Nevertheless, the Tornado leader saw the Falcon early enough to take what he considered to be sufficient avoiding action, generating over a mile horizontally and 500ft vertically. The Falcon safety net, namely TCAS, also provided its pilot with a course of action to prevent a collision: the pilot acted on it and again avoided the opposing ac. Despite the factors outlined below, this incident was in essence a conflict between 2 ac operating legitimately in the FIR and there was never any risk that they would have collided.

The Board accepted that, although the Letter of Agreement did not strictly cover the area in which this incident occurred, due to the close proximity of the airfields best practice would require a close liaison between controllers. It is frequently difficult to integrate RIS and RAS traffic: in this case the Leeming Controller made an attempt but he underestimated the rate of climb of the Tornados. Realising this, he chose an inappropriate FL to level them, albeit without full information on the intentions of the Falcon. The Teesside Controller had, on the other hand, been aware of the presence of the Tornados for some time, albeit not their intention to climb out from low level. It should however have been evident that they would probably become a conflict well before the first avoiding action was passed at 4½ nm with the ac head on. Although the ATSA passed TI on the Falcon to Leeming, co-ordination was the responsibility of the controller and was not effected. Specialists were unable to determine why the Teesside Controller had attempted to turn the Falcon R towards the Tornados' track rather than L away from it. The Board was aware that the entire sequence of events had taken place in a very short time interval which may have led to the breakdown of normal communication between the two units.

On scrutinising the RT transcript, Members noted that the Falcon pilot had not complied with recommended RT procedures for TCAS alerts but had used the phrase "*we've got a contact on the nose at*". Also that he did not inform the Teesside Controller that he was in receipt of a TCAS RA and was climbing. However he did tell them that he was avoiding the Tornados by turning L rather than R as had been advised by the Teesside Controller. This omission had not contributed to the incident.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict between IFR and VFR traffic in Class G Airspace.

Degree of Risk: C.

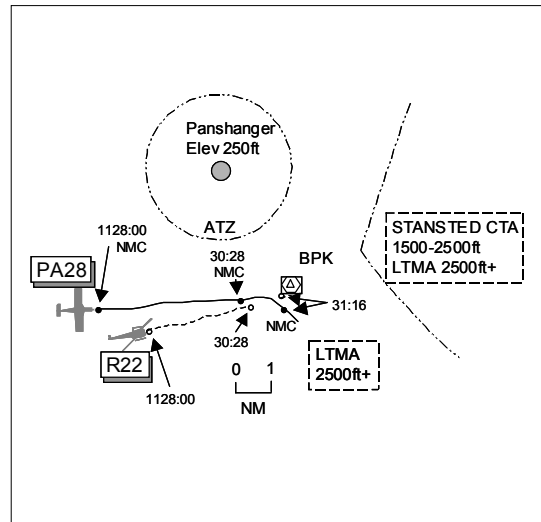
Contributory Factors:

1. Teesside Radar did not apply the RAS correctly.
2. The Leeming Controller levelled the Tornados at an inappropriate level.

AIRPROX REPORT No 071/04

AIRPROX REPORT NO 071/04

Date/Time: 13 May 1131
Position: 5145N 00008W (1nm WSW BPK)
Airspace: FIR (Class: G)
Reporting Ac Reporting Ac
Type: R22 PA28
Operator: Civ Trg Civ Club
Alt/FL: 1800ft 2000ft
(QNH 1023mb) (QNH 1026mb)
Weather VMC CLBC VMC CLNC
Visibility: >30km >25nm
Reported Separation:
nil V 200ft H 200ft V 200ft H
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE R22 PILOT reports flying a dual local training sortie from Denham and listening out with Panshanger RADIO on 120.25MHz; no transponder was fitted. The visibility was >30km below cloud in VMC and the helicopter was coloured maroon/silver with tail strobe light switched on. The Airprox occurred when 0.3nm WSW of BPK following a planned track between BNN and BPK heading 075° at 75kt and 1800ft QNH 1023mb. The student was about to turn onto 045° to track to BKY when he, the instructor seated on the LHS, looked L to clear the turn and saw a PA28 in his 7.30 position 700-800ft away on a converging course at the same level. He told his student to continue on course whilst the PA28 overtook, still converging. As the PA28 reached his 10 o'clock position, the instructor made a slight speed reduction, estimating the minimum separation as 200ft horizontally. The PA28 was coloured light/dark and he read the registration letters before changing frequency to London Information to report the Airprox. He expressed concern that had his student been flying solo, the overtaking PA28 would have been in his blind spot. The PA28 had passed so close that its pilot must have seen his helicopter but the pilot appeared to have disregarded the Rules of the Air during the encounter. Later, on his return to Denham, he had positioned his helicopter relative to a parked PA28 to confirm his estimated separation distance. He assessed the risk of collision as high.

THE PA28 PILOT reports flying enroute from Coventry to Ostend VFR and in communication with Stapleford INFORMATION on 122.8MHz squawking 7000 with Mode C switched off. The visibility was >25nm in clear sky VMC and the ac was coloured red/white. About 0.5nm W of BPK, after tracking from BNN at 2000ft QNH 1026mb heading 085° at 95kt, he first saw a R22 helicopter approx 200ft off the starboard wing and 200ft below at 1800ft. He immediately turned to port and climbed, levelling at 2300ft. He could then not see the helicopter so he turned R back onto his intended heading of 120° to track towards LAM. He assessed the risk of collision as high on the first sighting of the helicopter.

UKAB Note (1): The London QNH was 1023mb.

UKAB Note (2): The Rules of the Air Regulations 1996 Rule 17 Rules for avoiding aerial collisions para (2) (b) (i) states "...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". Para (4) Overtaking (a) states "...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, and shall not cease to keep out of the way of the other aircraft until that other aircraft had been passed and is clear, notwithstanding any change in the relative positions of the two aircraft”.

UKAB Note (3): Analysis of the Stansted radar recording at 1128:00 shows a 7000 NMC squawk, believed to be the PA28 5.3nm WSW of BPK tracking 085° with a primary only return, believed to be the R22, in its 1 o'clock range 1.5nm tracking 075°. The subject continue on converging tracks until the R22 fades from radar at 1130:28 1.25nm WSW of BPK with the PA28 in its 7.30 position range 0.33nm. Thirty seconds later the PA28 is seen to commence a R turn, steadying on a track of 125° at 1131:16 at which time the R22 reappears on radar 0.5nm SW of BPK tracking 080°, 0.4nm NNW of the PA28. The Airprox is believed to occur during this the 'radar fade' period.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

It was clear that Rule 17 pertained during this 'see and avoid' encounter in Class G airspace. Noteworthy was the fact that both pilots had been VOR tracking towards BPK on converging courses whilst flying VFR. Using radio NAV aids is well known to increase the likelihood of encountering other traffic also using the same beacon: the 'honey pot' effect. The PA28 pilot had every opportunity to see the R22 ahead, as he approached it from behind on a slowly converging/overtaking course, but he had only visually acquired the R22 as he passed abeam it. Members agreed that this had been a very late sighting by the PA28 pilot which had caused the Airprox. However, members were conscious that the R22 is a notoriously difficult helicopter to see, particularly when it is showing a tail-on aspect as in this case. Also, it was noted that the PA28 pilot had selected Mode C off. The AIP recommends that Mode C is selected on, subject to certain provisos, to provide level information to adjacent SSR equipped ATSU's and full data to TCAS equipped ac.

The PA28 pilot had responsibility to 'give way' to the R22 which he did, albeit late, after seeing the R22 200ft to his R and 200ft below. He had turned L and climbed, before turning back on course. Although the R22 instructor had seen the approaching PA28 in his 7.30 position range 700-800ft away, he had let it get close: 200ft on his LHS. Some members thought that it may have been prudent for the R22 instructor to have taken more positive action until he was certain that the PA28 pilot had seen him, notwithstanding any 'right of way' priorities. However, at the end of the day, the R22 instructor had always been in a position to manoeuvre, if required, had the situation deteriorated further, which led the Board to conclude that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A very late sighting by the PA28 pilot when overtaking the R22 on a converging course.

Degree of Risk: C.

AIRPROX REPORT No 072/04

AIRPROX REPORT NO 072/04

Date/Time: 16 May 0926 (Sunday)

Position: N5008 N W00126 W
(22nm S Isle of Wight)

Airspace: London FIR (Class: G)

Reporting Ac Reported Ac

Type: DR 400/500 Cessna 182

Operator: Civ Pte Civ Pte

Alt/FL: 3000ft 3000ft

(QNH 1027 mb) (QNH)

Weather NK HAZE VMC HAZE

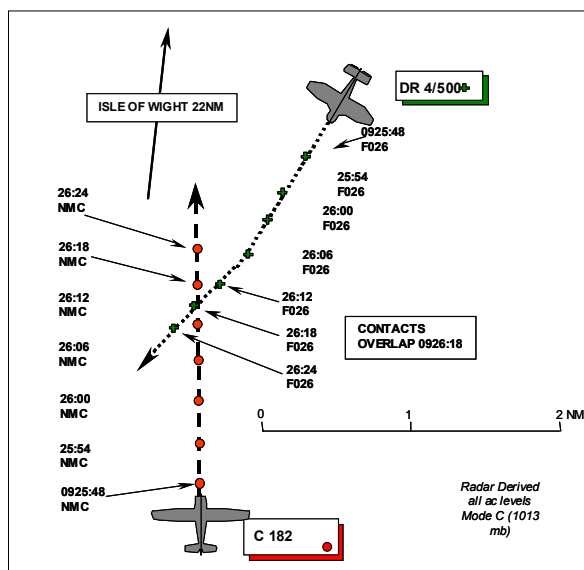
Visibility: 1.5km 5nm

Reported Separation:

0 V 20m H 0 V 50m H

Recorded Separation:

Contacts overlap



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DR 400/500 PILOT reports flying a blue and white ac with strobes selected on, squawking 7000 with Mode C, on a flight from Bembridge to Jersey having flown in from Jersey earlier, landing at 0845Z. The flight conditions inbound had been hazy but with reasonable forward visibility as the sun was from slightly behind, his track from 50N being 034°. On leaving 50N inbound to Bembridge, Jersey Zone had suggested that he called Bournemouth Radar since Plymouth Military are closed on Sundays. On the return, he also called Bournemouth as soon as there was a pause in transmissions about 3nm off the SE corner of the Isle of Wight (the controller was very busy) and he requested a FIS. With about 20nm to run to 50N, tracking 214° at 135kt and 3000ft on the Portland QNH, he saw another ac at very close range, at the same height, on almost exactly a reciprocal track. He had been keeping a good lookout, although he believed that he would be showing on radar, but the combination of haze and sunshine made the forward visibility very poor. There was no time to take any avoiding action and although the exact passing distance was hard to estimate, he thought it to be about 20m. Quite severe turbulence resulted and his port wing dropped. At the first pause in transmissions about 1min later he called Bournemouth to report the Airprox passing the position from the GPS.

He was aware that he had been in uncontrolled airspace and made between 50 and 100 Channel crossings a year. He thought he was receiving a FIS with a radar back up: he had not called London Information but in future he will before transferring to Plymouth or Bournemouth. He thought that the other pilot must have been talking to London. He considered that the occupants of both ac had been lucky to survive the incident and assessed the risk as being very high.

THE CESSNA 182 PILOT reports flying a red and white ac with strobes selected off, the beacon on, squawking 7000 with Mode C, he thought, from Caen to Old Sarum with one passenger. On leaving the Deauville CTR on a Deauville squawk heading 005° at 135kt at 2000ft QNH, he was instructed to climb to 3000ft by MP NDB [Cherbourg] to avoid conflicting traffic. He tried to get clearance through D036 from Deauville and Brest with no success. He called Plymouth Mil, also getting no response, so he then called London FIS. They cleared him through D036 since it was not notified as active and asked him for his estimate for SAM which he passed. Shortly after he saw another ac very close in his 12.30 at the same height but since it passed very quickly and he was on autopilot, he had no time to take any avoiding action. He thought that all ac using that recommended route should work Bournemouth radar and then Deauville at weekends and Plymouth Mil/Deauville during weekdays. He opined that the

problem was that both ac had been at 3000ft, which was correct according to rules, but working different frequencies.

UKAB Note (1): Both ac can be seen on the recording of the Jersey radar although the C182 has no Mode C displayed. The CPA cannot be determined as it occurs between 2 sweeps. On the sweep 2 or 3 sec after the event, the contacts are still overlapping.

UKAB Note (2): The UK AIP at AD2 –Jersey-1-12 states:

‘c. A bi-directional Recommended VFR Route between the Channel Islands CTR and the Solent CTA is aligned in the UK Airspace on a track between the MP NDB on the Cherbourg Peninsula and Southampton VOR (SAM). South of the Isle of Wight the Route may be used up to FL100 and all traffic flying above 3000ft amsl (irrespective of the flight rules being observed) is advised to maintain an altitude appropriate to the magnetic track in order that opposite direction conflicts may be minimised. The Route penetrates Royal Navy Danger Area EGD036 (see AD 2-EGJJ-3-1). The route may not be available during EGD036 scheduled hours or at other times promulgated by NOTAM. Flights wishing to use the route during EGD036 scheduled hours can request a Danger Area Crossing Service from Plymouth Military on VHF frequency 124.150MHz. Pilots are advised to call Plymouth Military in transit, as early and as high as practicable (but south of 511000N), to establish satisfactory two-way communications and to facilitate availability of the route for their use. Subject to unit workload, a radar service may be offered to flights in the sea area west of EGD036 if Danger Area activities preclude flight along the VFR Recommended Route itself. Pilots wishing to obtain pre-flight information may also contact the Plymouth Military Air Operations Tel: 01752 557751, during Plymouth’s published operating hours. Nevertheless, pilots should consult NOTAMs to check on any EGD036 notified activity outside scheduled hours. The activity status may also be confirmed through Southampton or Jersey ATSU’s or London Information.’

‘f. The base of Airway N866 between the Solent CTA and the Channel Islands is FL35. In order that the Class G airspace beneath the Airway is not constricted during periods of low pressure, the actual base of the Airway will always remain above 3000ft amsl, thus guaranteeing up to this altitude for General Air Traffic.’

UKAB Note (3): This incident occurred in Class G airspace about 8nm inside the London FIR and outside the Channel Islands CTR (the Jersey Transition Alt is 3000ft). The boundary of N866 is 13nm to the W.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and a radar video recording.

The Board determined that this incident had occurred simply because both pilots had not seen the opposing ac. They had both been flying at the same height in the belief that they should be at a suitable height to maintain communication and possibly paint on radar. The ac had been on almost a collision course and would have had no relative movement in each other’s windscreen, the visibility was very poor and they were closing at about 1nm every 15sec. Assuming that the reported visibilities were correct (into and out of sun) the Cessna would have become visible to the Robin pilot 15sec before they crossed and the Robin to the Cessna pilot just over 1min before. It may be however that the Robin in his one o’clock was obscured to the Cessna pilot by the windscreen pillar.

The Board noted that this was one of a number of recent incidents when a GA pilot was apparently under the mistaken belief that he was in receipt of a radar assisted service while on a FIS. Experts advised that if pilots require a radar service they should contact the LARS provider for the area and request either a RIS or a RAS.

AIRPROX REPORT No 072/04

Notwithstanding the comments above, both pilots had been operating under the see and avoid principle in busy Class G airspace and neither saw the other ac until it was too late to initiate any effective avoiding action. The Board was unanimous in their view that only good fortune had prevented a collision.

The Board discussed the possibility of implementing more robust VFR Channel crossing procedures but decided that a formal recommendation was not justified.

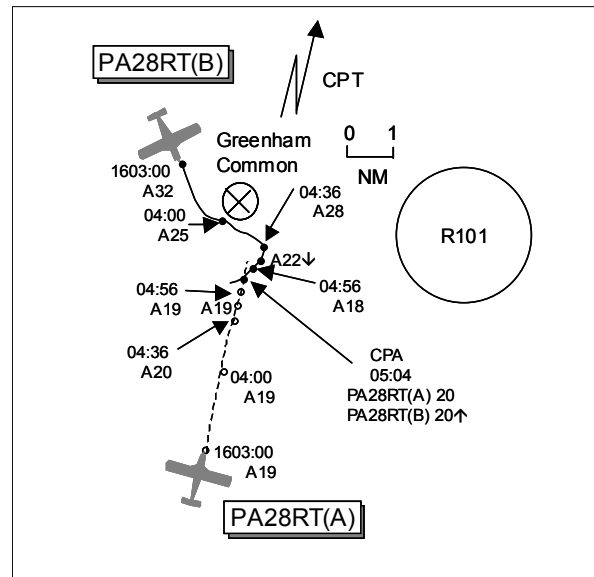
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sightings by both pilots.

Degree of Risk: A.

AIRPROX REPORT NO 073/04

Date/Time: 16 May 1605 (Sunday)
Position: 5121N 00116W
 (2nm S Greenham Common)
Airspace: FIR (Class: G)
Reporting Ac **Reported Ac**
Type: PA28RT(A) PA28RT(B)
Operator: Civ Pte Civ Trg
Alt/FL: 2000ft 4000ft
 (RPS 1028mb) (QNH 1025mb)
Weather VMC CAVOK VMC CLNC
Visibility: >10km
Reported Separation:
 2-3m V not seen
Recorded Separation:
 nil V returns merge

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE PA28RT(A) PILOT reports tracking 015° towards CPT at 120kt and 2000ft RPS 1028mb enroute from Compton Abbas to Wycombe Air Park and in receipt of an AFIS from Wycombe TOWER on 126.55MHz squawking 7000 with Mode C. The weather was CAVOK and the ac was coloured beige/brown with wing-tip strobe lights switched on. Although flying as P1 in the LH seat, a second qualified pilot (P2) was occupying the RH seat carrying out nav and radio duties with a further qualified pilot (P3) seated in the rear. P3 was reading out the approach instructions for Wycombe Air Park whilst P2 was checking their position and ETA. P3 then drew their attention to restricted area R101 in their 3 o'clock and they all turned to look. A few seconds later P2 shouted "look out" and P1 then saw the approaching underside of an ac in about their 1 o'clock position which immediately filled the windscreen. The other ac was in a climbing and turning attitude (R wing down 15-20°), its nose was out of view above the screen and slightly to his L, heading about 210-220° with the underside of its tail, at the leading edge of the elevators, being directly in line with his propeller. He could not see the whole underside of the other ac as it was so near but recalled it being white or light brown/beige, single engined with retractable gear possibly a Mooney, Bonanza or Arrow. Its wheels could be seen in their entirety in the wheel wells (not fitted with spats) and he estimated the distance to impact as 7-8m. Presumably as a reflex action he pushed the control column forward and collision was averted. However, he recalled the incident as if it had occurred in slow motion – he remembered processing the information, the unusually heavy resistance on the control column and on pushing forward being convinced he had pushed forward too late. The CPA was estimated as 2-3m vertically, the whole episode lasted about 4sec. Of concern was the fact that none of the 3 pilots on board had seen the other ac before the incident and he wondered whether its pilot had been climbing, turning or pulling sharply to avoid them or if they had been sighted at all. He assessed the risk as 'the highest possible'.

THE PA28RT(B) PILOT reports flying a dual training sortie from Blackbushe and in receipt of a 'radar' service from Farnborough on 125.25MHz squawking an assigned code, he thought. The visibility was >10km in SKC VMC and the ac was coloured beige/brown/red; no lighting was specified. During this navigation exercise, operating up to 4000ft, neither he nor his student had seen any ac conflicting with their flight path and he did not consider that his ac had been involved in the Airprox.

AIS MIL reports that the reported ac was tracked on recorded radar until it landed at Blackbushe at 1646Z with Blackbushe ATC confirming the identity of the ac as PA28RT(B).

AIRPROX REPORT No 073/04

ATSI reports that at 1555Z all ac on 125.25MHz were told to squawk 7000 as LARS was closing for 90min. Subsequently all pilots calling were advised by other pilots on frequency to broadcast their position and intentions and to treat the frequency as a 'traffic' frequency. No calls were heard from PA28RT(B) pilot. Further checks were made 1hr earlier in case of UTC/BST error but the frequency was again closed with no calls heard from the reported ac's pilot. The Farnborough APP frequency of 134.35MHz was checked between 1555-1615Z and no calls were heard from the PA28RT (B) pilot.

UKAB Note (1): Met Office archive data shows the Portland RPS 1500-1600Z & 1600-1700Z as 1025mb and the QNH for the Greenham Common area was 1028mb.

UKAB Note (2): Analysis of the Heathrow radar recording at 1603:00 shows a 7000 squawk believed to PA28RT(A) 5.7nm S of Greenham Common tracking 015° indicating 1900ft (London QNH 1028mb). At the same time another 7000 squawk is seen, believed to be PA28RT(B), 1.5nm NW of Greenham Common tracking 160° indicating 3200ft QNH 1028mb. PA28RT(A) continues on a steady track until the Airprox occurs with its Mode C varying between 1900-2000ft. PA28RT(B) however is seen to manoeuvre abeam Greenham Common, turning to the ESE and descending to 2500ft before climbing to level at 2800ft at 1604:36. Thereafter PA28RT(B) turns sharply R onto a conflicting south-westerly track and commences a rapid descent to 1800ft 20sec later (ROD 3000fpm) before immediately climbing again. The CPA occurs 8sec later at 1605:04 when radar returns merge, both ac indicating 2000ft.

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 authorities.

Members shared the reporting pilot's concern that PA28RT(B) had gone unsighted to all 3 pilots on board until the Airprox occurred. The radar recording shows PA28RT(B) manoeuvring ahead of PA28RT(A), initially crossing ahead L to R above their level before it turns into conflict. Thereafter it is seen to converge almost head-on, descend through their cruising level before pulling up and turning to the W. Conversely, PA28RT(B) pilot had the opportunity to see PA28RT(A) and should have seen it when he cleared the area into which he was turning. That said, on this occasion, for whatever reason, 'see and avoid' in Class G airspace had not worked. The graphic description of the incident from PA28RT(A) pilot, combined with the radar recording, left members in no doubt the sighting of PA28RT(B) had occurred too late for any avoiding action taken to have been effective, the subject ac passing by chance. This led members unanimously to agree that the Airprox had been caused by a non-sighting by PA28RT(B) pilot and an effective non-sighting by PA28RT(A) pilot and that a definite risk collision had existed.

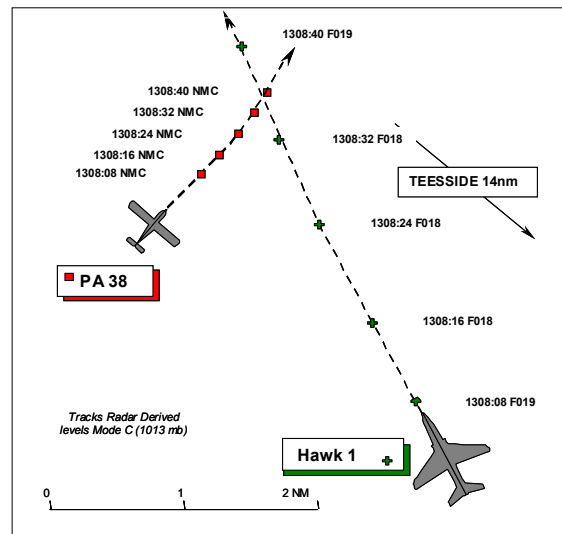
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by PA28RT(B) pilot and an effective non-sighting by PA28RT(A) pilot.

Degree of Risk: A.

AIRPROX REPORT NO 074/04

Date/Time: 17 May 1308
Position: 5437N 00150W (14 NW Teesside)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: Hawk PA 38
Operator: HQ STC Civ Club
Alt/FL: 2000ft 2000ft
 (RPS 1018 mb) (Teesside QNH)
Weather VMC CLOC VMC CLBC
Visibility: 8km 10km
Reported Separation:
 30ft V 0 H NR
Recorded Separation:
 Contacts Merge

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE HAWK PILOT reports flying solo leading a formation of 2 black Hawk ac 20nm NW of Leeming en-route to a FAC training exercise with HISLs and Nav lights selected on squawking 7001 with Mode C. The weather was good and he was heading out of sun with a little haze. He was heading 335° at 360kt at 2000ft on the RPS and had just called Newcastle APR to inform them of his sortie details. Having called them he went head-up, after a short period head-in to retune a VHF frequency, and a white and blue light ac was seen out of the corner of his eye, 100yd away and 30ft below crossing from L to R on a heading of about 070°. He instinctively pulled and rolled but had passed the light ac before his ac actually changed its flightpath. He believed that had there not been a height difference between the ac they would have collided. He also thought that his low arousal state during the transit just prior to a very high workload period, the obscuration of the conflicting ac by his windscreen pillar and head down work had combined to produce a close miss. He assessed the risk of collision as being very high. As a result of this incident he has re-examined his personal priorities and lookout technique.

THE PA38 PILOT reports flying a local flight from Teesside, solo in a club ac with strobes and nav lights selected on, squawking a Teesside squawk but Mode C was not fitted. He was in receipt of a FIS from Teesside and flew a triangular route to the NW of the airfield. Since the flight was made 3½ weeks before he compiled the Airprox report and the flight log had been destroyed, all he had was his logbook and memory to recall the details. The flight was VFR throughout, usually at 2000ft or below cloud and was flown at 90kt. From the recorded timings he had been in the area of the reported incident but did not recall seeing any other ac and the flight had been routine.

In his experience Teesside Radar always gave a first class service in keeping pilots advised of conflicting traffic but if no avoiding action is needed details are hard to recall.

UKAB Note (1): The Teesside QNH at the time of the incident was 1023mb. If the PA 38 was at 2000ft on that QNH, as the pilot reported, and the Hawk was at 2000ft but on the RPS of 1018, as its pilot reported, the PA38 would have been 150ft lower than the Hawk.

THE HAWK STATION comments that there is very little that can be added to this comprehensive Airprox report: the pilot has already identified the need for constant lookout at low level and the need to be vigilant at all stages of flight.

AIRPROX REPORT No 074/04

HQ STC comments that the Hawk pilot should have been more aware of the likelihood of encountering a light ac at 2000ft. For many years we have encouraged the GA community to fly at or above 2000ft to avoid fast jet traffic at low level; this guidance is also contained within the CAA's GA Safety Sense leaflet No 18A. All fast jet aviators should take note of this fact and be pro-active in increasing their 'heads out' time when operating in this height band or operate under a suitable LARS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar video recording, and a report from the Hawk operating authority.

This incident took place in Class G airspace with both ac planning to operate at the same altitude of 2000ft and both having an obligation to see and avoid one another. Although the Hawk was at 2000ft to comply with the regulation in the Mil AIP that ac should not transit in the LFS unless essential, perhaps 2000ft, a height regularly used by light ac, was an unwise choice. Fortunately, the 2 pilots were operating on QNHs, both appropriate to the area, which unusually differed by 7mb generating a small vertical separation. The Hawk ac being the higher, its pilot was able to pull up and roll at the last second. It was however, most unlikely that the Hawk flightpath had changed in the 100m (½ sec) between its pilot seeing the other ac and their tracks crossing. The Hawk would have been in the PA38's 3-4 o'clock with very little relative movement and not in the pilot's direct line of view. Nevertheless, Board experts reminded pilots that ac often appear coming from the areas where lookout is less easy and that most of the images seen and registered by the human eye are in a 10° cone round the line of vision: therefore a deliberate scan by moving the head laterally and vertically must be undertaken.

The Board again noted that this was another recent incident when a GA pilot was apparently under the mistaken belief that he was in receipt of a radar assisted service while on a FIS. Experts advised that if pilots require a radar service they should contact the LARS provider for the area and request either a RIS or a RAS.

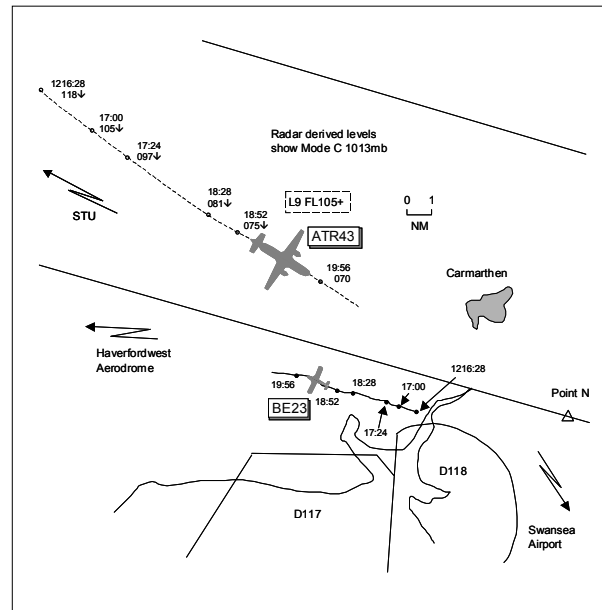
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the PA38 pilot and very late sighting by the Hawk pilot.

Degree of Risk: A.

AIRPROX REPORT NO 075/04

Date/Time: 14 May 1220
Position: 5150N 00430W
 (7nm WSW Carmarthen)
Airspace: LFIR (Class: G)
Reporter: Swansea ADC/APP
First Ac **Second Ac**
Type: ATR43 BE23
Operator: CAT Civ Pte
Alt/FL: ↓FL55 ↑FL65
Weather IMC KLWD VMC CLOC
Visibility: VMC CLAC 17km
Reported Separation:
 Not seen Not seen
Recorded Separation:
 3.75nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE SWANSEA ADC/APP reports that the BE23 departed Swansea at 1204UTC on a VFR flight to Kerry routing direct to Waterford. The ATR43 was inbound on a scheduled IFR flight from Dublin and had left STU VOR routing via Point November to avoid D117 and D118 intending to carry out a DME/ARC approach to RW22. LACC had passed a STU estimate earlier and had been requested to allocate FL55 towards Point November. The BE23 pilot reported passing Carmarthen at 6000ft, he thought, in cloud, the two subject ac were on roughly opposite direction tracks. When the ATR43 pilot called on frequency descending to FL55 he told the pilot to stop his descent at FL70 and TI on the BE23 was passed. The BE23 pilot was given TI on the ATR and when asked to report his level he replied 6000ft 'in cloud' adding shortly thereafter that he was VFR and that his intended level was FL65. He was again asked if he was VFR, which he confirmed, and that his flight conditions were 'in and out of cloud'. He was instructed not to continue his climb to FL65 but to return as soon as possible to VMC conditions, VFR flight rules and to report his intentions. The BE23 pilot reported that he would descend and that he was already passing 4400ft, subsequently levelling at 4000ft. The ATR was then cleared to FL50 and advised that he should now expect to carry out the full SWN NDB/DME procedure for RW22. For expedition he was re-offered the ARC/DME approach at FL50 but this was declined.

THE ATR43 PILOT reports tracking from STU to Point November, initially cleared down to FL70, at 180kt and in receipt of an ATS from Swansea. He requested to fly the DME/ARC procedure for RW22 and was cleared to fly the full procedure. Later he was cleared to descend to FL50 and given a revised clearance to fly the DME/ARC procedure to RW22. He had heard GA traffic talking to ATC whose pilot was apparently unsure of his position, height, altimeter settings and was climbing through cloud. During this time whilst flying in Class G airspace, he had been either in IMC, in cloud, or in VMC above cloud and had not seen any other traffic.

THE BE23 PILOT reports outbound from Swansea to Kerry VFR via Carmarthen and listening out with Swansea ATC on 119.7MHz squawking 7000 with NMC, he thought. The visibility was 17km in VMC and the ac was coloured white with strobe lighting switched on. He was negotiating a scattered cloud layer, base 4000ft to 6500ft, climbing through large gaps whilst maintaining visual contact with the ground and blue sky above. He was turning just to the S of Carmarthen onto heading 290° at about 5000ft climbing at 82kt and this was where he normally changed frequency to Haverfordwest. When he

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overheard ATC talking to an airliner based at Swansea and to another pilot he decided to maintain a listening watch with Swansea. He commenced descent immediately becoming aware of the airliner inbound to Swansea to increase his lateral visibility and opined that had he been told earlier of the inbound flight, he would have remained at a lower altitude until passing STU. He had not seen any other ac and was not informed at the time that any Airprox had occurred, only being informed about the incident after tracing action.

ATSI reports that the incident took place in Class G airspace, 22nm NW of Swansea Airport at approximately 1220UTC. The two flights involved were an ATR43, inbound to Swansea from Dublin, operating on an IFR flight plan and a BE23, which had recently departed from Swansea on a VFR flight to

At the time of the incident both flights were in receipt of an Approach Control Service provided by the Swansea controller who was operating the normal combined ADC and APC configuration. Swansea Airport is located in Class G airspace and is not radar equipped.

The unofficial weather observation for Swansea was EGFH 1150Z 21005 160V240 9999 FEW030 SCT045 15/10 Q1026= RW22 was in use at the time of the incident.

The pilot of the BE23 had indicated on his VFR flight plan a routeing direct to Waterford and then direct to Kerry, which is broadly a WNW'ly track from Swansea and he had filed an intended cruising level of FL65. At 1204, the BE23 was cleared for take-off on RW22 at Swansea and instructed to make a R turn after departure.

Some 14min earlier, at 1150, the LACC Sector 8 assistant had telephoned the Swansea controller advising him that an inbound flight, the ATR43, was estimating STRUMBLE VOR (STU) at 1213. It was agreed that Swansea would accept the flight routeing from STU to 'Point November' descending to FL55. Point November is a position 12.5nm NW of Swansea Airport and is utilised to ensure flights remain clear of Danger Areas D117 and D118 that lie to the W of the Airport. The base of Airway L9 on this track is FL105: consequently below this level the ATR43 would thereafter be in Class G airspace en-route to Swansea.

At 1215:30, the ATR43 crew made an early call to Swansea, while still under the control of LACC. The pilot reported estimating the 'SWN' (NDB at Swansea Airport) at time 1223 and requested the weather; the 1150UTC weather was provided. The crew then made a request to carry out the relevant 'ARC' (or Direct Arrivals) Approach Procedure for RW22. Subject to other traffic, the controller advised that he did not envisage a problem in accommodating this request.

At 1216:30, the Swansea controller warned the BE23 that Danger Area D118 was still active and requested the flight to report passing abeam Carmarthen (approximately 16.5nm NW of Swansea Airport). The pilot replied "*...er passing abeam Carmarthen climbing through four thousand two hundred (feet)*". Unsure whether this meant the flight was currently passing Carmarthen or not, the controller sought confirmation and the pilot responded with "*I am passing Carmarthen I'm in cloud at the moment...*". This response prompted the controller to ask "*You're VFR confirm*", to which the pilot answered "*VFR passing through the cloud VFR...*" (Note: MATS 1, Sect 1, Chpt 2, Page 3, para 4 "Visual Flight Rules" states that "The pilot of an aircraft is responsible for determining whether or not the meteorological conditions permit flight in accordance with visual flight rules". On this occasion the criteria for determining VMC were 1500m horizontal and 1000ft vertical distance from cloud and a flight visibility of 5km). Although the pilot stated twice that he was "VFR", the controller could not reconcile this with the report that the aircraft was in cloud and consequently unable to maintain VMC. As a result, at 1217:20, the controller transmitted to the BE23 "*...essential traffic information for you is an ATR Strumble the estimate...was time one three so in theory it should have passed that at the moment it's routeing north of the ranges in the descent to flight level five five IFR out towards the field*". The pilot acknowledged the message with c/s only. Irrespective of the VMC/VFR issue, the BE23 pilot had now

been provided with the ATR43's details and intentions, which would enable the pilot to make an informed judgement of the situation. The radar recording at time 1217 shows the ATR43 about 10nm E of STU on a SE'ly track, descending through FL105, Mode C. The BE23 cannot be positively identified on the radar but a slow moving primary-only radar target can be seen just to the N of D118 on a W'ly track and commensurate with the known details of this flight. At this point the two ac are approximately 18nm apart and although on opposing tracks which are slowly converging, they appear unlikely to cross until the ATR43 has passed astern of the BE23.

Under current regulations, IFR and VFR traffic in Class G airspace are not required to be separated and there are no minimum services to be provided by an ATC Unit in such circumstances. Nevertheless, on this occasion, in view of the relative tracks involved, the controller had sensibly planned to provide each flight with traffic information. (MATS 1, Sect 1, Chpt 1, Page 1 states that one of the functions of an ATC service is *"preventing collisions between aircraft in the air"*. Also in MATS 1, Sect 3, Chpt1, Page 2, para 2.1.1 under "Traffic Information and Avoidance", it states *"Traffic information shall be passed and traffic avoidance advice given to aircraft on any occasion that a controller considers it necessary in the interests of safety."*). At 1217:30 the controller asked the BE23 pilot to what level he was climbing; the pilot replying FL65. After this RT exchange, the ATR43 crew established communications with Swansea, following transfer from LACC. Still not convinced that the BE23 was in VMC, the controller elected to intervene and immediately instructed the ATR43 crew to stop their descent at FL70. Once acknowledged, he then instructed the BE23 pilot to stop his climb at FL60, which the pilot read back correctly.

At this point the incumbent controller was relieved for a SRATCOH break. The oncoming controller, who had been monitoring events, then explained to the ATR43 crew (1218:30) that he had VFR traffic en-route Swansea to Kerry, which had reported passing Carmarthen. He added that the pilot had reported *"...VFR climbing through cloud in the last three minutes so whether he's IMC or VMC I'm afraid I can't tell you but he is VFR stop your descent at Flight Level 70 and ...expect further descent later er be prepared to fly to the SWN for a full ADF approach or a visual approach on reaching the beacon..."*. The pilot acknowledged the information, reported that he would keep a good lookout and that the flight had now reached FL70. The radar recording for this time shows the two ac in each other's 2 o'clock position, 7nm apart and the ATR43 indicating FL75, Mode C.

Over the next minute or so, from 1219:30, the Swansea controller engaged in a series of exchanges with the pilot of the BE23, essentially to establish whether the flight was currently meeting the criteria for VFR operation. Although the pilot reported he was currently 'VFR', the controller appeared not to accept this stating that *"you can't be VFR and climb through cloud..."*. The tone of questioning was strong and at one point there was an inappropriate use of the RT by the controller. The BE23 pilot reported that he was returning to *"...full VFR conditions er descending..."* and at 1220:45 reported maintaining his cruising level *"...full VFR at 4000 feet on 1013mb"* (FL40). The radar recording shows that, at 1219:55, while these exchanges were taking place, the two ac pass each other starboard to starboard, 3.75nm apart with the ATR43 indicating at FL70. The BE23 still appears as a primary-only target, hence there is no Mode C level information. However, based on earlier level reports it is estimated that the BE23 was probably close to FL50 at this time. No sighting reports were made by the crew of either flight. Subsequently, the ATR43 was issued a descent clearance to FL50 and once more offered the opportunity to carry out a 'Direct Arrivals' (ARC) approach for RW22 at Swansea. Later, the relieving controller elected to file an Airprox on the basis that the BE23 on a VFR flight plan had climbed into cloud and conflicted with the ATR43.

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.

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Members agreed that the Swansea controller had done more than was required during this encounter between VFR and IFR traffic in Class G airspace. The BE23 pilot had been climbing through gaps in the cloud and had been responsible for determining whether the meteorological conditions were suitable both for VFR flight and to separate his ac from other traffic. However, when asked by the controller, the pilot had reported firstly “...I’m in cloud at the moment” and then “VFR passing through cloud VFR...”. The Swansea ATCO could not reconcile this information with the pilot’s ability to maintain VMC and had passed TI to the BE23 on the ATR. Immediately thereafter, the controller had ascertained the BE23 pilot’s intended cruising level as FL65 and he had elected to stop the ATR’s descent at FL70 followed by telling the BE23 pilot to stop his climb at FL60. The (oncoming) controller had then told the ATR crew about the BE23 “climbing through cloud...” and reiterated the stop-off level at FL70. Although not a requirement under current rules, the controller had taken measures to ‘separate’ the subject ac as he had perceived a potential confliction of flight paths. This had led to the Airprox report being filed.

At the end of day, with the benefit of radar data to supplement the pilots’ reports, it was clear to the Board that the flight paths flown by the subject ac combined with the actions taken by the Swansea controller resulted in the subject ac passing with no risk of collision.

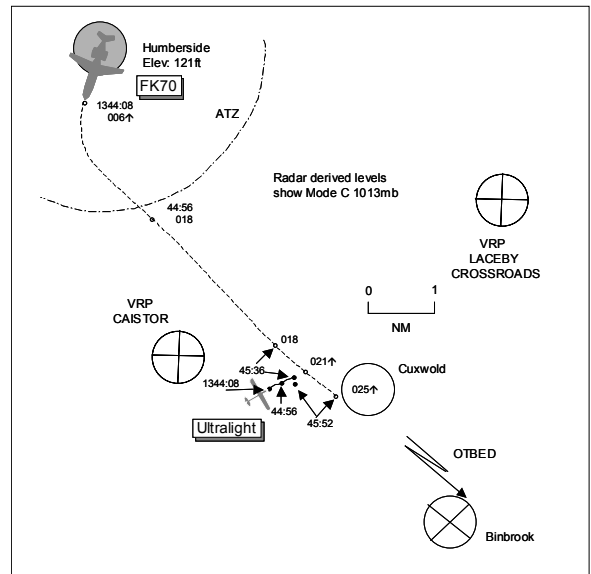
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction.

Degree of Risk: C.

AIRPROX REPORT NO 076/04

Date/Time: 18 May 1346
Position: 5329N 00016W (6nm SE
 Humberside - elev 121ft)
Airspace: FIR (Class: G)
Reporting Ac Reported Ac
Type: FK70 Untraced Ultralight
Operator: CAT
Alt/FL: 2300ft↑
 (QNH 1024mb)
Weather VMC CAVOK
Visibility: 10km
Reported Separation:
 Nil V 1000m H
Recorded Separation:
 0.2nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE FK70 PILOT reports outbound from Humberside IFR routing to OTBED at 250kt and in receipt of an ATS from Humberside APPROACH on 119.12MHz squawking 6021 with Mode C. Prior to departure, Tower had instructed the crew to maintain 2000ft QNH after take-off. Once airborne they turned L on track and then Approach gave them clearance to climb to FL230. When climbing through 2300ft QNH in CAVOK VMC, they saw an Ultralight ac on their RHS about 1000m away in an apparent descending LH turn away from them at the same level. An avoiding climbing LH turn was commenced and they assessed the risk as high. No target had been seen on TCAS nor had TI been passed by ATC.

AIS (MIL) reports that although a primary only response is seen to appear about 6nm SSE of Humberside and fly NE'ly, it fades just SW of Cleethorpes. Despite the locality of numerous microlight sites, procedural tracing action did not reveal the identity of the subject Ultralight.

THE HUMBERSIDE APR reports that the RADAR2 (R2) position was also manned whose function was to control IFR inbounds and IFR training traffic as well as acting as an overload position for the APR. He was busy with 5 or 6 VFR transit and training ac in the local area whilst the R2 had only 1 ac. He was aware that when the FK70 pilot had called the Tower controller for pushback, the ADC was told by the R2 that he would take the ac as the APR was busy. At 1343 he saw an ac depart, what he believed to be the FK70, which climbed and turned to the SE. He was surprised to receive a call from the FK70 pilot saying she was "maintaining 2000ft towards OTBED". Knowing the ac was on the wrong frequency, he was about to instruct the crew to change to the R2 frequency (123.15MHz) when the R2 attracted his attention and told him to climb the flight to FL230. This was carried out and he obtained a correct read back before instructing the crew to change to the correct frequency. The crew read back the frequency but then reported that they had nearly hit an Ultralight ac. The APR had seen nothing ahead of what he thought was the FK70's radar return nor had he formally identified the ac nor placed it under any radar service. He told the crew that nothing was showing on radar and the flight changed to 123.15Mhz and filed an Airprox. Within a few seconds of the initial report, he saw an almost stationary radar return in the fading track of the FK70 which was monitored until fading completely 1min later. Tracing action was requested from AIS (Mil) whilst the APR requested information from the local Microlight site at Wickenby but to no avail. The Airprox had occurred near to the disused Cuxwold Farm airstrip which had been out of use for several years.

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THE HUMBERSIDE APR (R2) reports that he released the FK70 on track to OTBED but to stop its climb at 2000ft owing to traffic in the KIM NDB hold at 3000ft QNH. He identified the FK70 on departure and when it was 3-4nm SE of Humberside he attempted to make contact with the flight crew but this was unsuccessful. He rang the ADC who advised him that the flight had been transferred to the APR frequency. At this point he heard his colleague making contact with the FK70 crew so he indicated to the APR to climb to flight to FL230 and to transfer it to his frequency. Seconds after the FK70 crew called a very weak radar return appeared in the vicinity of the disused aerodrome at Binbrook which quickly disappeared making tracing action impossible.

ATSI had no comment to make.

UKAB Note (1): The Humberside APR RT transcript at 1347:30 reveals the FK70 pilot reporting “...with the previous controller er there was an ultralight aircraft er it was on the right hand side of us er a few hundred feet probably above and we almost hit it he made a left turn...”. This transmission was acknowledged. Later, when asked for further details of the geometry by the controller, the pilot responds “...he was around er one nautical mile on the right hand side of us and we were just in the climb to er from two thousand feet and we were passing around two thousand three hundred feet and the aircraft was probably in a descending turn er we think he saw us as well”.

UKAB Note (2): Analysis of the Claxby radar recording at 1344:08 shows the FK70 squawking 6021 shortly after departure from RW21 at Humberside climbing through FL006 (930ft QNH 1024mb). At the same time, a slow moving primary only response is seen, believed to be the Ultralight, 6nm SSE of Humberside tracking 070°. The FK70 turns L 16sec later and steadies on a track of 135°, levelling at FL018 (2130ft QNH) at 1344:56. The subject ac continue to converge, until 1344:56 when the Ultralight is in the FK70's 1230 position range 0.5nm. The Ultralight fades on the next sweep 8sec later at the CPA, the FK70 having commenced a climb indicating FL021 (2430ft QNH). The next radar sweep shows the FK70 climbing through FL025 (2830ft QNH) 0.4nm ESE of the Ultralight which appears to have reversed its course, appearing 0.1nm to the S of its previous radar paint. Taking into account the Ultralight's speed both prior to and post incident, the CPA is estimated to be in the region of about 0.2nm.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the pilot of the FK70, 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 the incident had occurred in the open FIR, Class G airspace, where ‘see and avoid’ pertained. Members were disappointed that the Ultralight had not been identified, despite detailed tracing action. The FK70 crew were receiving an ATS at the time and were climbing en route when they had encountered an Ultralight on a crossing track. This had led to a conflict of flight paths between the subject ac which Members agreed had caused the Airprox.

ATC had been unable to give the FK70 crew any ‘heads-up’ warning of the conflicting traffic to supplement their visual scan as the Ultralight had not been showing on radar at the time. Fortunately, the FK70 crew had seen the Ultralight to their R, after commencing climb, and had turned L, reporting that the Ultralight pilot apparently had also seen their ac as it was seen to turn L and descend. The radar video recording had revealed a track change by the Ultralight ac as the FK70 passes an estimated 0.2nm ahead of its projected track. These elements when combined were enough to persuade the Board that any risk of collision had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

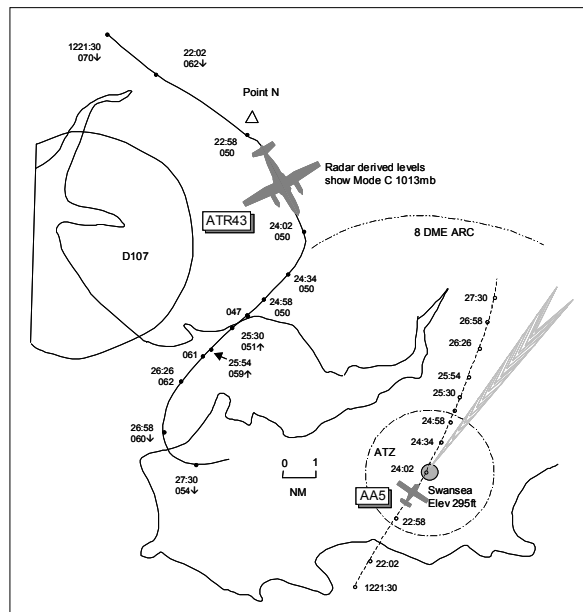
Cause: Conflict with an untraced Ultralight in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT No 077/04

AIRPROX REPORT NO 077/04

Date/Time: 14 May 1226
Position: 5140N 00408W (4nm NW Swansea Airport - elev 295ft)
Airspace: LFIR (Class: G)
Reporter: Swansea ADC/APP
First Ac Second Ac
Type: AA5 ATR42-300
Operator: Civ Pte CAT
Alt/FL: FL60 FL61↑
Weather IMC CLAC IMC KLWD
Visibility: >10km NR
Reported Separation:
Not seen Not seen
Recorded Separation:
7nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SWANSEA ADC/APP reports that the AA5 was enroute from Perranporth to Blackpool and the pilot requested to transit via the SWN NDB at 6000ft. It was determined that his flight conditions were IMC but his flight rules were not stated and that his initial call was only 3min before reaching the Swansea overhead. The ATR43 was inbound IFR from Dublin and the flight had been cleared for the ARC/DME procedure for RW22 at FL50. Earlier descent before establishing on the ARC was not possible owing to further traffic below and the ATR crew did not advise that the procedure could not be followed as cleared. The AA5 pilot reported overhead the SWN NDB, now at FL60. Shortly afterwards when he estimated that the ATR should be establishing on the ARC, he requested from the crew a range from the SWZ DME. The reply from the ATR crew did not answer his question but informed the controller that the flight was climbing to a higher level and wished to enter the hold. This climb was executed, for whatever reason, without clearance from a safe separated level to the level already occupied by the AA5. He thought that the ATR may have had a problem that was not being revealed so essential TI was passed immediately on the AA5 and, as soon as the opportunity arose, he told the crew to descend immediately to FL40. Essential TI was passed to the AA5 pilot on the ATR, the AA5 pilot reporting VMC on top and keeping a good look out. Subsequently the ATR was given further descent to the minimum safe sector altitude, cleared for a full NDB/DME procedure for RW22 which was completed without further incident.

THE AA5 PILOT reports heading 360° at 95kt en route from Perranporth to Blackpool and in receipt of an ATS from Swansea on 119.7MHz squawking 7000, he thought; with NMC. The visibility was >10km, 500ft clear above cloud in IMC and the ac was coloured white/red/blue with anti-collision light switched on. During his transit of the Swansea area he had not seen the ATR which, he understood, had been in conflict with his flight path.

UKAB Note (1): During a subsequent telephone conversation with the UKAB Secretariat, the AA5 pilot advised that the transponder had been serviceable when working St Mawgan, prior to calling Swansea. However, later when calling Manchester no squawk was seen by ATC. The transponder failed a ground test during subsequent fault checking and was removed for repair.

THE ATR43 PILOT reports inbound to Swansea from Dublin IFR via 'Point November' with clearance from ATC to descend to FL50 and carry out the DME/ARC procedure for RW22 at 185kt. With the DME reading 7.3nm and not being established on the ARC, he, the Capt and PF, turned onto a SSW'ly track away from high ground and commenced a climb to clear cloud and establish good VMC for safety/traffic considerations. After then requesting to return to the SWN for a full procedure, ATC cleared the flight to descend to FL40 and the request was approved; he turned onto 040° towards the SWN. The subsequent approach and landing were uneventful.

ATSI reports that the incident occurred within 10nm of Swansea Airport in Class G airspace at approximately 1225UTC. The AA5's flight rules were not declared at the time: however, immediately prior

At the time of the incident both flights were receiving an Approach Control Service from the Swansea controller who was operating ADC and APC in the normal combined configuration. Swansea Airport lies in Class G airspace and has no radar service.

The Swansea unofficial weather observation at 1250Z 22006KT 170V260 9999 FEW030 SCT045 17/10 Q1026= RW22 was in use at the time of the incident.

Approaching Swansea from the NW, the ATR43 had left CAS by descent on a direct track from STU (STRUMBLE VOR) towards a position 'Point November', 12.5nm NW of Swansea Airport, which is used to ensure flights remain clear to the N of Danger Areas D117 and D118. The flight had already been on frequency for about 3min when, at 1221, the controller requested its "...*distance to run*". The pilot reported he was "...*19 track miles from the field via er Point November*". The flight had been stopped at FL70 due to an earlier traffic situation but was now instructed to descend to FL50. At 1221:30, the pilot reported leaving FL70. This was acknowledged by the controller who then requested a report at "*10 DME*", adding that the flight could expect to carry out an 'ARC' (Direct Arrivals) approach for RW22. This was acknowledged by the pilot. The DME referred to is the "I-SWZ" located on the airport. Ten DME NW of Swansea Airport is the Initial Approach Fix (IAF) for the Direct Arrivals approach. The relevant Approach chart shows that from the IAF the flight would make a L turn to establish and follow the I-SWZ DME 8 arc clockwise, descending initially to not below 2300ft altitude.

At 1222, the AA5 pilot established communications with Swansea ATC reporting that he was just to the S of the Swansea overhead at 6000ft and requested a FIS. The controller then established that the flight wished to route through the overhead via the SWN NDB (located at the Airport). He then requested its level and flight rules. The pilot did not declare his flight rules but responded with "...*at the moment its er India Mike (IMC) and I'm at 6000 feet*" (Note: while the controller could expect the ac to be flying on the standard pressure setting of 1013.2mb in these circumstances, he nevertheless did confirm with the pilot a short time later that this was the case). Aware that the ATR43 had been descending, the controller immediately checked with the flight and established that it had now reached FL50. The flight was also asked to report taking up the 'ARC' at FL50 and approval was given for descent in accordance with the procedure. The radar recording at this time, (1222:58), shows the ATR43 just arriving at Point November, indicating FL50 Mode C and a primary only target, believed to be the AA5, 2nm SW of Swansea on a NE'ly track.

At 1224:30, the AA5 pilot was asked to report passing the SWN at FL60 and to provide an estimate of the time at the beacon. No estimate was provided but 30sec later, at 1225, the pilot reported overhead the SWN. The controller responded by instructing the flight to maintain FL60. The radar recording at this time reveals that the AA5 has already passed the overhead and is now 2nm NNE of the Airport.

[UKAB Note (2): The CPA occurs at this time, the ATR (indicating FL50) and the AA5 passing abeam one another with 7nm separation.]

AIRPROX REPORT No 077/04

Meanwhile, the ATR43, instead of being to the N of the Airport establishing on the ARC for RW22 as expected, is now about 7.5nm NW of the Airport on a SW'ly track. The crew made no announcement of this apparent change of plan.

To obtain a routine update, the controller, at 1225:30, requested the ATR43's DME range from the I-SWZ. The question was not answered, the pilot responding with "...we're just gonna climb back up to six eight and reposition back to the er beacon to enter the hold please".

[UKAB Note (2): ATC replies "There is no need to enter the hold the traffic is all clear do you wish to enter the hold for your own pur for your own purposes". The ATR crew then responds "affirm we wish to enter the hold er please er just approaching flight level six zero now".]

The controller then stated that no climb instruction had been issued and provided TI on the AA5, stating that it was "...just north of the beacon at flight level six zero IFR an AA5 aircraft please advise me your intentions". Reporting at FL61 (1226:30), the pilot declared he was ready to accept a level at the hold. Confirming first that the pilot has copied the "essential traffic information", the controller immediately issued a descent instruction to FL40, which was acknowledged. Turning then to the AA5, the controller transmitted "...essential traffic in the vicinity an ATR43 at FL60 is descending immediately to FL40 if able keep a good lookout". The TI was acknowledged, the pilot reporting that he would keep a good lookout now that he was above cloud. One minute later the pilot of the ATR43 reported passing FL53 for FL40 and subsequently carried out a full NDB procedure to RW22 with no further incident.

UKAB Note (3): The UK AIP at AD 2-EGFH-8-3 (Swansea) shows the MSA 25nm NW 2700ft, NE 3900ft and 10nm NW 2600ft, NE 2600ft.

THE CAA FLIGHT OPERATIONS INSPECTORATE (FOI) reports that the operator conducted a thorough investigation into this incident, finding shortcomings in the crew's situational awareness and CRM. The Capt did not follow the published IAP and then initiated a climb without ATC clearance. The FO was unable to prevent the train of events unfolding, notwithstanding his attempt to alert the Capt to the developing situation. Appropriate action has been taken with the crew concerned.

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 were concerned that on 3 occasions during the incident, the controller's questions were not answered correctly. The AA5 pilot had been asked his flight rules but had replied with his flight conditions (IMC); the controller tried to obtain an ETA from the AA5 pilot but this request was only answered, 30sec later, with a report as being overhead; and having not received any indication from the ATR43 crew that they were established on the ARC, the controller had then asked for their DME range, the crew replying that they were going to climb and position towards the NDB.

Noting that the AA5 pilot said he was IMC, the controller took it that VFR flight was not possible leading him to deduce that IFR were pertaining at the time. After ensuring the ATR43 had levelled at FL50 and giving the crew clearance to fly the ARC and descend with the procedure, in the absence of an ETA from the AA5 pilot, the ADC/APP then applied procedural separation between the subject ac, the AA5 to maintain FL60, being known traffic to the ATR. The ATR43 crew's statement that they were going to climb and position towards the NDB was queried by the ADC/APP but the crew reported "...approaching flight level six zero now". This climb had been executed, contrary to the ATC clearance, which led to a loss of procedural separation and caused the Airprox.

Unbeknown to the controller, the ATR43 crew was not to the N of the aerodrome having followed the ARC procedure but to the NW tracking SSW. By the time the ATR crew had informed ATC of their climb, the subject ac had already passed the CPA, laterally separated by 7nm on diverging tracks and vertically separated by 1000ft before the ATR descended slightly to FL47 before climbing above FL50. The ADC/APP immediately passed essential TI to the ATR43 crew on the AA5 and descent clearance to FL40. He then passed essential TI to the AA5 pilot on the ATR; neither crew visually acquiring one another. The radar recording revealed that the flight path flown by the ATR crew, fortuitously, had led to the subject ac passing without any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

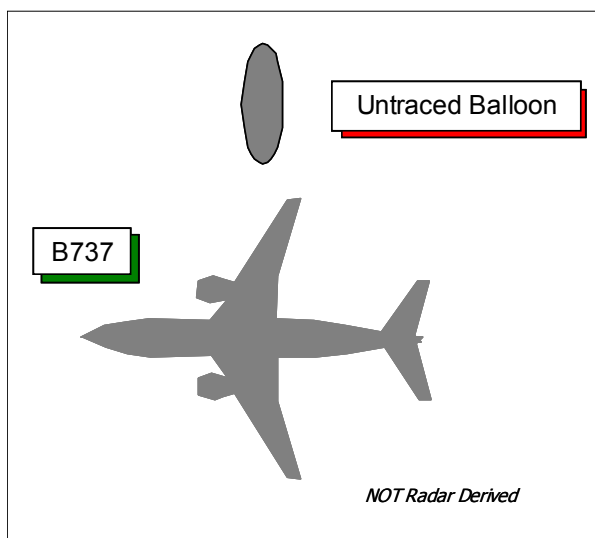
Cause: The ATR43 crew did not follow their ATC clearance which led to a loss of procedural separation.

Degree of Risk: C.

AIRPROX REPORT No 78/04

AIRPROX REPORT NO 78/04

Date/Time: 16 May 1242 (Sunday)
Position: 5145N 0045W (HENTON)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: B737-700 Balloon
Operator: CAT N/K
Alt/FL: FL52↑ ----
(SAS)
Weather VMC NR ----
Visibility: 30km ----
Reported Separation:
200m H/nil V ----
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-700 PILOT reports he was outbound from Luton IFR and in receipt of an ATC Service from LONDON CONTROL. Whilst climbing through FL50 for their cleared level of he thought FL70, and turning onto a heading of 270° (M) at 280kt, they sighted a large cylindrical object 200m away. No avoiding action was taken as the Balloon was already passing about 200m to starboard when spotted [he reported "...about ¼nm..." on RT]. He assessed the risk as "medium" and although he first thought it was a para sail, he realised the object was actually a long cylindrical balloon bent into an arc, which he estimated to be about 15ft in length. He reported the occurrence to ATC on RT.

AIS MILITARY reports that their efforts to trace and identify the agency that released the reported balloon in this incident have proved fruitless. Moreover no inadvertent releases were notified to them for NOTAM action. Regrettably, therefore, the operator of the balloon remains untraced.

ATSI reports that the B737 departed from RW08 at Luton en route for Palma. The flight was transferred to the LTCC NW Sector and established communication with the SC at 1241:40. The ac was tracking W, towards Henton, at 5000ft when at 1241:50, the SC instructed the crew to turn R 10° and climb to FL90. At 1242:20, when the ac was passing HENTON, the crew reported that they had "...just passed what looks like...a large para sail...went down the righthand side about ¼nm at about FL52 - there's nobody on it looks like maybe a sails just escaped but it looks quite large". Which the SC acknowledged. The crew later stated at 1244, that "...it probably was a balloon it was above the cloudbase...". Nothing was observed on the radar recordings and no reports of any captive balloons that had broken free were received at LTCC.

UKAB Note (2): This Airprox is not shown on radar recordings.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the B737 pilot, a transcript of the relevant RT frequency, radar video recordings and reports from the appropriate tracing & ATC authority.

Here the lack of any positive information relating to the origin of the balloon had clearly frustrated further investigation. It was explained to the members that the Board has tried in the past to address the problem of balloon releases, but with no success and aircrew will need to remain ever vigilant to these

random hazards. The Board was briefed that no information was readily available relating to the effects, or indeed the feasibility, of a jet airliner actually striking a balloon. It was not known if the airflow would, or would not, displace the balloon and deflect it away preventing it from striking the airframe. Military pilot members related the challenges of actually engaging the probe with a refuelling basket when engaged in Air to Air refuelling with a tanker ac. Furthermore, the Board was not aware of any effect that might result if the balloon burst and was ingested in the engines. The Board could only conclude, rather unsatisfactorily, that this Airprox had resulted from a conflict with an untraced balloon and that insufficient information was available to determine the risk involved.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict with an untraced balloon.

Degree of Risk: D.

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Date/Time: 19 May 1459

Position: 5127N 00206W
(5nm SW of Lyneham)

Airspace: Cotswold CTA (Y3) (Class: A)

Reporter: LACC Sector 23

<u>First Ac</u>	<u>Second Ac</u>
<u>Type:</u> HS125	Harrier GR7A

<u>Operator:</u> Civ Exec	DPA
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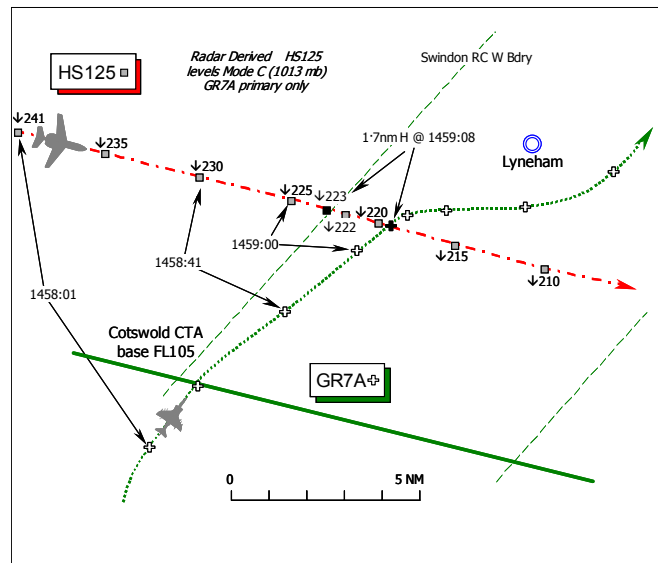
<u>Alt/FL:</u> FL230	FL230
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<u>Weather</u> VMC CAVOK	VMC CLAC
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<u>Visibility:</u> >10km	>50km
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<u>Reported Separation:</u> 300-400m H	nil V/2nm H
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<u>Recorded Separation:</u> 1.7nm H
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PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

LACC SECTOR 23 PLANNER CONTROLLER (S23PLAN) reports that LATCC (Mil) Controller 31 (CON31) rang to request a Cleared Flight Path (CFP) at BCN from SW to NE at FL230 for a foreign military ac. After discussion with the Sector 23 TACTICAL Controller (S23TAC) the CFP was approved for a climb to FL230 on the foreign ac's current heading. Shortly afterwards an electronic request from LJAO was received for a Tornado F3 to cross the Swindon Radar Corridor (RC) NE bound at FL230. The RC crossing was accepted and she called Sector 5 PLANNER to request that the HS125's descent inbound to Luton be started and the flight transferred early. She then rang CON31 and retrospectively amended the CFP clearance to a lower level of "climbing to FL210". CON31 then informed her that he would be turning his foreign military ac 20° L to clear CAS more quickly. S23TAC then started to descend the HS125 to FL220 so that it would be below the Swindon RC level of FL230. LJAO rang to inform them that the F3 would be W of the notified track through the RC and tried to obtain clearance on that track through the CTA. But this was not possible so she said 'no': LJAO's F3 must remain in the RC to avoid the HS125 which was already descending to avoid the corridor. LJAO therefore agreed to turn the F3 to the E. Shortly after that, another controller rang to inform her that LJAO's F3 was an Air Defence Priority Flight (ADPF) and would be remaining on track. Assessing the situation, she and her TACTICAL controller realised that the HS125 would be behind the F3. London Mil CON31 then rang again to request a further climb for the foreign military ac to FL230, which was agreed. At this point, S23TAC saw an unknown ac [the subject Harrier] 'go intruder' and asked CON31 if he knew anything about it: an electronic 'offer' [clearance request] was then received from LJAO for the subject Harrier GR7A to transit the Swindon RC at FL230. The GR7A was squawking Mode A but no Mode C (NMC) was shown and it was about 6nm S of the southern boundary of the CTA. Before she was able to assess whether or not she could approve the RC crossing at FL230, LJAO rang to verbally request the RC. By that time the HS125 was indicating FL230 in descent. LJAO informed her that the Harrier was being turned onto a heading of 040° so she agreed that provided it remained inside the Swindon RC it could cross. The HS125 then appeared to slow its rate of descent, levelling at FL220 about 1nm W of the RC, she thought, with the Harrier positioned 1nm inside its western lateral boundary.

LACC SECTOR 23 TACTICAL CONTROLLER (S23TAC) reports that at the time of the Airprox, traffic levels were low and it was not busy. When the HS125 was in the vicinity of NUMPO [7nm S of BCN] under control of LACC S5, co-ordination had been agreed with LATCC (Mil) [CON31] on a foreign military ac climbing to FL230. He had planned to drop the HS125 to a level above this foreign crosser

but it became evident that it was going to pass well clear. The HS125 crew had been instructed through S5 to start their inbound descent early as LJAO had asked for the Swindon RC at FL230 for a Tornado F3. The HS125 crew checked in on his frequency descending through FL270 so he instructed them to descend to FL220 to clear underneath the RC. At this point the F3 was SW of the RC [northeast bound] and co-ordination was effected enabling the F3 to cross the CTA outside the confines of the RC: this was agreed as the HS125 was going to pass well behind. It subsequently transpired that the F3 was an ADPF of which they were unaware. Just after this he spotted an ac - the subject Harrier - to the W of the Salisbury Plain Danger Area complex northbound, with about 6-7nm to run before entering CAS: it was moving fast and the jet's level was unknown as NMC was shown. He was unsure if was going to turn away or continue on its present track but he realised that if it continued it was going to come fairly close to the HS125. As the Harrier approached the southern edge of the CTA he became conscious that it would be continuing through because he could hear the S23PLAN talking to LJAO and advising that they had traffic in conflict. He was unsure if the GR7A was going to avoid the HS125 so he instructed the HS125 pilot to descend to be level at FL180 15nm before NIGIT to achieve the standing agreement into the LTCC CAPITAL Sector. It then became apparent that the Harrier was at FL230 with NMC displayed about 5nm away from his HS125 and now on conflicting tracks. LJAO TLC was not avoiding his HS125 so he continued to monitor the HS125's descent profile closely. It had been descending at a reasonable rate since the 'top of descent' and he believed that it was going to fly clear below the Harrier. However, the HS125's ROD appeared to decrease after FL230 so separation was eroded between these two ac down to a minimum of 1½nm horizontally and 600ft vertically. No avoiding action or traffic information was given nor was STCA triggered.

THE HS125 PILOT reports that he was flying IFR in VMC, from St Johns to Luton under the Control of LACC Swanwick and cleared to he thought FL200 in an en-route descent clear of cloud, with an in-flight visibility of 10nm+. Eastbound at 350kt he spotted a "fighter" ac in his 12 o'clock at about the same level but he did not specify the range at which he first saw it. The jet crossed his nose from R to L about 300-400m away and then climbed and turned, he thought, but he could not identify the ac type or colour. The ac was not displayed on his TCAS nor was he given any warnings about it. He assessed the risk as "*minimum*".

THE HARRIER GR7A PILOT reports he was flying as a singleton on a local sortie from Boscombe Down, initially under IFR at 440kt in VMC clear of cloud and 50km+ visibility out of the sun. The assigned squawk was selected but he reported his Mode C as unserviceable inside CAS. [UKAB Note 1: The Mode A was also unserviceable and the ac was only displayed as a primary return on the Heathrow radar recording.] Whilst in receipt of a RCS from LJAO SWANWICK MIL, heading 040° level at FL230, traffic was called by the controller in his 10 o'clock at a range of 5nm. This was followed by an avoiding action 50° R turn instruction onto 090°, with which he complied. The traffic was then called at 3nm, whereupon he sighted the other ac which appeared to be approximately level with his jet. He assessed that "*there was no risk of collision at any time*".

THE HARRIER GR7A PILOT'S STATION comments that the pilot responded correctly to ATC directions and was visual with the conflicting traffic at all times.

MIL ATC OPS reports that the Harrier GR7A was routing from Boscombe Down to East Anglia via the Swindon RC at FL230 whilst the HS125 was descending eastbound along YANKEE 3 inbound to Luton. At the time of the Airprox the LJAO CENTRAL Sector (CEN) was fully manned. The TACTICAL LEFT Controller position (TLC) was manned by a controller under training (UT) and a very experienced Mentor. At 1445:14, the LJAO CENTRAL PLANNER received a military pre-note on the Harrier which he allocated to the TLC. At 1451, TLC rang Boscombe Down to restrict the climb of the Harrier to FL220 so that it would be deconflicted with another ac in the vicinity of the RC at FL230. The TLC accepted the handover of the Harrier at 1454:15, subsequently identified the flight outside CAS and placed it under a RIS at FL220. At 1455:59, TLC instructed the GR7A pilot to turn R and head N, to route behind another ac already in the RC. The GR7A pilot responded that he was level at FL220. At this stage no CFP request had been submitted to S23 for the Harrier to route via the RC in accordance with SOPs

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and at 1456:05, a further R turn onto 010° was issued. After 1456:51, the Harrier's Mode C disappeared from the displayed radar picture: consequently at 1457:20, TLC asked the GR7A pilot to *"confirm level FL230"* to which the response was *"negative level 220"*. [UKAB Note 2: The Heathrow recording shows no GR7A SSR from 1456:30, and only one sweep thereafter, at 1456:50, with the Harrier indicating FL219]. TLC therefore instructed the pilot to climb to FL230 which he acknowledged at 1457:27. When the Harrier was 7nm S of the southern boundary of the RC at 1457:30, an 'electronic' CFP request was sent to the S23PLAN and 9sec later the GR7A pilot was instructed to *"turn right heading 040° to position for the Swindon Corridor"*. TLC then rang S23PLAN who inquired about the intentions of the Harrier. TLC's response was that it was *"going up to twenty three [FL230] through the corridor if you're happy with that?"* to which the S23PLAN replied, *"if he's inside the corridor yes..."*. TLC confirmed that the ac was turning R onto 040° and the S23PLAN responded just before 1458:00, *"OK right I'll accept it in the corridor then at 230"*, which TLC acknowledged *"roger..."*.

At this point the HS125 was descending through FL243, about 10nm W of the western boundary of the RC. At 1458:03, the Harrier pilot confirmed that he was heading 040° and was told by TLC that he could now route *"own navigation Brize"*, which was acknowledged. About 10sec later there was still NMC displayed on the Harrier's SSR track data block (TDB) and the pilot was requested to recycle his Mode C. However, at 1458:17 as the GR7A entered CAS, the ac's Mode C was not displayed. TLC passed traffic information to the Harrier pilot about the HS125 at 1458:28, *"[C/S] traffic left 10 o'clock, 4 miles...left to right co-ordinated below"*, whereupon the pilot replied 7sec later that he was visual with the other ac. At 1458:38, as the HS125's Mode C indicated it was descending through FL233, TLC passed an avoiding action turn to the Harrier pilot - *"avoiding action turn right heading 090° traffic left 10 o'clock 3miles 4miles, crossing left to right indicating similar level"*. This instruction did not elicit a response from the GR7A pilot and when the 2 contacts were 3nm apart at 1458:54, the TLC Mentor 'stepped-in' on the RT saying, *"[C/S] avoiding action turn right heading 090"*. The GR7A pilot then acknowledged this call and the ac was seen on radar to commence a R turn. An update on the traffic information was provided by TLC at 1459:06, and the pilot was asked to recheck his Mode C. At 1459:27, with the HS125 now indicating FL218 descending, the Harrier pilot was told to resume track for Brize: the Harrier's Mode C did not reappear until some time later.

At the time the LJAO TLC position received the pre-note on the Harrier, the HS125 was W of BRECON and its designator indicated that it was inbound to Luton and would be descending. The LACC MATS Pt 2 states that LJAO CENTRAL Controllers are to provide a minimum of 5min notification to S23 to activate the Swindon RC. However, given the proximity of the Harrier pilot's base - Boscombe Down - to the S edge of the Swindon RC, a fast jet's flying time to the CAS boundary is well within this 5min 'window'. Experience has shown that civil controllers like to be able to identify a crossing military ac on their radar display before they issue a CFP: therefore, TLC decided to wait until the ac was airborne before submitting their CFP request. However, TLC became distracted by other tasks so the request was not actually submitted until the Harrier was 1min from the edge of CAS – about 8nm. As the CFP request was within the 5min required, TLC also contacted the S23PLAN by landline to reinforce the CFP request but the time remaining for the S23PLAN to consider the request was very short. The Harrier was flying towards CAS and the situation was further complicated by the absence of any SSR Mode C indication from the jet. Nevertheless, S23PLAN clearly stated that provided the GR7A was inside the RC at FL230 then it would be cleared to cross as requested. No mention was made by the S23PLAN of the HS125's intentions but equally TLC did not enquire about it, presumably on the assumption that the HS125 would be below the level of the RC by the time it crossed the W edge of the RC. TLC therefore ensured that the Harrier was vectored on a heading of 040° towards the RC. The decision to release the Harrier pilot to fly under his own navigation direct to Brize, at 1458:03, resulted in a slight L turn which reduced the distance between it and the HS125 but nevertheless it was still within the confines of the RC, albeit close to the western boundary. As the Harrier approached CAS the ac was still not displaying Mode C and analysis of the radar indicates that its SSR transponder had failed. This had not been picked up by either the TLC trainee or Mentor as the flight had been "paired" by the code/callsign distribution system [CCDS] with its assigned SSR code and an associated Track Data Block, displayed from when the SSR was working. Whether the Harrier had Mode C displayed or not is

irrelevant insofar as TLC did not confirm the ac's level prior to its entry of CAS nor did the trainee change the type of service applied to a RCS. However, TLC did provide traffic information to the GR7A pilot who reported visual contact with the HS125.

As it became apparent that separation would be eroded, TLC issued an avoiding action turn. This was not acknowledged by the pilot so the Mentor had to step in to repeat the call, causing a delay. Therefore, by the time the avoiding action turn had taken effect, separation had reduced to 2nm horizontally and about 300ft vertically. It was evident from discussions after the incident that the S23PLAN was concerned about the late-notice request to use the RC. Nevertheless, she had agreed to the crossing, albeit at the last minute. TLC's plan to turn the Harrier R to track parallel with the airway centre-line if a CFP had not been forthcoming was sound and given the dynamics of the situation and the lateness of the request for a CFP, it might have been better to enact this prior to receiving the RC crossing clearance from S23PLAN. There was plenty of time to request the CFP and the TLC Mentor should not have allowed the situation to deteriorate to the point where a close quarters situation was inevitable: appropriate unit action has been taken.

LACC ATCI reports that the Swindon RC is established to allow LJAO controllers co-located at Swanwick (Mil) to cross the Cotswold CTA without the need for individual co-ordination. The RC is 8nm wide overall with its centre-line aligned between the Brize Norton and Yeovilton TACANs. Swindon RC is depicted on the radar video map and it is available at 2 levels: FL230 & FL240. The LACC MATS Pt 2 differentiates between procedures to be followed depending on its activation status. If the Corridor is activated as "*Activation TFN*" civil traffic must remain clear of its lateral and vertical limits and MATS Pt 2 BCN 3.2.2.2. states that:

"as a guide, eastbound aircraft descending into the London TMA should be at or below FL220 when 40 DME BCN or 70nm before OCK".

In this case, however, the Swindon RC was activated by "*Tactical Activation*", which requires a minimum of 5min notice to be given in order for the S23 team to review the traffic situation and ensure that the requisite separation is provided in a timely fashion. Here, the RC had previously been requested for a Tornado F3 at FL230 in accordance with established MATS Pt2 procedures. Consequently, the S23PLAN requested that the HS125 be transferred early from S5 so that descent could be initiated to get the ac below the RC. The HS125 pilot called at 1553:30 and was instructed to descend to FL220 [thereby effecting 1000ft separation below the level of the RC] but was not instructed to be level 70nm before OCK: S23TAC was relying on his ability to monitor the relative positions of the HS125 and the Tornado. The S23PLAN, however, assumed that S23TAC had stipulated this level requirement to the HS125 pilot and based her planning and actions on that assumption. Neither the S23 PLANNER nor the TACTICAL controllers were working with their 'own' watches: the S23 PLANNER was on a day shift and the S23TAC was from another watch entirely. In discussion with the controllers involved it became clear that their 'parent' watches applied a different 'working practice'. The TACTICAL controller reports that the 70nm before OCKHAM restriction was not used much on his watch whereas the PLANNER reports that its use is taught as 'standard practice' on her watch. However, the PLANNER did not cross-check her plan with TACTICAL which would have revealed the false assumptions made by both controllers.

At 1554:33, the LJAO TACTICAL RIGHT controller (TRC) contacted the S23PLAN to advise that the Tornado was an ADPF and needed to maintain its heading, W of the RC. S23PLAN was not happy with this late notification and advised the LJAO TRC that "*we are descending our traffic to be level 70 miles before OCKHAM*". S23TAC concluded, correctly, that the Tornado was sufficiently ahead of the HS125 that no action was required. Just under 2min later at 1556:26, the HS125 was cleared for descent to FL180 – to be level 15nm before NIGIT [the first RP situated on Y3 after the route enters the LTMA] - in accordance with the standing agreement with LTCC. Shortly afterwards S23TAC observed a 'background' track symbol change to a hollow diamond - the standard symbol for a 'Rogue Sector Entry' and asked S23PLAN if she knew anything about it. This was the Harrier, indicating a climb with the

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Cleared Flight Level (CFL) at FL230. Instead of calling LJAO, the S23PLAN answered a phone call from London Mil CON31 and became involved in different co-ordination. During this period the transponder of the Harrier failed.

LJAO is required to identify to the S23 Planner any non-SSR ac prior to entry to the RC. However, it is clear that all of the controllers involved had not noticed the change to the displayed track symbol and believed that only the Mode C had failed. The designed functionality of the data processing system retains the displayed callsign of tracked ac even if there is no longer any supporting secondary radar return. The representation of the track changes from a single slash to a cross. The Mode C indication is removed but the CFL indication remains: clearly, this does not guarantee that the ac has actually levelled at the CFL. It is considered that the display of the CFL for an ac that has NMC may result in a controller believing, erroneously, that the actual ac's level was being displayed.

The electronic CFP 'offer' was received for the Harrier at FL230, 1min before its entry into the RC. This action changed the radar plot of the Harrier to a 'foreground' track with a 'filled' diamond symbol. The LACCMATS Pt 2 BCN 3.2.1.states:

"A minimum of 5 minutes notice is required [from LJAO] when activating the Swindon Radar Corridor".

LJAO did not comply with this requirement and thereby placed the S23PLAN in a difficult situation that required a rapid decision. When at 1457:39, LJAO TLC contacted S23PLAN to verbally request crossing clearance, the Harrier was only 2½nm from CAS. At the time that this co-ordination took place, the HS125 was passing FL246 in descent for FL180 with 11nm to run to the edge of the RC. The HS125's Mode C was momentarily unclear due to an overlap with the TDB of an ac at a lower level.

Although the S23PLAN reported after the event that the HS125 was passing FL230 at this time, this was not the case and she did not positively confirm the level of the HS125 before accepting the Harrier into the RC. The S23PLAN later said that she felt 'backed into a corner' to make a quick decision. Whilst she could have refused the offer or requested that the ac carry out an orbit, she felt however that she had just given the 'Military' a "hard time" about the ADPF flight and now wanted to be helpful. Mistakenly, she thought that she had specified the HS125 to LJAO as she had done previously about the Tornado F3 ADPF and she also thought that she had previously spoken with this particular LJAO controller and had mentioned the HS125 in the previous exchange. This was partially due to the omission by the LJAO trainee controller to identify himself at the beginning of his telephone call. S23PLAN also thought the Harrier might be another ADPF and inadvertently put more pressure on herself to accept the ac.

The LACC MATS Pt2 GEN 4.4.2.1.states that:

"On receipt of an offered CFP, the PLANNER will assess the request and inform the TACTICAL. In the event of conflicting traffic, the TACTICAL and PLANNER will then agree a course of action and the PLANNER will notify the appropriate military controller accordingly.

The PLANNER must ensure that a PFS [paper flight strip] is displayed on the PFSB [paper flight strip board] and that any clearance conditions are annotated on the strip. The TACTICAL will acknowledge the crossing clearance by ticking the level in Box B of the PFS.

Furthermore BCN 3.2.2.1.states that:

"On receipt of an electronic CFP if the proposal is acceptable the S23 PLANNER places the printed PFS on the PFSB, informs the TACTICAL and electronically accepts the offer".

These two references do not entirely correspond. Consequently, several controllers validated on this Sector were approached and there was no consensus of opinion as to how such a conflict should be handled between PLANNER and TACTICAL nor whether the PFS should be ticked for RC traffic or not.

S23PLAN reported that she believed she had told LJAO about the HS125, indicating that she was aware of the possible conflict. The S23TAC was however not consulted and no agreement on a course of action was made. The PFS was not placed in front of the TACTICAL controller and he did not see it until after the incident. S23TAC, whose workload was light, had however been monitoring the progress of the Harrier and was aware that the PLANNER was co-ordinating something with LJAO. At 1458:03, S23PLAN initiated a phone call to the LJAO Planner. Whilst it is ringing a section of off-line conversation between the PLANNER and TACTICAL controllers can be heard when S23PLAN said, *“Actually he did say 230 but I’ll just check, he said he’s turning right onto 040...”*. The whole conversation is not recorded so it is not possible to confirm exactly what information and or concern was expressed. At the beginning of this conversation the HS125 was passing FL240 at 8nm range from the RC boundary. S23TAC recalls questioning the level of the Harrier: S23PLAN recalls that she was fairly sure of the level but this conversation sowed a seed of doubt in her mind: the Harrier entered CAS at 1458:17 and she continued to ring LJAO for a further 4sec but then chose to answer an incoming phone call from LATCC (Mil) CON31. From that point onwards, S23PLAN was engaged in a co-ordination about a separate ac and was ‘out of the loop’.

The Harrier entered the Swindon RC at 1458:17, less than 1nm from the western boundary. The HS125 had passed FL230 at a range of 2.5nm from the RC boundary. Although S23TAC’s perception that the HS125’s ROD reduced, analysis shows this was not the case as from ‘top of descent’ a constant rate of about 1500ft/min was maintained. S23TAC did not take any action and minimum separation occurred at about 1459:08, as the Harrier (subsequently confirmed as maintaining FL230) crossed 1.7nm ahead of the HS125 when the latter was passing FL223. Shortly after the CPA, the Harrier was seen to turn R onto a roughly parallel track with the HS125 [the Heathrow radar shows it gradually diverging] before then turning L and resuming a northbound heading through the RC. When S23TAC was asked why he took no action, having been aware of the conflict for some time and under a light workload, he said that he had incorrectly assumed the co-ordination must have included an agreement that the GR7A would avoid the HS125. He did not check this assumption by asking S23PLAN and added that he was not sure what co-ordination had been agreed between LJAO and his PLANNER so he was never entirely sure what level the Harrier was at. Nevertheless, his report suggested that his plan had been based on vertical separation being achieved. He advised he could see that the two ac were not going to collide and so he did not feel avoiding action was required. However, he did agree that he should have passed traffic information. When asked if he considered either turning the HS125 or expediting its descent, he said that he had considered both but was unsure what LJAO or the Harrier pilot might be doing. Asked why he did not contact LJAO himself to ascertain the answers, he responded that his PLANNER was talking to LJAO, there was only one phone so there was nothing more he could do. S23PLAN had in fact stopped attempting to contact LJAO some 45sec before the CPA. However, the PLANNER was engaged in co-ordination with a different Military controller on a different line. Whilst the functionality of the Direct Access telephone system did not enable the TACTICAL controller to see, from his operating position, who the PLANNER was talking to, S23TAC would still have been able to use his telephone ‘stacked’ display to call the LJAO TLC. It would appear that S23TAC had difficulty in recognising the risk inherent in the developing situation. It was only when the two ac were in close proximity that S23TAC sought assurance from his PLANNER (which he never actually received). S23TAC said he was confused about the seriousness of the situation because STCA had not triggered and the HS125 pilot had not reported responding to a TCAS alert. This lulled him into the mistaken belief that there could not be a serious incident happening.

Civil and Military procedures are adequate if acted upon correctly by the appropriate staff. There are however some details that are not completely aligned in different sections of MATS Pt2. The requirement to provide the required 5min notice for the activation of the Swindon RC with regard to departures from adjacent aerodromes is not conducive to the most efficient operations of either LJAO or Sector 23. “Standard practice” on the watches differs which leads to opportunities for an error chain. Whereas the LACC systems functioned as designed, the displayed indication of an ac following SSR failure was thus only a primary return was not noticed by any of the staff involved. Consequently, the indication of a Cleared Flight Level for an ac with no displayed Mode C may lead to a false assumption

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of the ac's actual level. As regards the specific incident, neither S23TAC nor S23PLAN actively sought information to confirm or refute any uncertainties. PLANNER allowed herself to be pressured into a rushed decision, in consequence there was very little time to brief TACTICAL who, in turn, did not insist upon acquiring a full understanding of the situation.

ATSI had nothing to add to the LACC report.

DPA had nothing further to add.

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 NATS advisor briefed the Board that the unit investigation into this Airprox had determined that there were a number of areas where lessons could be learned and recommendations for improvement made. The investigation had resulted in a series of safety recommendations covering aspects such as a joint review by LACC and LJAO of the applicable Swindon RC procedures and specifically the requirement for 5min advance notification for use of the corridor. The LACC unit management team accepted all of the report recommendations and 60% are now complete and closed. Those 4 recommendations remaining 'open' are being progressed and will be completed. Furthermore, a number of lessons have been learned from this incident, some of which have been published in a bulletin for the benefit of controllers and the NATS investigation report will be used as an example for Team Resource Management (TRM) training. Given that LJAO was already participating in the review of procedures it seemed superfluous to generate another recommendation on this topic from the Board; the Chairman requested therefore that the NATS and Mil ATC Ops advisors keep the Board apprised of the outcome of this work.

A military controller member opined that the catalyst to this Airprox was that the LJAO TLC controllers had not complied with the requirement to provide a minimum of 5min notice for activation of the Swindon RC. Whilst acknowledging that Boscombe was in close proximity to the RC entry point, the jet still had to be climbed to the appropriate level for the RC outside CAS and here it appeared there was no reason for not initiating the co-ordination earlier – as had been highlighted in the Mil ATC Ops report. The Member opined that the implementation of a call from Boscombe ATC to LJAO when the ac was rolling for take-off on the RW – 'a rolling call' – could provide the necessary 'trigger' to achieve the required notice regardless of any difficulties associated with identifying the ac to S23. The controller Member added that it should be quite feasible to provide the requisite notice in this manner if that is what LACC S23 requires and to leave it so late as occurred here – virtually at the last minute - was inexcusable. The Board agreed with the Mil ATC Ops view that given the extreme lateness of the request to S23, it would have been more sensible to have turned the GR7A away or flown it parallel outside CAS until separation was assured against the HS125. Whether the Mentor was trying to make a teaching point here was unclear, if it was he had left it far too late – so the salutary lesson was that training must not overtly impact on the standard of the ATS provided. Another topic worthy of mention here was that the Mil ATC Ops report had pointed out that the Harrier pilot was not placed under a RCS before he entered CAS. This is a common omission amongst controllers – civilian and military alike - that had figured in a number of Airprox assessments recently and caused the Board some concern. Pilots should be prepared to question ATCOs if this is not volunteered before the CAS boundary. The lesson worth repeating here was that ATS changes must be specified on RT and a pilot should not be left in any doubt as to the nature of the ATS being provided to him. It was also clear from the very comprehensive Mil ATC Ops and LACC reports that S23PLAN had agreed to the crossing of the GR7A through the corridor when she responded to TLC's request just before 1458:00, *"OK right I'll accept it in the corridor then at 230"*. This extremely late request from LJAO had clearly placed S23PLAN in a difficult position and the

LACC report had explained the background to this: nonetheless, controller Members agreed it had unfortunately resulted in a rushed decision to accept the crossing. The Board recognised that this agreement to the tactical activation of the RC gave the Harrier a CFP at FL230 and placed the onus on S23TAC then to avoid the GR7A whilst within the limits of the RC – which it was. The NATS advisor explained the significant operating difference between the way that the RC was 'booked' either 'TFN' or 'tactically': in the first instance the S23TAC would have to ensure that separation was established with the RC and a permanent 'blocking strip' was positioned to remind TAC. However, here it was theoretically a tactical booking, where there was a tacit agreement that S23 would avoid the crossing as identified to them, so a PFS should have been placed on the PFS board, but TAC apparently did not see it until after the incident. S23PLAN could not confirm from the radar display that the HS125 was at the correct level – FL230 - before accepting the corridor crossing traffic and the LACC report had detailed subsequent attempts by S23PLAN to clarify that for TAC. Some Members believed the lack of Mode C was a significant contributory factor here and there was also tacit acceptance by TLC that the Harrier was at FL230 as this had neither been confirmed by the controller nor the Harrier pilot after he had been instructed to climb from FL220 to FL230, which Members were in no doubt should have been done – another principal omission by TLC. A Member contended that it should have been recognised much earlier that the Harrier's Mode C had failed. It appeared that the CFL might have been misinterpreted as the actual Mode C, but the CFL faithfully reflected LJAO's instructions. Nevertheless, in his report the GR7A pilot had reaffirmed that he was flying level at FL230, which there was no reason to doubt. The lack of SSR had also rendered the HS125 crew's TCAS blind to the presence of the Harrier. Moreover, for his part, the HS125 pilot had not been forewarned about the GR7A at all, but had only spotted it as it crossed ahead where the radar recording showed it was somewhat further than the 3-400m he reported. However, the HS125 pilot was evidently not overly concerned to report the encounter himself until asked to respond to the LACC controller's submission.

It would also appear that S23PLAN did not ensure that TAC was aware of what she had agreed and the absence of any positive discussion and agreement between the two Sector 23 controllers did not ensure that there was a comprehensive plan to separate these two ac. It seemed to the Board that S23PLAN and TAC were operating in isolation on different assumptions that were not checked nor satisfactorily clarified. The salutary reminders for controllers here were never to operate on assumptions and if you are not given enough time to resolve a crossing clearance properly then say NO and turn the traffic away. Clearly, S23PLAN was acting with the best of intentions, but in the Board's view, if crossing clearance had been refused at this late stage it might have averted this conflict and kept it safe. The LACC report had made it plain that S23PLAN had assumed that S23TAC had instructed the HS125 crew to be level 70nm before OCK. This was not the case but S23PLAN had based her planning and actions on that assumption - possibly because the RC had been activated previously for the Tornado - therefore believing that the HS125 would be level at FL220 before it got near the GR7A. But S23PLAN moved on to co-ordinate other traffic and did not continue to monitor the conflict. Controller Members agreed that if S23TAC had specified that the HS125 must be level 70nm before OCK, this would have led to a different outcome. Unfortunately, the HS125 was still descending and had not levelled when the GR7A crossed 1.7nm ahead of it at the closest point. S23PLAN believed that she had identified the HS125 to the LJAO TLC, but this was not the case either as she had earlier given an 'ident' to the LJAO TRC and the TLC trainee had omitted to identify himself to S23PLAN. S23TAC had reported that he had unwisely based the separation on the HS125's observed RoD as it descended to FL220. Although he was aware of the possible conflict he evidently took no resolute action to ensure separation in the time available to him, possibly because he could see from the ac's trajectory that the HS125 would pass astern of the GR7A. The Board agreed that positive action should have been taken earlier to warn the HS125 crew, so traffic information should certainly have been passed and steps taken to ensure separation. There were significant TRM lessons here worthy of further promulgation, so the Board was encouraged to hear of the considerable work done already by NATS to bring this event and in particular the learning points to the attention of other NATS controllers and their military colleagues. In their determination of the cause the Members recognised that there were many factors to consider and whilst weighing all these for relevance some thought the LJAO TLC's late notification was an intrinsic part of the cause. Other Members recognised, however, that the CFP through the RC had been accepted by

AIRPROX REPORT No 080/04

S23PLAN and given to TLC who had reaffirmed that the GR7A was at FL230. A majority view prevailed that the late notification by TLC was but a contributory factor and the Board agreed, unanimously, that the cause of this Airprox was that the S23 controllers did not ensure separation between the HS125 and the Harrier GR7A.

With regard to risk, although S23 PLAN did not specifically identify it to them, TLC was evidently aware of the descending HS125. Consequently, traffic information had been passed to the GR7A pilot at 4nm range in the first instance [not 5nm] who reports he spotted the HS125 3nm away. He was thus aware of the other ac from this point and could manoeuvre away if the HS125 got too close, thereby giving substance to his assessment that *“there was no risk of collision at any time”*. Although TLC subsequently issued avoiding action to the GR7A pilot, this turn was aimed at preserving what horizontal separation there was, but it was largely ineffective at these close quarters because the Harrier pilot did not react to it immediately. It was suggested that this delayed reaction on the part of the GR7A pilot might possibly have been the result of him trying to get his SSR working, but this was conjecture. Even so two transmissions were required before the Mentor finally got the message home – here was a lesson for pilots – when issued avoiding action react without delay. With TCAS and STCA rendered inoperable because of the lack of SSR and no action taken by S23TAC to pass traffic information or ensure separation, all the safety nets in place to protect his IFR traffic in CAS had been breached. This suggested to some that safety had not been assured. Fortunately, the HS125 crew had also seen the Harrier but probably later than the latter’s pilot as it crossed ahead. On a day when IMC prevailed this Airprox might have been assessed differently but the degree of risk is always assessed on what had actually happened in these circumstances, not what might have occurred. Here, TLC had wisely passed traffic information that had enabled the Harrier pilot to spot the HS125 in a clear sky: thus he was in a position to afford greater separation in his nimble jet if needs be. Therefore, the Board concluded, unanimously, that no risk of a collision had existed in the circumstances reported here. This assessment should not be seen to detract from the seriousness of the incident in any way. It was clear that this report had been extremely valuable; the conscientious in-depth investigations conducted had revealed many lessons and the recommendations already made, some of which had been promptly absorbed and promulgated shortly after the occurrence, have the potential to enhance the safety of these specific aspects significantly.

PART C: ASSESSMENT OF CAUSE AND RISK

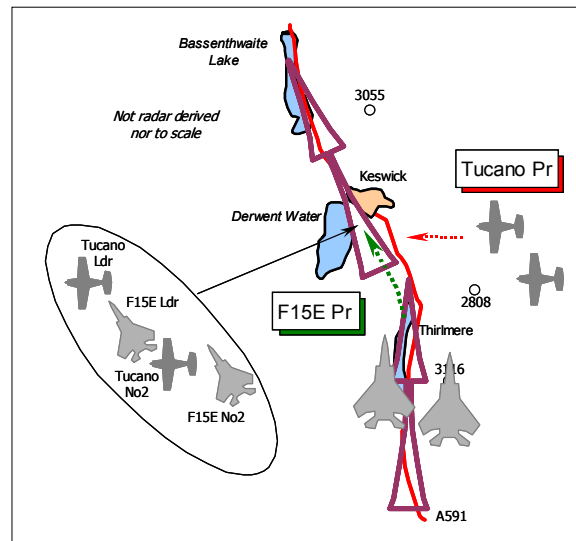
Cause: LACC S23 did not ensure separation between the HS125 and the Harrier GR7A.

Degree of Risk: C.

Contributory Factor: Late notification of the CFP request from LJAO TLC.

AIRPROX REPORT NO 081/04

Date/Time: 19 May 1254
Position: 5435N 0308W (1nm S of Keswick)
Airspace: UKDLFS - LFA17 (Class: G)
Reported Ac Reporting Ac
Type: F15E x2 Tucano x2
Operator: Foreign Mil HQ PTC
Alt/FL: 500ft 250ft
 Rad Alt msd
Weather VMC CLOC VMC CLOC
Visibility: >7nm 40km
Reported Separation:
 50ft V 100ft H/60ft V
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE F15E PILOT reports he was leading a flight of two F15Es on a low-level sortie through LFA17. The ac have a dark grey camouflage scheme but no HISLs are fitted. He was listening out on the LFS common frequency of 300.8MHz and the appropriate SSR code was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

The flight entered the uni-directional 'flowed' valley N of Lake Windermere, flying at 450kt [ground speed] from S to N at 500ft Rad Alt. Approaching a position 1nm S of Keswick, they transitioned into a L turn to follow the valley to the S of Keswick. As his formation rolled out of the turn onto a heading of 330°, a pair of Tucanos was spotted entering the 'flowed' valley "from 90° out" at 500ft agl. No avoiding action was taken as the Tucano pair passed 50ft below with an "extremely high" risk of a collision at 1254:26.

He opined that the correct procedure for entering a flowed valley from 90° out - at points other than the start - is to enter 250ft above the highest point on either side of the valley. The Tucanos entered at 500ft agl, well below the required 3058ft altitude over spot height 2808ft. After the encounter he attempted to call the Tucano leader on the LFS common frequency, but no response was received.

THE TUCANO TMk1 PILOT, a QFI, provided a frank account reporting that he was leading a pair of Tucanos on a low-level training sortie. Both ac were crewed by students instructed by a QFI with the students occupying the front seats. His No2 was flying in 'fighting wing' – the wingman swept back 45° off his port quarter. Both ac colour-schemes are black and the HISLs were on. A squawk of A7001 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted. They were not in receipt of an ATS, nor listening out on the LFS frequency of 300.8MHz.

Flying clear of cloud with a flight visibility of 40km, they approached Keswick at low level heading 270° at 240kt, when a pair of F15s was spotted 500m away to his left, flying down the valley in a left hand turn towards them. With the No2 student pilot formatting off the port quarter and looking at his leading Tucano the options were somewhat limited; they could not go down as they were at 250ft agl, nor could they fly right over Keswick, neither could they turn left into the path of the F15's or climb up into them as the jets descended. No avoiding action was taken as the lead F15 flew between the two Tucanos - astern of his ac but in front of his No2 - from left to right with a "low" risk of a collision. Minimum

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horizontal separation was about 100ft against the lead F15 that was about 60ft above his ac, but the second jet stayed up high throughout and was apparently visual with the Tucano pair.

He added that he incorrectly assumed that the student flying the No2 Tucano had seen the F15s and that the pilots of the jets were visual with them too. He stressed that he was reluctant to go right, as they would have flown over Keswick.

UKAB Note (1): This Airprox is not shown on the Great Dun Fell Radar recording. The Tucano pair are shown approaching the Airprox location from the E indicating 500ft Mode C (1013mb) for one sweep at 1254:12. Some 20 sec later a 7001 squawk is shown momentarily at 800ft Mode C followed later by two random returns, which could be from any of the 4 ac involved. From the Low Flying Chart (LFC) fragment provided by the Tucano pilot, their route followed the line of the valley westward toward the Airprox location about 1nm S of Keswick

UKAB Note (2): The UK Mil AIP at Vol III Part 1-2-17-1, specifies that the:

“Cumbrian Directional Flow Control System. In order to de-conflict opposing traffic in specific steep sided valleys, a system of mandatory flow control in a northerly direction is established in the central valley of the Lake District, along the M6 motorway pass located to the North east of Kendal and along the Ullswater valley. **Ac are to enter the flowed valleys only at the initial co-ordinates** but may exit at any point. Flowed valleys may be overflowed a minimum of 250ft above the ridge line. Details....as follows:

From Grasmere N54 27.18 W003 01.45.....along valley defined by Thirlmere – A591 – Bassenthwaite Lake to Ouse Bridge N54 40.65 W003 14.45... Crews are to avoid Keswick.

All valleys are to be flown in a northerly direction.

UKAB Note (3): The UK Mil AIP at Vol III Part 1-1-4, specifies that *“For flight safety reasons...300.8MHz has been allocated for use in the UKLFS. Whenever possible aircrew are to monitor this frequency as well as Guard.....”*.

THE TUCANO PILOT’S STATION comments that although the risk of collision was low on this occasion, this Airprox nevertheless highlights the essential need to lookout at all times when flying at low-level. Some lessons can be drawn from this incident, such as never assume your wingman has seen the other ac; if in doubt call it on the RT and secondly take extra care, particularly with lookout, when approaching junctions of valleys.

MILITARY LOW-FLYING OPS comments that flowed valleys have been established to enhance flight safety by reducing the risk of head-on collisions. In certain flow systems - the Cumbrian Directional Flow Control System is one such example - additional restrictions have been imposed on flight in the flowed valley to further enhance flight safety. On this occasion it would appear that the Tucano pair was erroneously attempting to join the flow system beyond the initial coordinates at less than 250ft above the ridge line – the height of the ridge line being the higher of the 2 ridge lines adjacent to the valley (UK Mil APD Vol III Part 1-1-4 para 15). Whilst this height is not explicitly defined for each flow system, and neither is there any intention to be so prescriptive, it would have been in excess of 3000ft AMSL in the vicinity of the Airprox.

It is noted that the Tucanos were not monitoring 300.8MHz, the UKLFS RT Frequency. It is not mandatory to monitor this frequency when in the UKLFS, but it should be the exception rather than the norm. That said, as confirmed at the recent Joint Low Flying Management Group Meeting in June 2004, there is no requirement to make specific positional flight safety calls on the UKLFS frequency – a possible option for the F-15 formation to have alerted the Tucanos of their presence and vice-versa. Indeed, it was thought that such RT calls would degrade safety by cluttering a generally quiet frequency

with a high volume of chatter providing potentially confusing information. This does not mean the frequency should not be used if there is a genuine specific flight safety concern, although Guard should also be considered in these circumstances. Other measures are used to minimise the risk of collisions in the UKLFS, including capping for LFA 17. In the future, the Military Flying Management Information System – scheduled to be introduced in 2006 - will provide increased conflict awareness.

HQ 3AF comments that the F-15Es were going about their legitimate business in the correct direction at an appropriate altitude. The intentions of the Tucano pair were not clear; if they were planning to join the Cumbrian Directional Flow Control System then, given their position approaching Keswick, they were in contravention of the regulation quoted at UKAB Note (2). If, on the other hand, they were intending to simply cross the flowed valley their height would appear to have been incorrect. They seem to have been following the valley to the E of Keswick which joins the flowed N-S valley at roughly 90 degrees, between the spot heights of 2808 and 3055 shown on the diagram. The Mil AIP dictates that the flowed valley should be overflown at least 250ft above the ridge line. In this case, the Tucanos, appear to have been flying along the adjoining valley at around 250ft agl; good airmanship would indicate that, on approaching the junction with the flowed valley, they should have climbed to clear the notional ridge line, i.e., the line joining the spot heights, by 250ft; moreover, had they continued to track W they would have needed to climb to achieve the prescribed clearance of the ridge line on the western side of the flowed valley. In the event, the Tucanos did not climb and an Airprox occurred apparently in a manner, which the regulations at UKAB Note (2) were intended to prevent.

HQ PTC comments that without any radar trace there can be no impartial arbiter in this case. Neither were we able to get any further elucidation from the Tucano leader. We are therefore forced to the view that the rules are such that they should not have been joining the flow part-way along its length. This put them in the position, when the F15s appeared, of being squeezed against the terrain with no avoidance options. If there is a well-established rule, it has generally been evolved out of hard experience.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the leaders of both formations and reports from the appropriate ATC and operating authorities.

The Board was briefed on the nature of the terrain in the vicinity of this Airprox. Although comprehensive recorded radar data was not available, it was evident to the members from the leading QFI's chart that the Tucano pair had followed the valley of the A66 from Troutbeck westbound toward Keswick. The Board noted the comments from Military Low-Flying Ops and echoed the sage advice from the Command, which made it clear that the Tucanos should not have flown through this vicinity following the route that they did. Evidently the Tucano QFI leader had allowed his formation to join the flowed valley here at 250ft, which was not allowed according to the applicable regulations within the Mil AIP [reproduced here at Note 2], thereby bringing his formation into conflict with the F15 pair that were following the established flow. The Board agreed unanimously that this was the fundamental cause of this Airprox. Members postulated why the Tucano leader might have done this, as it was inconceivable that he deliberately flouted the regulations. Seen in isolation the shape of one of the flow arrows shown on the LFC might have led him to think he could join here, but the Board was briefed that the regulations within the MIL AIP made it quite plain what to do, so this was not seen by the members as contributory to the cause. It was explained to the members that a small mandatory avoidance area (1nm radius) had been established some distance to the south for some helicopter load lifting sites, which might have caused the Tucano leader to re-route his formation further to the east initially, before rejoining his original route near Keswick. The PTC member suggested that if that was the case and the revised route was constructed in haste without reference to the MIL AIP, it might have led to such an error. The lesson here was clear - if changes are necessitated to a planned route at the last minute double check very carefully that all is in order.

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For their part the F15 pair were flying in conformity with the established flow, but when confronted with the Tucano formation crossing their path the F15 formation leader was placed in a difficult situation. His report had not reflected the range at which he first saw the Tucanos and whether or not any of the F15s' much vaunted sensors had alerted him beforehand was not clear. However, it was evident from his report that the leader did not take any action to avoid the Tucano pair. Although, the F15 leader might have been able to climb his formation up higher, he did not do so - perhaps not knowing what the other pilots would do - but also suggesting to some that an avoiding action manoeuvre might not have been crucial, even though he reported the risk was extremely high. The reports from both pilots' gave the minimum vertical separation as between 50-100ft, when the Tucanos flew under the lead jet, and the Board agreed with the Tucano pilot that in this confined terrain few avoidance options were available. Although the Tucano leader had spotted the jets 500m away, the members also noted his reluctance to over fly Keswick - as specified in the area brief. Board members agreed that, whilst not wishing to overstate the obvious, if it was essential to penetrate an avoidance area to avert a collision pilots should not hesitate to do so if that was the only remaining option. However, fast-jet members were mindful that had the Tucanos turned away to the N that would have placed them 'belly-up' in the turn and thus unable to keep sight of the jets. The Tucano leader had not felt compelled to take any avoiding action either and his report suggested that the No2 jet had stayed up high unlike the leading F15 which had flown between him and his No2. Weighing all these factors carefully, the Board concluded that as it was, the separation that existed had been just enough to prevent the two formations from colliding but, nonetheless, the safety of the ac involved here had definitely been compromised.

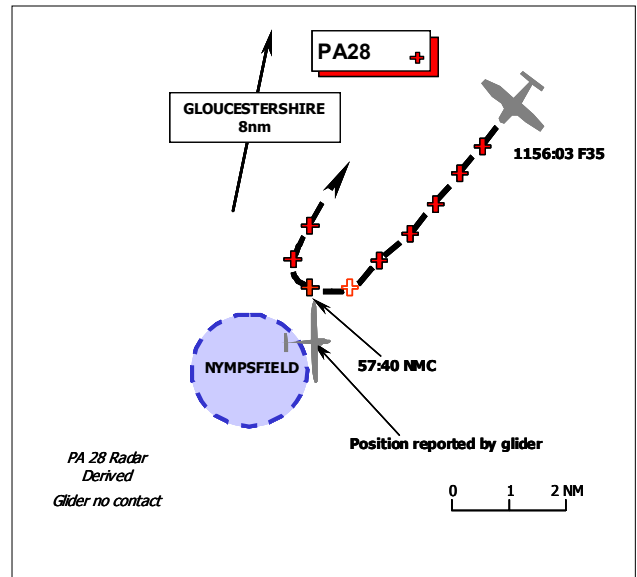
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The lead Tucano QFI had allowed his formation to fly in contravention of the applicable UKDLFS flow regulations within the Mil AIP, thereby bringing his formation into conflict with the F15s.

Degree of Risk: B.

AIRPROX REPORT NO 082/04

Date/Time: 15 May 1157 (Saturday)
Position: 5144N 00215W
 (2nm ENE Nympsfield)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: LS4 Glider PA28R
Operator: Civ Club Civ Club
Alt/FL: 2600ft FL30
 (QFE)
Weather VMC CLBC VMC CLBC
Visibility: >5nm 15km
Reported Separation:
 100ft V 0 H NR
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE LS4 GLIDER PILOT reports flying a white glider on a local soaring sortie from Nympsfield and listening out on their frequency. He was at 2600ft QFE heading 090° at 60kt when he heard engine noise and very shortly afterwards a light ac passed directly over him 100ft above. The ac came from his 9 o'clock and departed to his 3 o'clock and he was able to identify it by type and registration number. Since he saw the other ac so late, he was unable to take any avoiding action and assessed the risk of collision as being high.

THE PA28R PILOT reports flying a blue and white ac from Gloucestershire to Dinard [see UKAB Note (2)] with strobes and the beacon selected on, in receipt of a RIS from Bristol [International] Radar. At the reported time of the incident he was heading 185° at 135kt and FL30. Until he was contacted, he was not aware of an Airprox occurring. However, he doubted the proximity as reported by the glider pilot and assessed the risk as none.

UKAB Note (1): The PA28R can be seen on the Cleve Hill radar recording squawking 7000 climbing to and maintaining FL35 Mode C on a SW heading. One min before the incident the squawk changed to 0414, a Bristol code, and descended to FL31. It is seen directly over the reported position at 1157:49 in a hard R turn. Immediately after, the squawk changes back to 7000 and the ac departed the area on a Northerly heading.

UKAB Note (2): The PA28R took off from Gloucestershire at 1150UTC outbound for Dinard and encountered a problem in the vicinity of Stroud (the Airprox position). The ac turned round and recovered to Gloucestershire where the problem was rectified before taking off again at 1220UTC for Dinard. In a subsequent telephone conversation the pilot confirmed that his report was for the first sortie and that he had not seen any gliders (this was not clear from the written version).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar video recording and, reports from the air traffic controllers involved.

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The BGA provided written comments, which were concurred by the Board and are summarised in the following. This was a worrying incident in that it took place on a weekend soaring day. Nympsfield and adjacent Aston Down both have more than 50 gliders based there and it is likely that more than 10 would have been flying in the area on such a day. Furthermore, had the PA28R turned back to Staverton a little later, he would have almost certainly have passed over the Nympsfield launching wire. Nympsfield also launches by aero tow in this area. No mention was made [by the PA28R pilot] of seeing any other traffic which may have meant that he was concentrating on navigation, autopilot and transponder activities rather than looking out. Some form of advisory routing advice could provide a way forward so that en-route light ac and helicopters avoid the busiest spots: in this case routeing just a little to the W would have minimised the risk. Gliders travelling in straight lines are almost impossible to see, but an ac operating below 150kts should see a circling glider much more easily. You can hear ac approaching quite often in gliders but it is often very difficult to establish their direction and reactionary manoeuvring without visual contact can exacerbate the problem. Most LS4 pilots will be experienced and the glider pilot having sufficient capacity to note the type and registration does indicate the encounter must have been relatively close.

Notwithstanding the BGA comments, both pilots had a responsibility to see and avoid each other. That neither did in time to take effective avoiding action was of concern to, and the reasons analysed by, the Board. Members agreed that the PA28R pilot had probably become distracted by his ac problem, deciding whether to return to Staverton, plotting a new course and changing frequency and squawk. A combination of these factors had probably led to a lapse in his lookout. If the glider pilot was circling, his picture of the surroundings would have been changing continuously. However if the PA28R came from his 9 and departed to his 3 o'clock, as he reported, then he was probably a little farther NE than the position reported. This would have meant that he had been in a position to see the PA28R for some time, albeit presenting a small target to acquire, not moving across his canopy and coming straight towards him. Members surmised that a combination of these factors had led to the glider pilot not seeing the other ac until it was too late to take avoiding action.

Since neither pilot was able to take any action to avoid the opposing ac, it had been only good fortune that prevented them from colliding: the Board judged that there had therefore been an actual risk of collision, grading the Airprox 'A' accordingly.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the PA28R pilot and effectively non-sighting by the LS4 glider pilot.

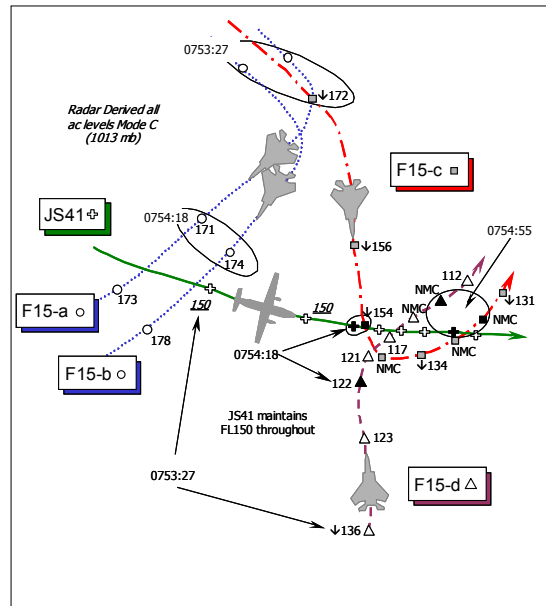
Degree of Risk: A.

AIRPROX REPORT NO 083/04

Date/Time: 19 May 0754
Position: 5245N 00001W
 (vicinity of Fenland NDB)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: JS41 Jetstream F15C
Operator: CAT Foreign Mil
Alt/FL: FL150 NR

Weather VMC CAVOK VMC NR
Visibility: Unlimited NR
Reported Separation:
 30m H/nil V. F15-d: 2nmH/2000ft
 F15-c: 1nm H/1000ft

Recorded Separation:
 JS41 v F15-c: ¼nm H/400ft↓ @ 0754:18

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE JS41 JETSTREAM PILOT reports he was inbound to Norwich from Manchester on an IFR FPL, but flying in CAVOK VMC at FL150 and in receipt of a RIS from London MILITARY, squawking the assigned code with Mode C. The ac has a red, white & blue livery, but TCAS is not, as yet, fitted.

Approaching FENLAND NDB heading 110°(M) at 285kt, the London MILITARY controller (who was very busy) passed traffic information about a flight of three F15 jets and included the callsign of one of them. Information on another F15 (again the C/S was given) was not passed and neither was the pilot heard on VHF. A single conflicting grey jet was first spotted as it crossed through the level of his Jetstream in a descending L turn some 30m ahead from L – R [he said south to north on RT], with a “high” risk of a collision. There was no time to take avoiding action, but he added that it would not have been possible to see the jet any earlier from the cockpit of his JS41, as it had been in a dive from above. He opined that TCAS would probably have given an avoiding action RA if fitted. An Airprox was reported to London MILITARY on RT just after it occurred.

THE PILOT OF F15-d one of the 4 camouflaged grey F15 jets involved provided a very helpful report but it was the wingman - F15-c - that was the jet reported by the pilot of the JS41. All four F15 jets were in receipt of a RIS from London MILITARY and squawking their assigned codes with Mode C. His original wingman had aborted the sortie, so at the time of the Airprox he was joining with a replacement wingman – F15-c the ac reported by the JS41 pilot - as they had been sent E to set up for a 2v2 against a pair of F15s [F15-a & F15-b] beneath the East Anglia Military Training Area [EAMTRA FL245 – FL550]. They had received a point-out [traffic information] from London MILITARY about eastbound civilian traffic – the JS41, which he had sighted at a range of about 5nm. At that point his ac was SE of the eastbound JS41 and below it. His wingman – the reported F15-c - was above the Jetstream to the N heading southbound. To the best of his recollection, his wingman confirmed he was visual with civilian traffic, but not that he was visual with his own jet - F15-d - whereas he was visual contact with all of the ac. He directed his wingman – F15-c - to turn to the N to effect a flight rejoin. During this rejoin he issued “directive communication” to his wingman who confirmed that he was visual with the JS41 to avoid any potential for an unsafe situation. After the rollout, he reconfirmed that his No2 had been visual with the airliner and received an affirmative reply so no further action was taken. He added that the incident

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seemed routine at the time and so it was not mentioned at the flight debrief or to the Ops supervisor post-flight.

MIL ATC OPS reports that London MILITARY Controller 12 (CON 12) was initially providing a RIS to the pilots of a three-ship formation of F15s [F15-a, F15-b & F15-c] on a UHF frequency, whilst also providing a RIS to the JS41 crew routing TRENTO to Norwich at FL150 on a VHF frequency. CON 12 had both the selected VHF & UHF frequencies on Tx/Rx throughout and 'cross-coupled' together, thereby enabling transmissions from the selected frequencies to be re-broadcast on the other selected frequency. At 0751:26, CON 12 transmitted to the JS41 crew on VHF "...traffic left 11 o'clock, 5 miles [but actually 11nm away] manoeuvring, three ship of F-15s in the height block between FL50 and 240" and the JS41 crew responded "OK looking for traffic...". At 0751:39, CON 12 passed traffic information to the three-ship F15 formation about the JS41 "...traffic south-west, 10 miles tracking east at FL150, inbound to Norwich", which the formation leader [F15-a] acknowledged. At 0751:52, another F15 pilot – the pilot of F15-d - contacted CON 12 on the same UHF frequency that the three-ship F15 formation was on. F15-d was provided with a RIS and told "you are cleared to manoeuvre initially between FL50 and FL240." The pilot of F15-d then informed CON 12 that he would like to "re-join and fight" with the three-ship F15 formation [F15-a/F15-b & F15-c]. Shortly afterwards, at 0752:21, the JS41 crew broadcast "...copied the flagship of 3." At 0752:30, in response to his request CON 12 then transmitted to the pilot of F15-d on UHF "...you are clear in the block between FL50 and FL240", which the pilot acknowledged at 0752:48. At 0753:27, CON 12 passed traffic information to the pilot of F15-d about the JS41, "...traffic north, 10 miles, tracking east at FL150 inbound to Norwich" that was acknowledged. The JS41 crew requested descent at 0753:39, however CON 12 did not respond immediately but transmitted to all four F-15 pilots on UHF "...you are cleared in the full height block in the East Anglia MTRA in the eastern portion up to FL550, in the western portion only up to FL280." Returning to the JS41 crew at 0754:14, CON 12 transmitted on VHF only "...traffic north 5 miles manoeuvring no height, further traffic south 3 miles, tracking north indicating FL120." Whereupon the JS41 crew acknowledged the traffic information and at 0754:21 reported, "...we've just had an Airprox with an F-15 right across our bows backing away." The JS41 crew then asked for and was given descent, initially to FL60. The JS41 pilot reaffirmed that he wished to file an Airprox and described the flight path of the conflicting jet, erroneously, as "...south to north...about a quarter of a mile descending...". At 0755:49, CON 12 passed traffic information to F15-d about the JS41 and a non attributable transmission was made on UHF, probably by F15-d calling "...tally." At 0756:02 traffic information was again passed to the JS41 crew about F15-d, to which the crew reported "...looking for the traffic...".

[UKAB Note (1): The Claxby Radar recording shows that when CON 12 transmitted traffic information to the JS41 crew at 0751:26, the JS41 was 11nm ENE of Cottesmore tracking SE in a level cruise at FL150 Mode C, which is maintained throughout the encounter. At the same time F15-a, F15-b & F15-c are seen manoeuvring to the ENE of the JS41: F15-a & F15-b indicating FL127 and FL115 respectively and the nearest of the three F-15s is 11nm from the Jetstream. Simultaneously, F15-d is shown 33nm SE of the JS41 tracking NW. When the three-ship formation (including at that stage the wingman F15-c) was passed traffic information about the JS41 at 0751:39, (but acknowledged by the leading F15-a at the time) the airliner is 10nm from the nearest jet. At 0753:27, (when the diagram commences) the JS41 is 9nm NW of F15-d. Later, the wingman – F15-c - is shown NE of the JS41 indicating FL156 descending and F15-d is shown SE of the JS41 indicating FL123 descending. Meanwhile, F15-a & F15-b turn right to track clear astern of the JS41 over 2000ft above it. At 0754:18, F15-c is shown descending through FL154, passing from L – R through the JS41's 12 o'clock at a range of ¼nm as F15-d is shown at FL122 Mode C, in the JS41 crew's 3 o'clock – 1½nm. The Mode C of F15-c & F15-d becomes somewhat intermittent displaying no Mode C on the next sweep as meanwhile F15-c has crossed from L – R above F15-d - indicating FL121, some ¾nm S of the JS41 at FL150. The wingman maintains a descent and turns about to effect the join on F15-d as reported, whilst the latter turns NE indicating FL117 about 3300ft below the JS41 before passing ¼nm astern of the airliner. F15-c crosses through the nose of the JS41 but no Mode C is shown; as the previous and successive indication shows the jet below the airliner F15-c was probably in excess of 1500ft below the JS41 at this stage. At 0754:55, F15-c & F15-d are shown again at FL112 and FL131 respectively. After the 'join-up'

the pair continue to track NE and at 0755:19, the JS41's Mode C indicates that the ac has started descent. Shortly afterwards, the pair turn southbound and pass the JS41 again 1.2nm astern indicating FL128, with the jets some 800ft below it indicating FL120.]

Throughout this incident all the ac involved were being provided with a RIS by the same controller and, consequently CON12 was not required to pass any avoiding action to any ac. However, CON 12 was obliged to pass "...the bearing, distance and, if known, the level of the conflicting traffic." This he did satisfactorily for the most part, however, when calling the three ship of F15s - F15-a/b/c - to the JS41 crew, he gave the range as "5nm" when it was actually 11nm distant. In addition CON 12 passed TI as "between FL50 and 240"; although this was useful information the Claxby Radar Mode C data was available on 2 of the F-15s showing FL127 and FL115 - all other TI was accurate. In accordance with the conditions for a RIS at JSP 552 235.115.1, the controller was not responsible for separating ac and was only obliged to update the traffic information if he considered under the caveat at JSP 552 235.115.1, that the conflicting traffic continued to "constitute a definite hazard." At 0753:46, when F15-c was 4.9nm NE of the JS41 southbound and descending from 1800ft above it, F15-d was northbound 6.2nm SE of the JS41, CON 12 chose to transmit a clearance to the F15s to operate in the East Anglian MTRA in the UAS. The pilot of F15-d reports that he and the pilot of F15-c were visual with the Jetstream at this point, but the RT transcript does not reflect any calls from any of the pilots' involved reporting visual contact to CON 12 at this stage. Although what constitutes a "definite hazard" is a matter of individual judgement, CON 12 could have updated the traffic information to the Jetstream crew and the jet pilots at this point instead of passing the clearance to permit GH in the MTRA. The controller clearly considered it was warranted as he passed traffic information straight after this clearance. However, none of the pilots involved had requested an update of the traffic information given or made any transmission to CON 12 indicating that they had visual contact until 0756:00. Whilst recognising that CON 12's workload was increased by the use of dual frequencies and the pilot of F15-d having to change frequencies, CON 12 should have provided more comprehensive and timely traffic information than he did. However, neither the Jetstream crew nor the pilots of F15-c/d appear to have taken any action to separate their flight-paths, request updated traffic information or report visual contact to CON 12.

HQ 3AF comments that there is little to add to the Mil ATC Ops analysis. CON 12 provided early warning of the potential confliction to the JS41 and the F-15 formation yet subsequently, none of the 3 major players: - CON12 - the pilots of the JS41 and F15-c, initiated or took sufficient further action to eliminate the risk of an avoidable 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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board was concerned that despite traffic information being provided by CON 12 to the pilots of the ac involved here, all being under the RIS, an Airprox had resulted. This essential traffic information should have been sufficient to warn the pilots of each other's ac, but none had apparently taken any positive action to forestall this avoidable encounter in the time available to them. From the JS41 crew's perspective, they were legitimately proceeding inbound to Norwich and approaching their 'top of descent' when the Airprox occurred. CON 12 evidently passed an incorrect range when he said the three-ship formation was 5nm away when in fact they were 11nm, but notwithstanding the less agile nature of the JS41 airliner compared to the more nimble F15 jets, Members recognised that the JS41 crew was content to accept a RIS where separation from the jets was entirely the crew's responsibility in the 'see and avoid' environment of Class G airspace. Clearly if the JS41 crew wanted the controller to effect radar separation against other traffic in the FIR then they should have requested a RAS. The Board did not agree that the JS41 crew would not have been able to see the jets any earlier as they

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approached. Whilst they might not have been seen in time to take any avoiding action, and F15-d was below them, CAT pilot members contended that F15-c was not that far above the airliner, whose crew should have been able to spot it earlier in the reported CAVOK conditions. This led the Board to conclude that the very late sighting by the JS41 crew was part of the cause, notwithstanding that in accordance with the 'Rules of the Air', the JS41 crew had right-of-way over F15-c.

The Mil ATC Ops report had clearly shown that CON 12 had also transmitted traffic information to the pilots' of F15a, b & c, at 10nm, but whilst it should have been heard and had indeed been acknowledged by the formation leader flying F15-a, there was no guarantee that the pilot of F15-c had received it. Unfortunately, CON 12 had chosen the wrong moment to tell the F15 pilots of their clearance into the MTRA. The Board agreed entirely with the Mil ATC Ops view that traffic information about the JS41 was far more important at that stage. There were clearly grounds for the controller to surmise that F15-c & d posed a "*definite hazard*" and the additional update call to the pilots of F15-c & d should have been made earlier. That said, the Board recognised that none of the pilots involved had requested an update about the traffic, which it would have been sensible to request at the time. Whilst CON 12 was not obliged to take pre-emptive action under the RIS, the LATCC (Mil) member agreed that the controller's priorities were not ideally chosen here and he stressed the importance of accurate and, most importantly, timely traffic information. After the investigation of this Airprox, controllers at the unit have been reminded of these important lessons.

Whilst most illuminating, the comprehensive account provided by the jet pilot here was not actually penned by the pilot of F15-c - the ac spotted by the JS41 crew - but his section leader's account had been most helpful. It was explained that the initial account by the JS41 pilot on RT had suggested that the encounter had been with the F15 flying from south to north: consequently a report was obtained from the pilot of that ac - F15-d. However, when the JS41 pilot's written submission was received and compared with the radar recording it was clear that F15-c had been the closer of the two and the subject of the reporting pilot's report. Nevertheless, the pilot of F15-d was the section leader responsible at the time. The HQ 3AF advisor explained to the Board that notwithstanding the section leader's account, in the Command's opinion it seemed highly unlikely that the pilot of F15-c had indeed seen the JS41 before he set course to join on F15-d as the wingman of the reporting jet pilot. It seemed more likely that if the pilot of F15-c had spotted the airliner at all, it was at a far later juncture when it was all too late, just as he flew past it, when he was probably unable to materially affect the horizontal separation. This seemed to the Board the most likely reason for passing a mere ¼nm away from the airliner (somewhat more than the 30m reported) as the jet descended down across the nose of the JS41 to join with his new section leader. The counter argument was that if the pilot of F15-c had seen it beforehand then he had intentionally flown that close. Despite the section leader's assertion that his wingman had seen the JS41, Members were sceptical and discounted the latter view. It seemed inconceivable that a pilot would knowingly be so 'cavalier': Members were therefore swayed by the Command's contention that although the pilot of F15-d had believed that his wingman had spotted the airliner as they joined, this was probably not the case. Whilst his "directive communication" to his wingman - orders in any other parlance - might have directed F15-c onto his own jet, this might have focused his attention too much and distracted him from acquiring the airliner sooner. The Board accepted this view and determined unanimously that this Airprox had resulted despite traffic information from LATCC (Mil) CON12, from a very late sighting by the JS41 crew and a probable non-sighting by the pilot of F15-c. At these ranges, the JS41 crew was unable to manoeuvre out of the way of the fast F15s, whose intentions would have been far from clear to the former as they joined in formation and turned about. Moreover, the JS41 pilot was apparently oblivious to the proximity of F15-d below him. Consequently, the Board agreed unanimously that the safety of the ac involved here had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

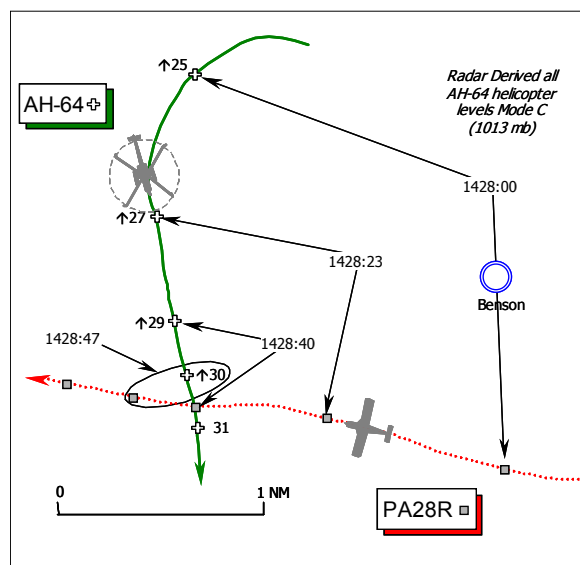
Cause: Despite traffic information from LATCC (Mil) CON12, a very late sighting by the JS41 crew and a probable non-sighting by the F15-c pilot.

Degree of Risk: B.

AIRPROX REPORT No 84/04

AIRPROX REPORT NO 84/04

Date/Time: 20 May 1427
Position: 5135N 00108W
(1½nm SW of Benson - elev 226ft)
Airspace: MATZ/Oxford AIAA (Class: G)
Reporting Ac Reported Ac
Type: Apache AH Mk1 PA28R
Operator: HQ DAAvn Civ Pte
Alt/FL: 3000ft 32-3300ft amsl
(QNH) (QNH 1016mb)
Weather VMC CLOC VMC NR
Visibility: Good >30nm
Reported Separation:
Nil V/400m H ¼nm H
Recorded Separation:
0.2nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE APACHE AH MK1 HELICOPTER PILOT reports that he was executing a practise PAR approach to overshoot at Benson, whilst in receipt of a RIS from Benson APPROACH. The PF was flying IFR on instruments, but they were flying 'into sun' in VMC some 3-400ft below & 1000m clear of cloud with "good" in flight visibility. After initiating the overshoot they set course and climbed out on a heading of 160°(T) in accordance with ATC instructions at 100kt. Approaching the level off at 3000ft ALT, a low-wing single engine light ac (LA) was spotted at 11 o'clock, some 3-400m away at a similar altitude. To avoid the LA he turned slightly L, which took them 400m behind the LA at the same altitude with a "moderate-high" risk of a collision.

THE PIPER PA28R ARROW PILOT reports his ac has a white colour scheme with yellow stripes and the wing-tip strobes were on whilst in transit from Elstree to Swansea with a glider pilot as his passenger. He was not under any ATS at all, nor in communication with any agency. A squawk of A7000 was selected but no Mode C is fitted. Flying at 3200-3300ft amsl in VMC, in the vicinity of Benson aerodrome, heading 275-280°(M) at 140kt, the military Apache helicopter was first spotted about ½nm away to starboard. As soon as they saw the helicopter they could see that it was on a divergent track and he felt the best course of action was to maintain his course straight and level. A climb would have slowed them down and reduced the distance by which the ac would have passed behind them, moreover he wanted to avoid passing too close to the cloud some 400ft above them. Both he and his passenger felt that there was very little or no risk of collision.

MIL ATC OPS reports that the AH 1 crew had just completed a Precision Approach (PAR) at Benson with the intention of overshooting and departing to Odiham climbing to FL35. The AH 1 crew completed their PAR at 1425:34, and reported to Benson APPROACH (APP) overshooting, whereupon the flight was identified, placed under a RIS and the pilot requested to "report level at FL35". At 1426:18, APP instructed the AH 1 crew "...on passing 1800ft [the minimum from Radar Vector Chart] take up own navigation for Odiham". After the completion of some administrative calls, APP advised the Apache crew that the traffic information was 'limited' from all around due to the proximity of the helicopter to Benson's radar overhead, but added traffic information on "traffic east 3 nm tracking west, no height". The AH 1 crew reported visual with the traffic at 1426:45, so APP tried to ascertain the height of the conflicting traffic but with no success. Traffic information was passed, again, on the unknown track at 1428:34, as "previous traffic now 12 o'clock, ½nm, tracking west, no height information", whereupon the

helicopter crew reported *“visual”*. At 1428:45, the AH 1 pilot reported he would be filing an Airprox against the other ac – the PA28R - routing *“¼nm across our nose, same height”*. APP handed over the AH 1 to Odiham at 1434.

[UKAB Note: (1): The Heathrow Radar recording first shows the AH 1 helicopter climbing out from Benson, tracking N, indicating 2000ft Mode C (1013mb), with the PA28R 2nm SE of the helicopter (1½ nm ESE of Benson), tracking 250°, squawking A7000 [no Mode C fitted]. The AH 1 is shown initiating a L turn at 1427:28, indicating 2100ft Mode C, whilst the PA28R turns R onto a track of 290° at 1427:44. The AH 1 steadies on a southerly heading at 1428:23, with the PA28R at L 10 o'clock – 1¼nm tracking 290°. Without either ac showing any deviation from their respective tracks, the contacts continue to converge as the LA crosses 0.3nm ahead of the helicopter from L-R at 1428:40. The AH 1 closes to 0.2nm in the PA28R's 4 o'clock at 1428:47, the helicopter indicating 3000ft Mode C at the CPA, before passing directly astern of the LA that maintains a westbound course as the helicopter climbs to 3100ft Mode C.]

On completion of the PAR, the AH 1 had been climbed by APP to FL35 and released own navigation for Odiham, which required a southbound heading. The traffic information passed to the AH 1 crew whilst the helicopter was ¼nm SW of Benson, climbing through 1700ft Mode C, on traffic *“...east, 3nm tracking west, no height”*, correlated exactly with the position of the PA28R. However, the second transmission of traffic information passed stated *“previous traffic now 12 o'clock, ½ nm, tracking west, no height”*. The Heathrow Radar recording shows no other traffic in this position, but it might nevertheless have been detected and displayed to APP on the Benson SRE. It is feasible that the traffic APP called in the first instance may not necessarily have been the PA28R but another track in the same vicinity. At that stage the PA28R was 1¼nm SE of the AH 1. The fact that the helicopter pilot called visual with traffic after both transmissions of traffic information suggests that the information given was reasonably accurate and that an ac was operating in the specified location.

HQ DAAvn comments that with 2min available to the Apache crew to alter their flight path this encounter was perhaps closer than necessary but was certainly not dangerous nor lax given their situational awareness and ac's manoeuvrability. It is likely that the Apache crew was lulled into expecting greater airspace protection having just followed such a specific and directed activity as a PAR, however, APP provided appropriate and timely information under the RIS requested. The situation was undoubtedly compounded however by the disappointing airmanship displayed by the PA28 pilot who did not deem it wise to seek an ATS in such a busy locality, as communication with Benson ATC would have been of considerable benefit. Both ac's crews chose a course of action that avoided confrontation but which subsequently proved to be a little less comfortable than anticipated.

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.

A Member expressed his concern at, in his view, the disappointing airmanship displayed by the PA28R pilot. The Mil ATC Ops report had confirmed the LA pilot's report that he had not called Benson ATC, despite crossing close to this busy aerodrome just at, or slightly above, the upper limit of the Benson MATZ of some 3000ft aal – 3226ft being the upper altitude here – and within the confines of the Oxford AIAA. Whilst cognisant of the PA28R pilot's legitimate right to fly either through the MATZ [but not the ATZ] or in close proximity to it, without calling Benson ATC, the Board agreed with the GA pilot Member's opinion that this was most unwise. If the PA28R pilot had indeed called Benson on VHF, even just for a FIS, then the PA28R could potentially have been identified and thus become 'known traffic' to ATC. This might have additionally resulted in traffic information being given to the PA28R pilot about the helicopter, thereby alerting him at an earlier stage to the presence of the AH1. Or, potentially, if the PA28R pilot had asked for a MATZ penetration service (the UK AIP at ENR 2-2-3-1 refers) in addition to

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traffic information being provided then positive separation could have been effected by ATC between these two ac as the helicopter climbed out. As it was the PA28R pilot did not do this and was thus required under the 'Rules of the Air' to give way in this crossing situation. The PA28R pilot elected to maintain his course and speed so that, as he reported, the separation that did exist would not have been eroded still further. It is axiomatic that the 'Rules of the Air' can only be applied when pilots have spotted the other ac in sufficient time to take the action required of them. Here the PA28R pilot says that he had not spotted the helicopter until it had closed to a range of about ½nm – a late sighting. At this juncture it was left to the Apache crew to take action. The Mil ATC Ops report reveals that according to the RT recording the helicopter pilot spotted the other ac from 3nm away (not the 3-400m the pilot had included in his written submission) following the traffic information provided by APP under the RIS. This seemed somewhat surprising as this call was given when the helicopter was northbound, climbing out after the PAR, and the PA28 was SE of the aerodrome. The later update was however transmitted after the helicopter had 'rolled-out' on its southbound heading when the pilot had again called visual with the PA28 and at about the same point that the latter's pilot apparently saw the helicopter. The RIS provided is essentially a 'VFR service' that requires the crew to maintain their own separation visually, in the 'see and avoid' environment of Class G airspace. The HQ DAAvn Member postulated that the helicopter crew might also have mistakenly thought that ATC was going to effect appropriate separation – a not uncommon misconception in this sort of scenario – but which was neither mandated nor asked for by the AH1 crew here. APP had provided traffic information, although in the Mil ATC Ops advisor's opinion the later transmission at ½nm was a little too late, albeit that no update had been requested by the helicopter crew. Some Members viewed the helicopter crew's decision to close to this range, having seen the LA earlier, somewhat perplexing and in the HQ DAAvn Member's opinion the helicopter pilot could have given the PA28 a wider berth if needs be. It was however pointed out that the helicopter was undertaking an intensive training exercise at the time. Nevertheless, the AH1 crew only elected to turn L slightly, which resulted in minimum horizontal separation of 0.2nm, almost exactly the range reported - 400m. This led the Board to conclude, unanimously, that this Airprox had resulted from a conflict in the Oxford AIAA resolved by the Apache AH1 pilot. Moreover, the helicopter crew were aware of the PA28 at range from APP's traffic information: the latter's pilot had seen the helicopter and both could have afforded greater separation had they chosen to do so. The Board concluded, therefore, that the Apache pilot's avoiding action turn had effectively removed any risk of a collision in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

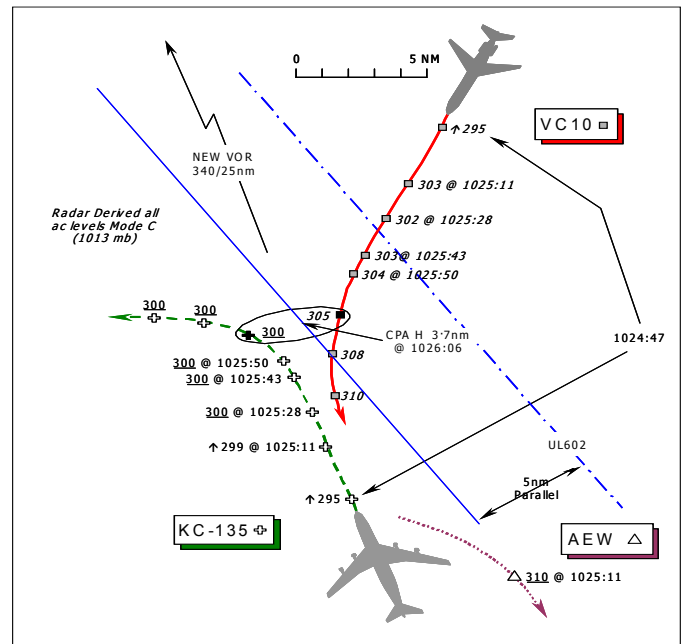
Cause: Conflict in the Oxford AIAA resolved by the Apache AH1 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 85/04

Date/Time: 21 May 1026
Position: 5539N 00128W
 (160° NEW VOR 25nm)
Airspace: UTA/MRSA (Class: B)
Reporter: ScACC MONTROSE SC
First Ac Second Ac
Type: KC-135E VC10
Operator: Foreign Mil HQ STC
Alt/FL: FL300 ↑FL320

Weather IMC VMC CLOC
Visibility: -- >10km
Reported Separation:
MON SC: 3½nmH/500ft V
 200ft H 2nm H
Recorded Separation:
 3·7nm H/400ft V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE ScACC MONTROSE COMBINED PLANNER & EXECUTIVE CONTROLLER (MON SC) reports that the KC-135 was handed over from London MILITARY (EAST) after a request for a UAR joining clearance at NEWCASTLE VOR (NEW). An AWACS ac was operating in UK AEW Orbit Area 4 at FL310, so he had requested that the KC-135 be handed over early, as there was also other GAT at FL320 that had to be descended to FL260 by NEW, but which was not in conflict with the KC-135. The KC-135 was level at FL280 when identified and then climbed to FL300, before a landline call was received from LJAO NW, who rang to co-ordinate traffic squawking A6441 15nm N of the KC-135 tracking S [the VC10]: its Mode C showed FL303 and climbing. LJAO NW said the VC10 was not climbing above FL300, but he advised that his KC-135 was also at FL300. The LJAO controller then amended the co-ordination to “not above FL310” so he mentioned the AWACS at FL310. The A6441 squawk had by then descended to FL302 and the distance had closed to about 9 miles, so he told LJAO NW to standby whilst he gave his KC-135 an avoiding action turn of about 50°-60° onto 270° and passed traffic information to the crew. However, the KC-135 pilot did not reply so he had to repeat the avoiding action instruction. Reporting the VC10 in sight, the KC135 pilot turned L onto 270°, whereas the A6441 climbed: he estimated the ac passed about 3½ nm and 500ft apart. The KC-135 pilot was informed that he would be taking reporting action. Initially, he believed that the A6441 squawk indicating FL303 Mode C and displaying a climb arrow, would be above his traffic before horizontal separation was breached. When he realised that this would not happen he initiated avoiding action.

THE KC-135E PILOT provided a short account, reporting his ac has a dark grey camouflage scheme and both upper and lower HISLs were on. TCAS is fitted. Returning to their home base at Bangor MN USA from Waddington, northbound in an en-route climb at 360kt, reportedly in IMC, a TCAS TA was enunciated. He levelled off and started to take a turn away from an unknown ac, which passed as he believed “200ft” away horizontally and above his ac. No RA was triggered because he had reacted beforehand, but “if no action had been taken” he assessed the risk of a collision would have been “high”.

THE VC10C Mk1K PILOT reports his ac has a light grey camouflage scheme, but the HISLs were on whilst flying VMC ‘out of the sun’, clear of cloud with an in flight visibility of >10km. Although the crew included a training captain, student captain, co-pilot and 2 navigators, at the time of the Airprox the pilot

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reports his workload was "medium to high", flying 'single pilot', with the co-pilot not on the flight deck. He was flying IFR in receipt of a RCS from London MILITARY, but neither TCAS nor any other form of CWS is fitted.

They had just completed air-air refuelling in the vicinity of Air-Air Refuelling Area (AARA) 5 and had initiated their recovery to Brize Norton on completion of the sortie at 470kt. The flight had been cleared direct to POLE HILL (POL) VOR and ATC ordered 2 level changes - he could not remember exactly which - but possibly included a "stop climb" at FL300 and/or FL310, before eventually being instructed to climb to FL320. The controller passed an avoiding action L turn instruction onto 140°, requesting that the turn be initiated immediately. A KC-135 was sighted during the L turn about 2nm away possibly at a similar level. He assessed the risk of a collision as "low".

ScACC reports that at 1018:30, a London Military (EAST) Assistant phoned MON SC, requesting a UAR join of UL602 at NEW VOR for the KC-135 climbing to FL290, outbound to the USA as General Air Traffic (GAT). This was agreed at FL280, the correct westbound level. The KC-135 crew contacted the MON SC at 1022:46, with some 48nm to run to NEW VOR. After identification the crew was instructed to route NEW-TALLA thence for their OCA entry at 57°N 010°W under a RCS in the upper airspace. At 1023:38, MON SC asked the KC-135 crew what level they required for the crossing, to which the pilot responded FL310 for the OCA entry. Because an AEW ac was operating in the vicinity at FL310, the MON SC cleared the KC-135 crew to climb initially to FL300. At 1024:47, the LJAO NORTH WEST controller (LJAO NW) [situated at Swanwick (Mil)] contacted MON SC to co-ordinate the VC10, some 19nm N by E of the KC-135 passing FL295 in the climb. The KC-135 was also passing FL295 at this time; LJAO NW controller stated that her traffic was "...climbing flight level 32[0]" then broke off to correct herself, saying "...not above flight level 300". At this point however, the VC10 was already indicating FL302 in the climb. MON SC replied that the KC-135 was "...climbing to maintain [FL] 300" to which LJAO NW responded, at 1025:10, "roger, I'll climb [FL] 310". MON SC then advised of the AEW ac operating at FL310 20nm to the S of the VC10, upon which LJAO NW reported radar contact. ScACC STCA activated at 1025:11, when the range was 12nm between the ac. At just before 1025:20, the MONTROSE Sector transcript reveals that LJAO NW instructed the VC10 crew to "...climb flight level 310", albeit with no mention of any need to expedite the climb. Moments later at 1025:28, the MON SC initiated avoiding action and transmitted to the KC-135 crew, "...avoiding action, turn left heading 270°, traffic in your 1 o'clock range 8miles, Mode C 302". There was no acknowledgement from the KC-135 crew, so at 1025:40 he repeated the instruction saying, "avoiding action, turn left immediately heading 270°". Whereupon the KC-135 pilot responded at 1025:50, "[C/S] turning left 270 have the traffic in sight". A different voice from the LJAO NW controller initiating co-ordination [probably the LJAO mentor] then reported that "we've gone left 140° as well MONTROSE". The KC-135 began a L turn at 1025:59, when the VC10 was 4.2nm distant and passing FL304 in the climb. MON SC said to the London Mil controller "We're going to have to file on that" to which LJAO NW replied "OK, no problem". SMF was not triggered.

MONTROSE Sector was single-manned, with one controller – MON SC – operating both PLANNER and TACTICAL positions; traffic levels were light and single manning was considered appropriate. Before the incident, the KC-135 was flying 'off-route' at FL280 within Class B airspace under the control of London Military (EAST) [as OAT], requesting a UAR join at NEW [the KC-135 thus becoming 'on-route' GAT] to proceed towards its OCA entry point at GOMUP under a RCS from ScACC. LATCC (Mil) co-ordinated a handover to MON SC and the KC-135 crew made their first call to MON SC at 1022:46, reporting level at FL280. After establishing that the KC-135 pilot required a higher level [FL310] for his OCA entry point, the flight was climbed initially to FL300 because of the AEW ac operating in the vicinity at FL310. LJAO NW [situated at Swanwick] initiated co-ordination with the MON SC against the KC-135 with their VC10 heading SSW, climbing through FL295 for FL300 at 1024:47. At this point the distance between the ac was 19nm and although this was perhaps a little late, there should just about have been adequate time to agree and achieve requisite separation of 1000ft vertically or 5nm horizontally between ac.

The ScACC MATS Pt 2 General 5.4.11.1, states that: *On-route GAT has priority over Operational Air Traffic (OAT) and Defence Air Traffic (DAT), except when OAT or DAT has been granted Non-Deviating Status or Air Defence Priority Flight (ADPF) status. Additionally, certain special flights which are subject to procedures agreed by NATS HQ have priority of passage over GAT.*

Furthermore MATS Pt 2 General 5.4.14, Responsibility for Initiating Coordination, states that:

On-Route GAT: Military controllers are to initiate coordination when OAT/DAT may conflict with GAT which is on-route or holding in the Upper Airspace.

Off-Route GAT: Civil controllers are to initiate coordination when off-route GAT conflicts with OAT/DAT in the Upper Airspace; however, at certain times and subject to agreed procedures, off-route GAT may be afforded on-route status.

On this occasion the landline interchange was rather protracted. LJAO NW stated in the call that the VC10 was climbing to FL320 but then corrected the level to "not above FL300". However, at that point the VC10 could be seen on radar already climbing through FL302 Mode C. When MON SC stated that the KC-135 was maintaining FL300, LJAO NW said she would climb the VC10 to FL310. MON SC warned her about the AEW ac in the Newcastle area also at FL310, which necessarily lengthened the telephone dialogue. LJAO NW interjected at 1025:19, to climb the VC10 to FL310 when the ac were converging about 12nm apart with the VC10 climbing through FL303. However, on the next Scottish radar sweep, the VC10 indicated having descended again to FL302. The MON SC reports that because it was agreed that the VC10 would be climbed to FL310 to ensure 1000ft vertical separation against the KC-135, and that the VC10 could be seen on radar already at FL303 and climbing, he judged that the requisite separation would be achieved. However on a subsequent radar sweep some seconds later, the VC10 is shown at FL302 and it was clear to him that he would have to take immediate, decisive action to resolve the situation by giving the KC-135 an 80° L turn. When giving avoiding action to the KC-135 crew, the MON SC controller was not certain if the pilot had heard the instruction, as it was not acknowledged: thus he repeated the transmission. However, a review of the radar recording suggests that the crew did begin to respond to the first instruction before the repeat instruction was completed. LJAO NW recognised the requirement to co-ordinate and attempted to do so, but separation was eroded before co-ordination was agreed. Despite being reported as an Airprox, minimum separation between the ac was not less than 3.7nm/400ft. Moreover, the SC was aware of the developing situation and took measures to resolve it.

Following their analysis of this Airprox ScACC ATCI observed that, controller-to-controller co-ordination between ScACC and LJAO is normally problem-free, although there have been difficulties in the past with other military units. Therefore it was recommended that ScACC senior management reviews the lessons learned from all telephone co-ordination between ScACC and external military agencies and considers if action is required to de-risk procedures. The ATCI recommendation was accepted and controller-to-controller telephone co-ordination will be considered as a suitable subject for a safety survey.

MIL ATC OPS reports that the VC10 was routeing from the North Sea inbound to Brize Norton under a RCS from LJAO NW climbing to FL320. The KC-135 was outbound under the control of ScACC climbing to FL300 as off-route GAT. At the time of the incident LJAO NW was manned by a mentor, instructing a trainee controller.

The VC10 was identified, placed under a RCS by LJAO NW, and instructed to climb to FL320 at 1023:02. The VC10's climb was restricted to FL300 by LJAO NW at 1025:00, for "*co-ordination purposes*", before at 1025:14 the crew reported level and was given a further instruction to climb to FL310. This was followed 14sec later at about 1025:28, by an avoiding action instruction when LJAO NW transmitted "*...avoiding action turn left heading 140° traffic was 12 o'clock eight miles left - right*

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FL300". The VC10 crew subsequently called visual with the conflicting traffic – the KC-135 - and levelled at FL 310 at 1026:38.

The Claxby Radar recording shows the VC10 at 1024:29, 14nm SE of Newcastle, tracking 210° climbing through FL270 Mode C. The KC135 is shown 4nm S of Teesside, tracking NW indicating FL287 Mode C climbing. The KC135 levels at FL300 at 1025:19, whilst the VC10 climbs to and maintains FL303 for 2 sweeps, before descending again to FL302 for a further 3 sweeps and then initiates a climb to FL310 at 1025:47. The KC135 is seen initiating a L turn at 1025:50, when vertical separation is 400ft. Minimum horizontal separation of 3.7nm occurs at 1026:06, as the 2 ac are in their respective turns.

LATCC (Mil) (EAST) had originally taken a prenote for the VC10 from CRC BUCHAN, but with the aim of saving the pilot a squawk and frequency change LATCC (Mil) asked LJAO NW if they would be happy to take the handover direct from BUCHAN and provide an ATC service in LATCC (Mil)'s airspace. Given the light traffic loading at the time, LJAO NW - acting with the best intentions - readily agreed. The VC10 crew first called LJAO NW at 1022:46, when the KC-135 was 60nm SW of the VC10 indicating FL280 Mode C. At that point the KC-135 was 10nm W of the western edge of UAR UL602 and therefore "off-route" as per the ScACC MATS Pt 2 Gen 5.4.10.1. At face value, it would seem that the sole onus for initiating co-ordination lay with ScACC MON SC. However, given the predicted tracks of the 2 ac, it was likely that the point of conflict between them would be on or close to UL602 so arguably LJAO NW shared a joint responsibility for initiating co-ordination. Indeed, LJAO NW had interrogated the electronic FPL details of the KC-135 at 1018 when the KC-135 was still under the control of LATCC (Mil) (EAST) and this data remained on their screen until 1021:58. The FPL data showed that the flight would be climbing to FL280 and proceeding as GAT via UL602 from NEW. However, whilst this was useful as a planning tool it could not be relied upon for co-ordination purposes. In this instance LJAO NW placed undue reliance on this FPL information and believed that the VC10 would reach its assigned level of FL320 before it came within 5nm of the KC-135, which LJAO NW supposed would maintain FL280. LJAO NW realised the point of conflict would be when the KC-135 was 'on-route' and the 2 ac would have to be co-ordinated, as even the perceived vertical separation would be only 4000ft. Between the time of the first RT contact with the VC10 and the Airprox, LJAO NW took a prenote from another ATSU as well as an electronic allocation, which in accordance with SOPs required LJAO NW to request a PLANNER to man the Sector. It is likely that all these actions happening simultaneously distracted LJAO NW from the developing situation. When LJAO NW's attention returned to the subject ac, the KC-135 was still maintaining FL280. However, at 1024:29, the KC-135 started to climb. Recognising this and notwithstanding that the KC-135 was still 'off-route', LJAO NW contacted MON SC to request co-ordination. LJAO NW's initial reaction was to stop the VC10's climb at FL300, but NW had to readjust their plan when the MON SC advised that he was climbing the KC-135 to FL300. With the ac now 20nm apart and closing rapidly, LJAO NW stated that he would continue the climb of the VC10 to FL310. However, insufficient airspace was available to allow the VC10 to reach this level (thereby establishing vertical separation) before horizontal separation was eroded: avoiding action was therefore issued by both LJAO NW and MON SC against the opposing track.

It might be suggested that contrary to the ScACC MATS Pt 2, MON SC did not initiate co-ordination of the KC-135 whilst operating off-route in the UAS. However, given the anticipated flight profile of the KC-135 and the likely point of conflict, LJAO NW must share equal responsibility for the lack of early co-ordination or avoiding action. LJAO NW's over reliance on the flight plan data of the KC-135 was another factor, as well as their well intended decision to work the VC10 which was well outwith LJAO's area of responsibility.

HQ STC comments that there is a salient lesson for all in that early action could have prevented this Airprox. The controllers appear to have effectively allowed a situation to develop where all flight level manoeuvre options were used up whilst either distracted or relying on the other to do something about it. A simple 20-30° turn at range would have resolved any conflict had the situation been recognised early enough.

HQ 3AF had nothing further to add.

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 crux of this encounter revolved around the controlling aspects of scan and co-ordination. The ScACC MATS Pt 2 makes it plain that there was an inherent responsibility on the part of the MON SC to initiate co-ordination against 'OAT' – the VC10 - whilst the KC-135 was technically 'off-route' having not yet joined the UAR structure at NEW. Nevertheless, if MON SC had tried to call LATCC (Mil) to initiate co-ordination, in whose Mandatory Radar Service Area (MRSA) this Airprox occurred, the call would have been fruitless as he would have called the wrong unit! Given the sound working relationship that exists between the units here, the issue of who was required to initiate co-ordination was to some rather academic and it was clear that each controller involved had an inherent responsibility for their own ac, which they were discharging as best they could. The Board recognised that whilst it was well intended, the decision by the LJAO NW Mentor and trainee to provide the crew of the VC10 with a RCS outwith their area of responsibility (at the suggestion of LATCC (Mil)) and thereby save the VC10 crew the additional disturbance of a frequency change had subsequently been fraught with difficulty. The very full ScACC account, coupled with the comprehensive Mil ATC Ops report, had laid bare the essential details of this encounter in the Class B UAS, where some useful and pertinent reminders had been drawn for all controllers from this unfortunate encounter: not to base plans too closely on FPL data from the military perspective; and to scan well ahead for potential conflicts and take decisive and robust action at an early stage.

The LJAO NW trainee's initial attempts at co-ordination reflected in the transcript evinced a confused scenario, which was indicative of late detection of a conflict that should have been readily apparent and the attempted co-ordination was plainly not successful. It appeared to some Board members that LJAO NW had tried to 'co-ordinate to conflict'. The LJAO mentor should have instructed his trainee to effect an early avoiding action turn away which could potentially have resolved the situation when it became plain that co-ordination might not be accomplished successfully. Nevertheless, when it was obvious that avoiding action was necessary (at the same time that MON SC instructed the KC-135 crew to turn L), the instruction issued was effective and coupled with the traffic information provided allowed the VC10 pilot to sight the KC-135. However, best practise would suggest that it was unwise to expect U/T controllers to operate efficiently outwith their own Unit's MRSA and the trainee might understandably have been a little flustered at working in 'foreign territory'. Whilst flexibility is one of LJAO's great strengths there was a salutary lesson here for mentors insofar as trainees should not be instructed to operate outwith a unit's area of responsibility.

For his part the ATSI advisor opined that it was unfortunate that the MON SC did not apparently detect the conflict until the LJAO NW trainee called to initiate co-ordination and it was pointed out. The controller had apparently not been unduly concerned until it became evident that the VC10 was not climbing at a sufficient rate to ensure that standard separation would be maintained. The MON SC's decision to dispense with co-ordination by that stage and effect an avoiding action L turn was well founded and the ScACC report had shown that the KC-135 crew had indeed responded to this first transmission, it having the desired effect. In the Board's view, neither the LJAO NW mentor and trainee nor the MON SC had spotted the conflict early enough to be able to resolve it and maintain standard separation within the time and airspace available to them. Consequently, the Board agreed that this erosion of separation had resulted from a lack of effective and timely co-ordination by the controllers concerned.

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Why this KC-135 pilot perceived that the VC10 flew within 200ft horizontally was not plain at all from his short account: from the radar data he was evidently mistaken. The combined effect of the controllers' complementary turn instructions and the crews' prompt reaction had ensured that both ac flew no closer than 3.7nm apart. The Board noted that as this minimum range was greater than the range at which the VC10 pilot states that he saw the KC-135 [2nm] so he must have actually seen it a lot earlier than he stated. Furthermore, the VC10's climb had added 500ft vertical separation by that stage, which convinced the members that these combined actions had effectively removed any risk of a collision here.

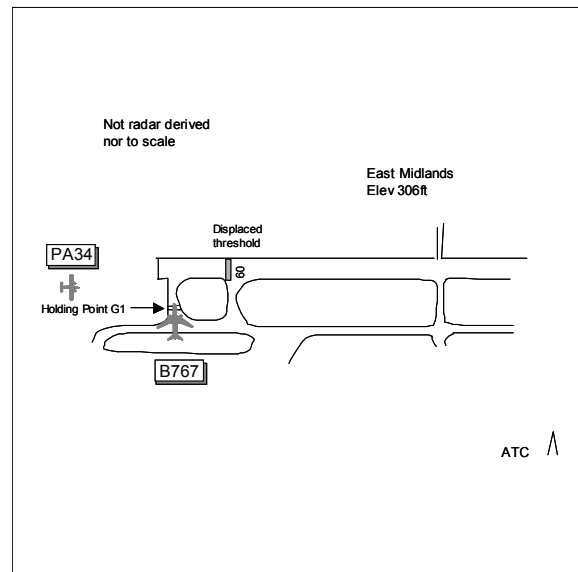
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Lack of effective and timely co-ordination.

Degree of Risk: C.

AIRPROX REPORT NO 086/04

Date/Time: 21 May 1407
Position: 5250N 00121W (RW09 Holding Point East Midlands - elev 306ft)
Airspace: ATZ (Class: D)
Reporting Ac Reported Ac
Type: B767-200 PA34
Operator: CAT Civ Trg
Alt/FL: surface 600ft↓
 (agl) (QNH 1025mb)
Weather VMC CLBC VMC CLBC
Visibility: 20km 20km
Reported Separation:
 40ft V >300ft V
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE B767 PILOT reports being stationary at Holding Point G1 for RW09 at East Midlands and in receipt of an ATS from East Midlands TOWER on 124.0MHz. The B767 was heading N and a conditional clearance had been received to line up and wait after training traffic at 2nm on a go-around. The approaching traffic, a white coloured PA34 with landing light on, was seen visually as it was a very clear day, although it was slightly S of the RW extended C/L in a slightly nose down attitude on a 3° glide slope and appearing to be slightly low; he assumed the PA34 would commence a go-around at 200ft agl somewhere near to Donington Park situated about two-thirds of a mile from the RW threshold. He was used to seeing test ac at East Midlands, however when the subject PA34 reached about 200ft, it was seen to veer further S of the C/L and continue its descent towards them. He would have called out "go-around" himself but the PA34 was on another frequency. He spooled up his engines in anticipation of taking avoiding action but there was no time left. It went through his mind that the PA34 had suffered a live engine failure and that its instructor was making a forced landing but the ac did go-around at the last minute, its engines being heard and felt, both on the flight deck and the cabin. Both he and the FO estimated that the Seneca had sunk to about 40-50ft agl directly in front of the airliner and initiated the go-around 40-50m before reaching them. They only saw the PA34 arresting its ROD because it passed over them at that stage. Considering the Boeing 767's fin height is 50ft, he thought this an extremely high risk to both ac.

THE PA34 PILOT reports flying as an examiner on an initial instrument rating test (IRT) flight from Oxford to Cranfield via East Midlands and in receipt of a RCS from East Midlands APPROACH on 134.17MHz. The visibility was 20km 2000ft below cloud in VMC and the ac was coloured white/blue with wing-tip strobe lights switched on. The examinee was seated in the LH seat with screens obscuring his external view whilst the examiner's screens were angled to allow adequate view from the R. At 4nm on the ILS for East Midlands he could see an ac lining up plus 2 others holding at the holding point S of the RW. The approach flown had been reasonably stable heading 090° at 100kt until 2nm when the examinee allowed the ac to drift to ½ scale deflection above the G/P which he corrected smoothly. Throughout the last 2nm, the examinee drifted S so that approaching decision altitude (DA) he had a ½ scale fly L indication. At about 600ft QNH the ac again drifted high however this time the examinee pitched the ac's nose down by approximately 10°, rapidly moving the ac to >½ scale deflection below the G/P. He immediately took control and went around just before DA 530ft QNH and eased the ac L to

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avoid overflying the B767 at the holding point. He estimated that he climbed over the front of the B767 above 300ft agl (600ft QNH), assessing the risk as low.

THE EAST MIDLANDS ADC reports that the incident was not seen because at the time he had been dealing with an ac that had just departed. The pilot of the subject B767, which was at holding point G1, advised him that an MOR would be filed regarding the subject PA34 which was executing a low approach and go-around.

THE EAST MIDLANDS GMC reports that she saw the PA34 on short final for RW09 pitch down and turn slightly towards the B767 which was at holding point G1 S of the RW09 threshold. This was quickly followed by the PA34 pitching up and turning L away from the B767.

ATSI reports that there are no apparent ATC causal factors. Although the ADC did not see the PA34 approaching the B767, the incident was observed by the GMC. As the incident occurred so quickly and was resolved by the PA34 pilot, any remedial ATC intervention was not practical.

UKAB Note (1): The incident occurred below recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members could not reconcile the disparate differences in the separation distances reported by both crews. During the later stages of the PA34's approach, the examinee had allowed the ac to drift S of the FAT and descend below the nominal G/P, heading towards the B767 S of the RW. However, the PA34 examiner had taken control, just before DA, and executed a go-around, turning L to avoid the B767 and passing >300ft above and in front. The B767 crew had been concerned at the PA34's flight path and estimated that it passed 40ft above them. The ADC had not seen the incident but the GMC had seen the incident unfold broadly in line with the PA34's report. Fortunately, East Midlands ATC had provided the UKAB with a CCTV recording from a camera situated adjacent to the ATC building, facing WNW. This shows, using a time lapse recording technique, the RW09 threshold area, holding point and part of the taxiway together with the last part of the FAT, as shown in the diagram. The recording initially shows an approaching airliner which carries out a landing followed by another airliner lining up and departing, with the subject B767 moving to the hold after the previous departing ac had moved onto the RW. Shortly after this, the PA34 is seen on final approach describing a similar path on the screen to the previous arriving airliner before it executes a missed approach on short finals and turns L away from, and climbs well above, the B767 at the Holding Point. The recording on the CCTV does not support the distances estimated by the B767 crew. This left the Board in no doubt that the PA34's flight path flown had not compromised safety and the incident had been little more than a sighting report.

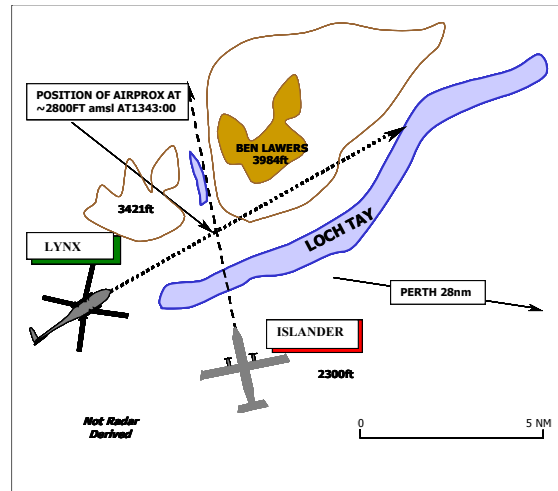
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 087/04

Date/Time: 22 May 1347 (Saturday)
Position: 5630N 00415W (N Bank Loch Tay)
Airspace: Scottish FIR (Class: G)
Reporting Ac *Reported Ac*
Type: Lynx Islander
Operator: DAAvn Civ Pte
Alt/FL: 2800ft FL030
 (QNH 1030 mb)
Weather VMC CAVOK VMC CLBC
Visibility: >50nm 20km
Reported Separation:
 300m H 0 V 1-200yd H 0 V
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE LYNX PILOT reports flying a grey/green camouflaged ac with HISL and nav lights selected on en route from Prestwick to pick up two passengers from a field site near Aberfeldy. He was flying VFR, in receipt of a FIS from Scottish Military and squawking 7000 with Mode C selected off. While on the final leg heading 050° at 130kt and 2800ft on the regional QNH of 1030mb and while checking navigation features and looking out, he saw a dark blue fixed wing ac 400m away in his 3 o'clock, at the same level, making an avoiding action climbing right turn. He warned his crew and carried out a descending left turn away from the hazard. Once it was confirmed that he was clear of the other ac he re-established the original height and heading. The fixed wing ac departed to the N towards Loch Annalairige (a valley running N/S to the left of his track). He informed Scottish Information by radio and sent a follow-up telephone report to them landing at Aberfeldy. The pilot assessed the risk of collision as being high.

THE ISLANDER PILOT reports flying a blue and white ac, single pilot, from Thornhill to Inverness squawking with Mode C selected and in receipt of a FIS from Scottish. While heading N at 130kt and at FL30, he first noticed a Lynx coming into view in his windscreen in his 11 o'clock, about 500yd away, at the same altitude and moving swiftly to dead ahead. He executed a sharp right turn but kept the Lynx in sight. Initially it kept constant altitude and direction but then broke away in a descending turn to the left. He turned left behind the Lynx and resumed his original track.

THE LYNX STATION comments that from the description and debrief obtained from the crew this Airprox seems to have occurred due to late sightings by both crews involved. The fixed wing ac appears to have been approaching from the 4 to 5 o'clock position. This would have made it very difficult to be seen by the Lynx crew due to the construction of the ac. The likelihood of a collision taking place would at first glance appear to have been high, but was reduced by the avoiding action taken by the fixed wing pilot. The equally late sighting by the Lynx crew and their subsequent avoiding action further reduced the risk. This incident took place in open FIR airspace on a weekend in good weather conditions and serves to amplify the need for good lookout at all times. This point will once again be widely circulated around the unit.

ATSI reports that the civil ac was receiving a FIS from ScACC but the AFISO was not informed of the encounter until after it had occurred and then by ScATCC (Mil) who had been informed on the RT by the Lynx pilot. The Islander pilot made no mention of it directly until subsequently challenged by ScACC

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and the pilot said on RT that he would not be filing. The event took place at 2800ft which is below the base of radar cover and neither ac can be seen at the time and position of the Airprox.

HQ DAAvn comments that this incident appears to have been caused by late sightings by both pilots who subsequently took correct action to resolve the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and a report from the Lynx operating authority.

Specialists informed the Board that when valley flying, other ac crossing the valley are often impossible to see until very late when they appear over the surrounding ridges: the converse also applies to ac crossing valleys. In this case therefore, the respective pilots would not have had the opportunity to see each other much earlier.

This incident took place on a Saturday when Military Helicopters are limited to 500ft MSD and the Lynx was well above that. (The valley floor height is ~ 400ft amsl and the height of the terrain in the area of Airprox is ~ 800ft amsl).

In this incident both pilots had seen and reacted to the other ac as early as could reasonably be expected. Having seen the other ac, the respective pilots had avoided each other by as wide a margin as practicable in the circumstances: consequently there had been no risk of collision.

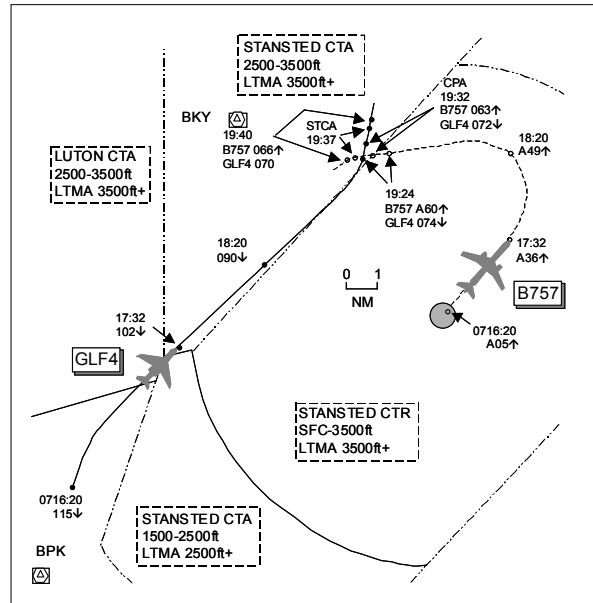
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G Airspace resolved by both pilots.

Degree of Risk: C.

AIRPROX REPORT NO 088/04

Date/Time: 20 May 0719
Position: 5158N 00010E
 (5nm NNW Stansted)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: B757-200 GLF4
Operator: CAT Civ Exec
Alt/FL: FL65↑ FL76↓
Weather VMC CLBC VMC NR
Visibility: 60km >10km
Reported Separation:
 400ft V v.close H 1000ft V 0-5nm H
Recorded Separation:
 900ft V 0-4nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports outbound from Stansted IFR on a positioning flight heading 270° at 240kt and in receipt of an ATS from London squawking 2251 with Mode C. Near to BKY climbing to FL70, he saw opposite direction descending traffic on TCAS showing +2300ft but with a high vertical closure rate. About 30sec later when climbing through FL65 TCAS gave a TA followed quickly with an RA “adjust vertical speed”. This gave the crew very little time to respond to the TCAS command which continued until the other ac had passed behind. The PF decreased the v/s and then turned L as instructed by ATC, TCAS indicated the other traffic passed 400ft above and very close. Although the visibility was 60km, the traffic was not seen visually, owing to a thin layer of stratus cloud at precisely the crossing level. He assessed the risk as high.

THE GLF4 PILOT reports heading 045° at 250kt inbound to Luton IFR following vectors for the ILS on RW08. Initially ATC cleared the flight to FL80 then FL70 but, when descending through FL76, then asked if they were at FL80. He answered that they descending, as assigned, to FL70. Traffic was seen on TCAS which was assumed to be climbing to 6000ft as both flights were on conflicting paths. The controller quickly determined there was a confliction and gave immediate orders to the other ac’s crew to ‘stop climb’, he thought, to avoid further conflict. Neither crew members saw the CPA but TCAS distances of <0.5nm horizontally and 1000ft vertically were noted. No avoidance was taken owing to the controller’s actions, TCAS had annunciated ‘traffic traffic’ and ‘monitor vertical speed’ during this encounter and he assessed the risk as ‘moderate to low’.

THE ESSEX RADAR CONTROLLER reports working the Stansted INT and FIN positions banded with the frequencies cross-coupled during a short period of steady traffic. The B757 outbound on a CPT SID was placed on a radar heading of 270° and climbed to 5000ft to parallel Luton Gate traffic whilst the GLF4 was given heading 045° to position No2 to a preceding Luton inbound. When the B757 was parallel to the Luton Gate traffic she climbed it to FL70 as the GLF4 fps was marked FL80 only. Later she observed the GLF4 at FL76 and asked the crew if they were maintaining FL80. The pilot replied no and that he was cleared to FL70; she could not remember whether she did or did not give descent clearance to the GLF4 to FL70 and thought this may have been a possible ‘level bust’. She immediately gave the B757 crew an avoiding action turn onto heading 220° but omitted TI. A voice was then heard on frequency reporting a TCAS RA manoeuvre which she thought had been the B757 crew.

AIRPROX REPORT No 088/04

ATSI reports that the controller described her workload at the time of the Airprox as moderate. She commented that she had been operating the Essex Radar and Stansted FIN positions in banded mode but another controller was available, in the operations room, if it had been considered necessary to split the sector. She mentioned that she had felt tired due to lack of sleep during the two preceding nights but, at the time, considered herself fit to work. She wondered whether, with hindsight, this may have been a factor.

The GLF4 crew established communication with Essex Radar, at 0716, reporting descending through FL115 to FL80. The controller instructed the flight, which was approaching BKY from the S, to descend to FL70, on radar heading of 045°. However, she did not annotate the fps to show that descent to FL70 had been issued. She then turned her attention to vectoring Stansted inbound traffic.

The B757 crew made their initial call on the frequency, at 0717:30, reporting climbing to 5000ft on a Compton 2S SID. This departure involves a L turn, after departure from RW05 at Stansted, routing to BKY. The Essex Radar Controller instructed the flight to fly a heading of 270°. She explained that this heading was to parallel that of a Luton inbound to the N, which was maintaining 6000ft, preparatory to issuing further climb to the B757. Accordingly, at 0718:22, with lateral separation established from the Luton inbound, she cleared the B757 to climb to FL70, the agreed level for transfer to TC NW DEPS. This clearance did not take into account the GLF4, which she had cleared to descend to FL70. The controller said that, prior to issuing climb clearance to the B757, she had looked at the GLF4's fps. Because she had omitted to annotate its fps with its cleared level of FL70, it still indicated that the ac was descending to FL80. Consequently, she believed, after reference to the fps display, that vertical separation would exist between the subject ac. The radar, timed at 0718:22, shows the B757 passing 4900ft, turning onto a conflicting track with the GLF4. The latter ac is 8.5nm SW, passing FL90. From this point, the Essex Radar Controller's plan, carried out in the belief that vertical separation would be provided, was to wait for the tracks of the two ac to cross, before issuing further descent to the GLF4. In order to position the GLF4 behind other Luton traffic, she, subsequently, issued it with a tactical L turn heading 010°, resulting in it tracking further away from the B757.

The controller said that, following a routine scan of the radar display, she noticed that the GLF4's Mode C was showing FL76. She immediately sought confirmation from the pilot that he was maintaining FL80. As soon as the pilot replied that "*we were given er flight level seven zero*" she instructed the B757 to make an avoiding action L turn heading 220°. As there was little time to pass TI, the controller chose to issue just the avoiding action instruction as a priority. The radar, timed at 0719:24, when the avoiding action turn was issued, shows the two ac were 0.9nm apart, the GLF4 was passing FL74 and the B757 an altitude of 6000ft (equivalent to FL57). By the time the pilot of the B757 had replied to the avoiding action turn instruction the ac had passed and were now 0.4nm apart with vertical separation of 900ft. Thereafter, vertical separation continued to decrease as their tracks diverged. STCA activated, with a low severity alert, at 0719:37, i.e. after the ac had passed, minimum separation (1.5nm/400ft) occurring 3sec later.

The controller could not explain, having instructed the GLF4 to descend to FL70, either why she had not annotated its fps with the correct level, or had not recollected issuing the clearance. She explained that the usual method of operation, when dealing with this type of scenario, is either to maintain FL80 with the inbound, whilst issuing climb to the outbound to FL70, or to descend the inbound to FL70 or 6000ft i.e. separated from the outbound climbing on the SID to an initial altitude of 5000ft. In either case, to await the crossover before initiating the level change. In this instance, she thought she may have, initially, gone for the second option, descending to FL70 above the level of a Luton inbound routing north of Stansted at 6000ft. For whatever reason, she did not recollect this action and based her plan on her inaccurate fps annotation. She added that, if the Stansted FIN DIR position had been manned, at the time, the incident would probably not have occurred. She explained that, any descent to Minimum Stack Level (FL70 on this occasion) or below before a line drawn from Stansted through BKY to the NW, has to be co-ordinated with Stansted FIN. This co-ordination would probably have removed the

possibility of a conflict between the subject ac, as each controller would, by necessity, have been more aware of the ac's cleared level.

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 could add little to the ATSI report. The Essex Radar controller had given the GLF4's crew descent to FL70 on initial contact but, for whatever reason, had not annotated the appropriate fps. About 2min later, when the B757 was clear of a Luton inbound ac and after she had checked the GLF4's fps data, she had climbed the B757 into conflict which had caused the Airprox.

In the belief that vertical separation would be established, the Essex Radar controller had given the GLF4 crew a tactical L turn onto 010° for positioning. Shortly thereafter she noticed that the GLF4 was indicating FL76, which she thought indicated a possible 'level bust', and had challenged the GLF4's crew: they had replied that clearance had been given to FL70. Immediately, she gave the B757 crew an 'avoiding action' L turn but by which time the CPA had occurred, the ac passing 0.4nm horizontally and 900ft vertically apart; STCA activated 5sec later. Although vertical separation had continued to reduce to 400ft at range 1.5nm 8sec later, the subject ac were rapidly diverging on almost opposite direction tracks. The B757 crew were aware of the potential conflict, noting the GLF4's presence (+2300ft) on TCAS and, after receiving a TA alert then an RA command, had followed the guidance, the TCAS display indicating the GLF4 400ft above and very close in azimuth. The GLF4 crew saw the B757 on TCAS, had received a TA alert and then an RA 'monitor vertical speed' warning, which was followed, the TCAS display indicating that the B757 passed within 0.5nm and 1000ft below. Taking into account all of these elements/actions and, mindful that the recorded radar shows the GLF4 crossing through the B757's 12 o'clock range 0.9nm and 1700ft above descending, the Board were able to conclude that there had been no risk of collision during the encounter.

The NATS advisor informed members that a review of ATC procedures in the Luton/Stansted airspace had taken place. Following the review, recommendations for improvement were made which included sector splitting procedures. These recommendations are under consideration within NATS.

PART C: ASSESSMENT OF CAUSE AND RISK

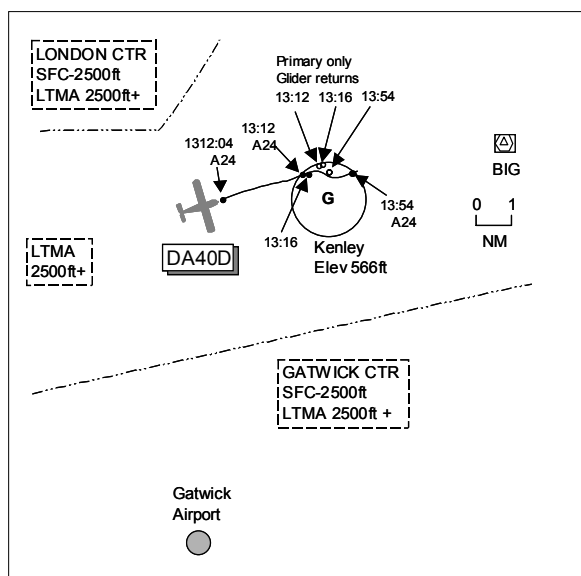
Cause: The Essex Radar controller did not annotate the GLF4's descent on the fps which led her to subsequently climb the B757 into conflict.

Degree of Risk: C.

AIRPROX REPORT No 089/04

AIRPROX REPORT NO 089/04

Date/Time: 19 May 1313
Position: 5119N 00006W
(0.75nm NNW Kenley - elev 566ft)
Airspace: FIR (Class: G)
Reporting Ac Reported Ac
Type: KA8 Glider DA40D
Operator: Civ Club Civ Trg
Alt/FL: 1800ft 2000ft
(agl) (QNH)
Weather VMC CLNC VMC CLBC
Visibility: 50km >10km
Reported Separation:
50ft V 100m H 300ft V 800m H
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KA8 GLIDER PILOT reports flying solo from Kenley at 1800ft agl thermalling in a RH orbit over the NW aerodrome boundary of Kenley. The visibility was 50km in SKC VMC and the ac was coloured red/white; no radio was fitted. Turning through E an ac was sighted about 1000m away approaching him from behind tracking E and after turning about, the other ac was seen still to be approaching. The geometry remained unchanged after completing 1 further orbit so he tightened his RH turn to avoid the conflicting ac, a white/blue coloured low wing T tail single engine type. Simultaneously it was seen to execute a RH wing-over to avoid him, passing 50ft below and 100m clear to his L, before it then turned back onto track towards Biggin Hill. He believed that there had been a risk of collision.

THE DA40D PILOT reports flying a dual training sortie en route from Southampton to Stapleford at 2000ft, he thought, and he was in receipt of a FIS from Biggin Hill on 129.4MHz squawking 7000 with Mode C. The visibility was >10km 1000ft below cloud in VMC and the ac was coloured white with strobe lights switched on. Approx 1nm S of Kenley, he thought, whilst heading 070° at 120kt, he saw a glider in a RH orbit about 1000m ahead and above his level. He turned 20-30° R to avoid, the glider continued to orbit without taking any avoiding action, and it was seen to pass 800m to his L and 300ft above. He opined that the glider pilot probably saw his ac a lot later than he acquired the glider and he did not consider there to have been any risk at all. Also, he went on to say that if he had thought that there had been a risk, he would have altered his heading by a lot more than he did.

UKAB Note (1): The London QNH was 1023mb.

UKAB Note (2): The UK AIP at ENR 5-5-1-3 promulgates Kenley as a Glider Launching Site centred on 511820N 0000537W for winch launches where cables may be encountered to 1700ft agl during daylight hours; site elevation 566ft amsl.

UKAB Note (3): Analysis of the Heathrow and Gatwick recorded radars at 1312:04 shows the DA40D 2.85nm W of Kenley Glider Site tracking 070° indicating 2400ft altitude QNH1023mb; this level is maintained throughout. Just over 1min later an intermittent primary only return is seen on 2 consecutive sweeps at 1313:12 and 1313:16 before fading, believed to be the KA8 Glider, tracking 090° 0.9nm NNW of Kenley, just to the L of the DA40D's 12 o'clock range 0.9nm. The DA40D is seen to commence a R turn immediately thereafter, steadying on a track of 120° for 3 radar sweeps before turning L and

regaining its original track 0.8nm NE of Kenley. The Airprox is not seen, the KA8 Glider only re-appearing on radar at 1313:54 0.7nm N of Kenley 0.66nm W of (behind) the DA40D. The KA8 pilot had reported flying at 1800ft agl during the encounter which equates to about 2300-2400ft amsl.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

Members were aware that airspace near to Kenley is 'tight' owing to adjacent CTRs and the LTMA, base level 2500ft, above. Gliding activities are predominantly training flights which are normally concentrated within the immediate vicinity of the glider site and usually within the upper levels of the available height. Although the DA40D's track towards BIG would not have overflown the site, some Members thought that the pilot should have planned to give Kenley a wider berth. As it was, the KA8 pilot had been thermalling to the NW of the site and the DA40D pilot's chosen route had brought the subject ac into conflict which had caused the Airprox.

Members could not resolve the disparate separation distances reported by the pilots. The KA8 pilot had reported flying at 1800ft agl (2366ft QNH) and had seen the approaching DA40D, monitoring its progress; his options to avoid were limited owing to his speed. After completing 1 further orbit, he had tightened his R turn to increase separation, estimating the DA40D passed 50ft below and 100m clear. The DA40D pilot had reported cruising at 2000ft and had seen the glider 1000m ahead and above his level. He had turned 20-30° to the R to avoid it by 800m laterally and 300ft vertically below it. The recorded radar shows the DA40D indicating 2400ft QNH during its transit of the Kenley area. Putting the distances issue aside, the Board agreed that both pilots had discharged their duties to 'see and avoid' and their combined actions had been effective in removing any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

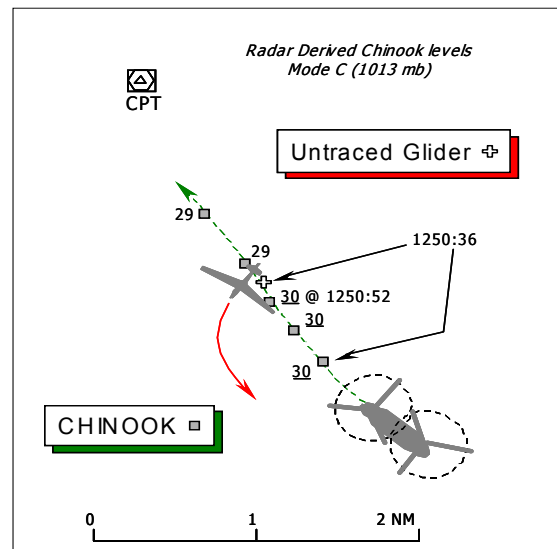
Cause: Conflict in the vicinity of a notified gliding site resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT No 090/04

AIRPROX REPORT NO 090/04

Date/Time: 18 May 1250
Position: 5128N 00112W
(1½nm SSE COMPTON VOR)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: Chinook Mk2 Untraced Glider
Operator: HQ JHC N/K
Alt/FL: 3000ft N/K
(QNH 1025mb)
Weather VMC Haze -
Visibility: 10km -
Reported Separation:
80m H, nil V NR
Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHINOOK MK2 PILOT reports that his helicopter has a green camouflage scheme, but the landing lights and HISL were on whilst outbound from Odiham after a SID 2 departure. He was in receipt of a RIS from Odiham APPROACH (APP) on UHF and squawking A4562 with Mode C, but neither TCAS nor any other form of CWS is fitted. Flying in level cruise at 3000ft London QNH (1025mb), the visibility was >10km in haze 'down sun', but reduced 'into sun' whilst operating some 1000ft below scattered/broken Cu with a base of about 4000ft.

Approaching the COMPTON VOR heading 330° at 120kt, Odiham ATC reported a radar contact at 12 o'clock 1½nm away, he thought; a glider was spotted 1nm away at the same altitude heading away from his ac. However, the glider turned L so he turned his Chinook R to avoid it. But the glider pilot continued his L turn through 180° and ended up pointing almost directly at his helicopter. The white glider (with a red nose cone) passed about 80m away down the port side of his helicopter at the same altitude with a "high" risk of a collision.

THE CHINOOK MK2 PILOT'S STATION comments that this Airprox occurred in an area of poor coverage for Odiham's radar. A radar handover to Brize Norton was in progress and the contact, 1 of 2, was reported by the Brize controller "½ mile in 2 o'clock" to the Odiham controller, who then relayed it to the Chinook crew. As gliders are difficult to identify on radar and have no transponder, it cannot be positively determined that the Airprox was with the reported traffic.

This incident occurred in one of the worst hotspots for high VFR traffic density: the Compton VOR. In the conditions on this day, a glider would have been very difficult to spot until quite close. Similar problems occur in the western instrument approach lane, which is just N of Lasham Gliding Centre. Whilst this Airprox will remind aircrew of the importance of good lookout when under a RIS in a high-density area, could more be done by the glider pilots to look out for and keep clear of military ac? Additionally, more could be done to assist controllers in identifying glider returns; glider pilots have apparently resisted pressure to incorporate SSR equipment in their sailplanes on the grounds of cost and weight. But would the extra margin of safety that would be afforded, justify a call for gliders and other light ac in the busy skies over southeastern England to be fitted with SSR equipment as a mandatory requirement.

AIS (MIL) reports that only intermittent primary contacts are shown on the Heathrow 10cm radar recording, which may, or may not be, the reported glider possibly in an orbit some 1½nm NNW of the reported Airprox position. The Airprox seemed to occur moments after 1250:52, when the contact was very intermittent; the glider seemed to track SW passing over Greenham Common where it faded from radar. However, despite exhaustive enquiries and a detailed systematic search for the glider, tracing action has proved unsuccessful. Consequently, AIS (Mil) have been unable to identify the reported glider.

MIL ATC OPS reports that Odiham RT tape transcript timings were found to be inaccurate by 1hr 2min; action has been taken to rectify this situation and all timings in this report have been corrected to UTC. The Chinook crew was in transit from Odiham to Boulmer, via Cottesmore and Leeming. The helicopter was identified on radar by APP at 1242:31, instructed to climb to 3000ft QNH (1025mb) and placed under a RIS whilst approval was given to carry out a "SID 2". APP commenced a prenote of the flight to Brize Norton ATC Assistant (FOA) at 1243:16, which took nearly 1 minute to complete. The Chinook crew reported "...reaching 3000ft" at 1244:40. Traffic information was passed to the Chinook crew at 1245:55, "[C/S] traffic right 1 o'clock, 6 miles manoeuvring, no height." At 1248:42, APP passed the Chinook crew the Brize Norton squawk in preparation for handover with Brize Norton LARS (BZN), which commenced at 1249:40. During the handover BZN reiterated the type of service – RIS - and pointed out conflicting traffic at "right one o'clock, crossing right left, no height; further traffic 12 o'clock 3 miles ...manoeuvring no height", which was relayed to the crew by APP. The Chinook crew reported "visual with the traffic in our 12 o'clock" to APP, before switching frequency to BZN at 1250:28. Details of the Airprox were later passed by the Chinook crew to Brize Norton SUPERVISOR at 1307.

The Heathrow Radar recording shows the Chinook, 9nm SE of CPT, tracking 330°, squawking A4562 indicating FL30 Mode C. A contact that may or may not be the reported glider is displayed at 1247:42, in the Chinook crew's 12 o'clock 6.5nm with no Mode C. The contact disappears from radar at 1248:27, and reappears at 1249:05. The Chinook changes squawk to A3715 at 1248:57, indicating FL29 with the glider in the Chinook's 12 o'clock - 4nm. At 1249:48, just after the handover commenced, the helicopter's Mode C indicates FL30 with a horizontal separation against the 'pop-up' primary contact of 3nm. The glider disappears from radar at 1250:09, before reappearing at 1250:36 for one sweep when the 2 ac contacts are ¾nm apart as the helicopter closes from the S.

The Chinook had departed Odiham under a RIS at 3000ft (QNH). At the time of handover, APP did not observe any conflicting tracks in the vicinity of the Chinook and the traffic information given about the glider was pointed out by BZN during the handover. No limitation of service was applied to the Chinook by APP, which would imply that the conflicting glider should have been painting satisfactorily on radar.

HQ JHC comments that this Airprox occurred during a period of high workload for the crew of the Chinook. Although the radar service provided to them had not been limited, they had been warned of at least 2 contacts in their area and a potential accident was avoided by their good lookout and subsequent actions. This area to the W and NW of Odiham is renowned for gliders and due to their streamline design and colour they are extremely difficult to spot visually. This Command strongly supports the call for mandatory IFF in all ac, which is viewed as a step forward to improving flight safety in busy airspace. It is of concern that the glider pilot appears not to have seen the Chinook. This Airprox serves as another reminder to all airspace users of the need for thorough lookout at all times.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Chinook pilot, transcripts of the relevant RT frequencies, radar video recordings, and reports from the appropriate ATC and operating authorities.

The STC member was surprised that the Chinook crew had chosen to retain a radar service from Odiham; he thought Benson might have been able to provide a better service in this vicinity. However,

AIRPROX REPORT No 090/04

it was pointed out that Benson is not a LARS unit and would probably only work the transit if the flight would either directly effect their traffic or route through their MATZ. Nevertheless, Brize had detected the contact and traffic information was relayed by Odiham APP at a range of 3nm, which had enabled the Chinook crew to sight the circling glider. Despite the helicopter pilot's avoiding action turn, it would appear he achieved only 80m separation against the glider – less than ideal – and he was evidently concerned that the glider pilot had carried on turning toward his helicopter rather than taking more appropriate action to stay clear. Whereas the helicopter pilot was clearly required to avoid the glider and had been thwarted when he had tried to do so - it seemed inconceivable to some members that the glider pilot would not have been aware of the presence of the Chinook by way of its size and the sound of its engines. Notwithstanding that 'flying machines' are required to give way to gliders in the 'see and avoid' environment of the Open FIR, both pilots were ultimately responsible for affording appropriate separation against each other's ac. However, some members opined that the glider pilot might well have been turning for this very reason - to keep the helicopter in sight - and the turn might have appeared more threatening to the Chinook crew than might have been the case. It may have been that the glider pilot felt the separation was adequate and he had thought he had the situation under control, for in general terms glider pilots are quite happy operating relatively close to other gliders and tugs – but this was mere speculation. However if the separation was indeed as reported by the Chinook pilot, and the Board had no reason to doubt the veracity of his account, the glider pilot should have turned a little less to open the separation. Either way it was not advisable to get too close to any helicopter, especially such a large machine and the glider pilot would have been well advised to stay well away from a twin-rotor Chinook in his lightweight unpowered ac.

The glider pilot correspondent undertook to ensure that the BGA instructors committee was aware of this Airprox. Nonetheless, without the glider pilot's report it was impossible to know if he did, or did not, see the Chinook and without a continuous radar recording that illustrated the event it was not possible to ascertain independently the minimum separation that pertained here. The Board was advised that it should have been very easy to read the competition number or identification letters on the tail of the glider, but there was no mention of either in the Chinook pilot's report. Furthermore, it is not that easy to 'run away' from military traffic in a glider and it is often much better to try and make the ac more conspicuous by banking quickly one way and the other to get the mainplane to flash in the sun and provide a better plan view for the crew of the other ac. The highest concentration of gliders on thermal days will generally be from the cloudbase down to about 2000ft agl. Therefore, operating helicopters where feasible below this height can reduce the risk. On the topic of SSR transponders, it would appear that glider pilots are not averse to transponders on the grounds of cost and weight; the overriding issue would appear to be one of battery power. Developments are under way to produce lightweight and low power versions that will be suitable for all unpowered flight, but they have as yet to come into production.

The Board's assessment of this encounter was severely hampered without a report from the glider pilot and his view will forever remain a mystery. With that in mind the Board could only conclude, rather unsatisfactorily, that this Airprox had resulted from a conflict in Class G airspace with an untraced glider, but that insufficient information was available to the Board upon which to make a determination of the inherent risk.

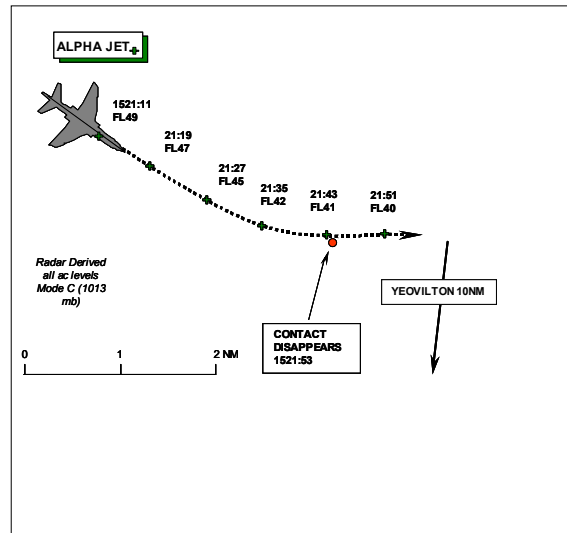
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace with an untraced glider.

Degree of Risk: D.

AIRPROX REPORT NO 091/04

Date/Time: 24 May 1521
Position: 5109N 00232W (10nm NNE VLN)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: Alpha Jet Untraced Glider
Operator: DPA NK
Alt/FL: FL40 NK
Weather VMC
 Haze BC NK
Visibility: 5km NK
Reported Separation:
 50ft H 100ft V NK
Recorded Separation:
 Contacts Merge



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ALPHA JET PILOT reports recovering to Boscombe Down from a local training sortie flying a camouflage ac squawking as directed and in receipt of a SSR-only RIS from Boscombe APR. While heading 120° at 300kts and at FL50, a stranger was called in their 12 o'clock. They turned to 090° and started searching for the stranger, descending to FL40 to maintain clear of cloud. Subsequently a white 2-seat glider was seen in his 12 o'clock 3/4nm away below the cloud and a slight turn away to avoid it was initiated. They thought that the glider was not the original stranger reported by APR and the turn onto 090° precipitated by the stranger call had turned them directly at the glider. He assessed the risk of collision as being high.

Despite extensive enquiries the glider was not traced.

THE ALPHA JET STATION reported that this incident occurred when the Boscombe radar was undergoing maintenance and only transponding traffic was visible to ATC. An education programme is underway to inform all their aircrew that about 25% of the traffic in the Boscombe area is not transponder equipped. This is not the first time, nor will it be the last, that gliders have been encountered near the cloud base, and is another good lesson in why summertime transits near the cloud base should be avoided whenever possible. In order to try to optimise ATC coverage of the busy airspace around Boscombe, action is in hand to install radar links to Yeovilton and Portland to cater for Boscombe primary radar outages. Despite the above, good lookout by the Alpha Jet crew enabled them to see and avoid the glider.

MIL ATC OPS concurred the Boscombe Down report, which stated that during a relatively quiet period, in blue weather conditions, an Alpha Jet, 10nm NNE of Yeovilton and tracking ESE towards Boscombe Down under his own navigation, free-called Boscombe APR for a visual recovery. APR placed him on a limited RIS using SSR only. Soon after identification he passed TI on a contact. Neither the APR controller nor the Military Supervisor were aware at the time that an Airprox had occurred as the pilot reported it to operations on landing rather than to ATC.

HQ DPA comments that as observed in the Station Comments work is apace to remove the practise of SSR only operations at Boscombe Down which, as this Airprox as demonstrates, are not ideal. Undoubtedly, the good lookout and correct avoiding action by the Alpha Jet crew prevented this occurrence from being potentially far more serious.

AIRPROX REPORT No 091/04

UKAB Note (1): The recording of the Burrington Radar shows a primary contact appearing at 1515:07 to the SW of the Airprox position with very little movement. Five minutes later the Alpha Jet can be seen just over 11nm WNW of the Airprox position heading SE at FL50. The Airprox appears to occur at 1521:44 as the Alpha Jet passes just to the N of last position of the primary contact as it disappears from radar. The primary contact reappears in the same position a short time after the event probably indicating that it was thermalling.

THE BGA provided written comments which comments are summarised as follows:

In thermal conditions, gliders will more often be found under clouds and at a higher concentration just below cloudbase; when below 2000ft on a good day, with a cloudbase similar to this, the risk is reduced.

Boscombe APR did well in signalling traffic so the Alpha Jet crew who were already looking for of another ac or glider. However, if only some of the returns are displayed, then it can cause additional risk if avoiding action ends up causing a conflict with those that are not displayed. On soaring days such as this, there will be high concentration of gliders soaring or carrying out cross-countries together, so a single return may actually indicate the presence of several.

The glider pilots would have had little chance of seeing an Alpha Jet in poorish visibility at 300kts and without the benefit of any warning. Unfortunately it is unlikely that this situation can be improved until battery powered transponders become available but in the meantime it is worth reminding pilots to try and adjust their recoveries in thermal conditions to minimise the risk.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of the Alpha Jet, a radar video recording, a report from the air traffic controllers involved and a report from the Alpha Jet operating authority.

Members concurred the BGA comments. Gliders operate just below the base of the cloud, are often white in colour and are difficult to see against fair-weather cumulus. Pilots should anticipate this and adjust their flying and lookout accordingly. In this instance good lookout by the Alpha Jet crew followed by a small avoiding action turn prevented there being a risk of collision.

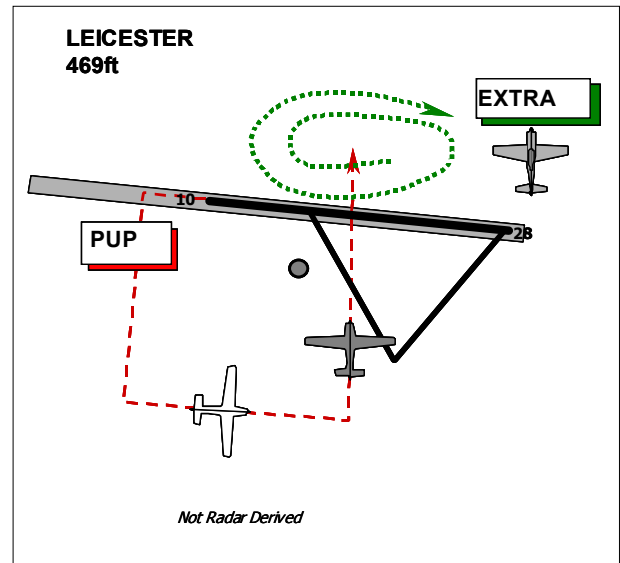
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Presumed non-sighting by the glider pilot and late sighting by the Alpha Jet pilots.

Degree of Risk: C.

AIRPROX REPORT NO 092/04

Date/Time: 22 May 0942 (Saturday)
Position: 5236N 00101W (Overhead RW28
 Leicester - elev 469 ft)
Airspace: Leicester ATZ (Class: G)
Reporting Ac Reported Ac
Type: Beagle B121 Pup Extra 260
Operator: Civ Pte Civ Pte
Alt/FL: 2000ft 500-2500ft
 (QNH 1030mb) (QFE)
Weather VMC CAVOK VMC CAVOK
Visibility: <10km 40km
Reported Separation:
 0 V <100ft H NR
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE BEAGLE B121 PUP PILOT reports flying a blue and white ac with no strobes or SSR fitted on a local flight from Leicester and in receipt of an A/G service from them. He took off from RW28 and climbed out to 700ft at 85kt and then turned onto a heading of 190°, continuing his climb to 1000ft. He made a radio call to A/G “climbing to overhead” and continued his climb. When he was in a position flying N back to the centre of the R/W he saw an ac at 3nm ahead of him on the dead-side of RW28 performing aerobatics. As he continued inbound the ac (an Extra) descended towards him and went out of his vision. While he still had RW28 in sight ahead of him the Extra came upwards in front of him appearing as big as his own ac. He then entered turbulence and his ac rocked considerably. He lost sight of the Extra as it climbed above him and he was concerned that it may be doing a second loop so he turned immediately to the W towards the city as he thought this would be the safest place to go. The Extra was doing an aerobatic display revalidation that was being observed from the ground. He assessed the risk as being high.

THE EXTRA 260 PILOT reports flying a red, grey and white ac with no strobes or SSR fitted on a full display sequence over Leicester airfield. The aerobatic sequence was flown for Display Authorisation (DA) renewal and had been arranged in advance with the CFI at Leicester and the DA Evaluator (DAE). He had a comprehensive briefing with the DAE the previous day and arranged for the tower at Leicester to be manned for the flight. He planned to fly the sequence in the overhead before midday in order to reduce noise and traffic disruption. He also arranged for any visiting ac to be advised that the overhead would be active for approximately 6min. After getting airborne, he called Leicester Radio to inform them that he was about to commence the sequence and was running in from the E: the message was acknowledged by the tower. At some point during the sequence he heard a call on the radio “Visual with the aerobatic traffic”. He assumed that this pilot knew what was happening and would take action to stay clear or adjust his circuit. The sequence lasted 5min 48 sec after which he landed. Only after he was back on the ground did he realise that the pilot who had been “visual” was upset. He spoke immediately to the DAE, who was also surprised that the Pup pilot had seen the aerobatic ac but had continued to close with it, further exacerbating the situation. He thought that the pilot had decided to climb to the overhead come what may and was not going to change his mind. He spoke to the CFI who agreed to meet the pilot, who was an ATPL with over 8000 hrs and training captain, on his return. As an unlimited display/competition pilot he feels that he made an appropriate risk assessment, prior to

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flight and was surprised at the other pilot's poor airmanship and situational awareness. He did not see the other ac at any time.

UKAB Note (1): The UK AIP AD 2 –EGBG-1-1 (Leicester) states:

AD hours: Summer 0800-1600 and by arrangement.

ATS: Summer A/G (ATZ) 0800-1600. A/G also available by arrangement.

The AIP also promulgates Leicester ATZ as being a circle of 2nm centred on the longest R/W. and further states:

Noise Abatement Procedures: All ac to climb straight ahead maintaining R/W centreline to 1000ft before turning.

UKAB Note (2): The incident was not recorded on either the Claxby or Debden Radar.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar photographs/video recordings.

Members addressed in turn the part played in this incident by the 3 parties involved.

From the information available it would seem that the only person who had a complete picture of events was the AG operator. Although he had no formal obligation to do so, Members thought that he could have done more to inform the pilots of each other's intentions and activities.

The Extra 260 pilot, it would seem, did as much as possible to mitigate the risk of his activities. Notwithstanding his meticulous pre-flight preparation, he still had a responsibility to ensure that he saw and avoided other ac operating in his vicinity and expert opinion was that he should have seen the Beagle Pup approaching.

The Board unanimously considered however, that the prime responsibility for the incident lay with the Beagle Pup pilot. Members found it almost incomprehensible that, having seen the Extra performing its aerobatic sequence from some distance, he continued to fly towards it. By continuing to fly into conflict he displayed poor airmanship and bad judgement, putting both pilots and observers on the ground at some risk. At the precise moment that the 2 ac were at their closest, neither pilot was in sight of the other ac and it was therefore only by good fortune that they had not collided.

Members were again unanimous that safety had not been assured.

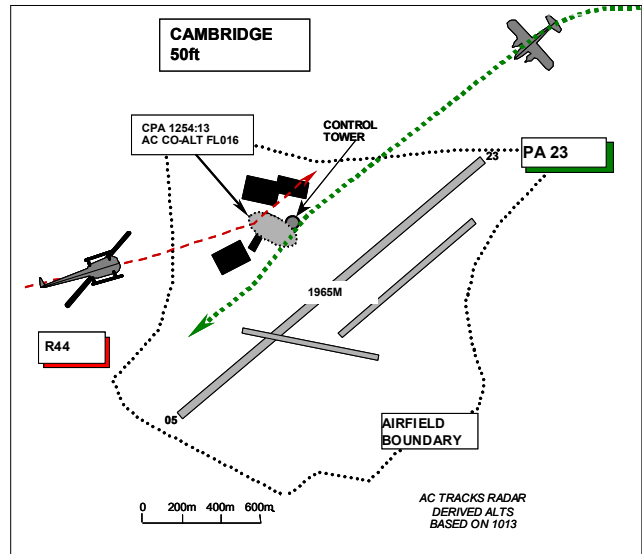
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Having seen aerobatics in progress, the Beagle Pup pilot flew into conflict with the Extra 260.

Degree of Risk: A.

AIRPROX REPORT NO 093/04

Date/Time: 19 May 1352
Position: 5212 N 00010W (Overhead Cambridge Airport - elev 50ft)
Airspace: Cambridge ATZ (Class: G)
Reporting Ac Reported Ac
Type: R44 PA23
Operator: Civ Pte Civ Trg
Alt/FL: 1500ft 1800ft
(QFE) (QNH)
Weather VMC CAVOK VMC CAVOK
Visibility: >10km >10km
Reported Separation:
0 V 200m H 300ft V 500m H
Recorded Separation:
0V ~100m H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE R44 PILOT reports flying a white and blue ac from Milton Keynes to a private site near Mildenhall in receipt of a FIS from Cambridge and squawking 7000 with Mode C. He was heading 065° towards Cambridge Airport at 95kt and 1500ft on the QFE and asked Cambridge APP if he would like him to go over or around the airfield. Initially APP asked them to go to the N but shortly after changed this and cleared them through the Zone, overhead the threshold of RW23 at 1500ft (it may have been 1400 but whatever APP told him was the exact height that he flew – the report was written a week later). He saw a light coloured twin engined ac about 500m ahead climbing towards him from his 11o'clock. He turned to the left as soon as he saw it and was able to read the last two letters of the ac registration. The other ac had apparently been cleared for a “low approach go around”. He reported the Airprox to Cambridge APP.

He assessed the risk of collision as being high and thought that if he had seen the other ac 2sec later they would have collided.

THE PA23 PILOT reports flying a blue and white ac on a local IR renewal flight from Cambridge with strobes selected on in receipt of a “procedural IFR” service from Cambridge Tower and squawking as directed with Mode C. The Candidate was wearing an IFR hood. They were heading 230° at 120kt after they had conducted a go-around from an ILS at approximately 450ft (QNH) and were climbing straight ahead to 2000ft procedurally IFR. He saw a R44 about 500m ahead and passing down his right side slightly below. He heard the R44 captain talking to ATC and saying that he had got very close to a PA23 (them). They were unaware that he had been cleared through the airfield ahead at 1500ft which was in their flightpath. During the go around they were busy as they were simulating an engine failure after take off and the candidate was dealing with it. The AZTEC had a good rate of climb as verified by their being at 1800ft before reaching the upwind end of the RW.

He did not take any avoiding action and assessed the risk of collision as being low.

CAMBRIDGE APPROACH CONTROLLER reports that at about 1250 an R44 reported on frequency from a private site near Milton Keynes to a private site near Mildenhall requesting overflight at 1500'. Initially the R44 was N of the RW23 centreline and to the WSW of Cambridge. He asked the pilot to avoid the climbout and pass N abeam as he would have traffic going around from an instrument

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approach. He was given a FIS when the instrument traffic had completed its base turn and was visual from the VCR he then advised the R44 pilot that he could now route overhead the RW 23 threshold at 1500ft. He thought that it would now be approaching from a W or NW direction, and sufficient vertical/track separation would exist, therefore no further TI was given. The R44 pilot advised APP that he was approaching the overhead and asked if they could see him but the controller replied that he could not. At that time the PA23 was on short final and shortly afterwards went around. A short time later the R44 pilot reported seeing the PA23 pass in front of him and the PA23 pilot replied that he could see the R44 throughout. The PA23 was climbing straight ahead (RWY 23) to the SW to altitude 2000ft. On leaving the ATZ to the NE the R44 pilot free-called Lakenheath. Apart from the initial report/comment on the RT there had been no further conversation or contact between himself and the R44 pilot and he was not aware that an Airprox had been filed until 10 days later.

ATSI reports that the Approach Controller (APP) was conducting the duty from the Cambridge VCR, seated adjacent to the Aerodrome Controller but, due to a shortage of qualified staff, the Approach Radar (APR) position was not manned. The Approach Controller described his workload as low at the time of the Airprox.

Cambridge airfield is situated within Class G airspace. It has an ATZ, a circle radius 2.5nm centred on RW 05/23, extending from the surface to 2000ft aal.

The PA23 was carrying out IFR training at Cambridge. At 1243, the ac was cleared for a procedural NDB approach to RW23 and 3min later reported Beacon Outbound. The pilot was instructed to report Base Turn Complete and stated his intention of carrying out a low approach and go around, before departing to the N VFR.

The R44 established communication with Cambridge APP at 1248, reporting at a range of 8-9nm, routeing VFR from Milton Keynes to a private site south of Mildenhall. The pilot requested to route through the Cambridge overhead at 1300ft. He was instructed to report the airfield in sight, cleared to overfly and informed that a FIS was being provided. The pilot reported that he was already visual and APP then added *"...if you could avoid erm the final approach correction the climb out to runway two three I'll shortly have traffic climbing away from an NDB Approach, which is a P A Twenty Seven and route to pass just north abeam the airfield"*. The pilot read back the routeing instruction correctly. The standard missed approach for an NDB procedure, on RW23, is, initially, to climb straight ahead to 2000ft

The PA23 pilot reported Base Turn Complete, at 1251, and was cleared for a low approach and go around. The radar recording of the event shows that the R44 was approximately 5nm WSW at the time, tracking directly towards the airfield. Just over one minute later, at 1253:00, APP transmitted to the R44 *"can you er overfly the airfield er north of the final approach to runway two three one thousand five hundred feet. There'll be circuit traffic at one thousand feet"*. Following an acknowledgement by the pilot, the controller changed the routeing instruction to *"if you route overhead two three threshold at one thousand five hundred feet that will suffice"*. The pilot read back the routeing adding *"you can probably see me just erm at the boundary now"*. APP responded *"no I can't see you but we have a very big roof area"*. The radar recording, timed at 1253:18, when the controller passed the revised routeing to pass overhead, shows the R44 1.9nm WSW of the airfield at an altitude of 1700ft. The PA23, on a reciprocal track, was slightly right of the final approach track, at 600ft, 3.1nm from the R44.

The controller commented that he had been visual with the PA23 throughout its approach, however, he could not see the R44. He believed that the R44, having been instructed to route to the N of the final approach path, would be approaching the airfield on a more Easterly track rather than from the WSW, as it actually had. The airfield is equipped with D/F and this could have shown the R44's bearing from the airfield. Consequently, when he rerouted the helicopter over the 23 threshold at 1500ft, he assumed that, firstly it was closer to the airfield than it actually was and secondly, having observed the PA23 going around at about 300ft, he estimated that vertical separation of at least 1000ft would exist as the ac passed. The controller thought that he probably misinterpreted the 'boundary' call by the pilot of the R44

as meaning the airfield boundary, whereas radar evidence shows that the helicopter was nearer to the ATZ boundary at the time. The controller admitted that, in view of its range and altitude, he should have been able to see the R44 from the VCR, when its pilot queried whether he had him visual, as it would have been outside the area obscured by the roof area.

The MATS Part 1, Section 1, Chapter 2, Page 4 states that, irrespective of the class of airspace: *“Controllers are to provide an air traffic control service to ac within an aerodrome traffic zone and to ac under their jurisdiction in the vicinity of the aerodrome”*. The primary purpose of an air traffic control service, as described in the same publication, is to prevent collisions between ac in the air. Additionally, the Cambridge MATS Part 2, Page 4-1, states that Approach Control has the specific responsibility of *“Issuing pertinent traffic information on known Visual Flight Rules (VFR) flights to IFR flights”*. Because the controller believed that the subject ac would be adequately separated, he did not pass TI to the pilot of the PA23 and did not update the information already provided to the pilot of the R44. The radar recording of the event shows that the ac passed within 0.1nm of each other, at the same altitude. Both pilots reported sighting the other traffic at a distance of 500m.

The Airprox occurred because the Cambridge Approach Controller allowed the R44 to route over the RW23 threshold, while the PA23 was carrying out a go around following an NDB approach. This resulted from a lack of situational awareness, by the controller, of the R44’s position, although it should have been visible from the VCR and D/F would have indicated its position. In accordance with MATS Part 1/2 procedures, to fulfil his responsibilities, the controller should have passed TI to both flights. The pilot of the PA23 was not warned about the helicopter crossing at the threshold. The pilot of the R44 was informed, some 5min before the incident, of traffic ‘shortly’ climbing away from an NDB approach but this information was never updated as the helicopter approached the overhead. Consequently, notwithstanding that this Airprox occurred within Class G airspace, because the controller did not provide information that would have assisted the ac to avoid each other, it is assessed that the Cambridge Approach Controller must bear a significant degree of responsibility for the incident.

UKAB NOTE (1): The tape of the Stansted radar shows both ac clearly. A 2nm scale blow-up of the area of the incident was available and showed the horizontal miss distance as being 105m; however, the accuracy of horizontal measurement on such high-scale recordings is limited, hence a figure of approximately 100m is considered reasonable. Both ac were at FL016.

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 air traffic controllers involved.

Members familiar with the area were surprised at the planned routing of the R44 and suggested that it would have been wiser for a single engined helicopter to avoid the town, the hospital and the airfield by a substantial margin. Accepting the routeing however, the pilot’s actions had been proper and he had reacted appropriately to the instructions passed to him by APP. He therefore, had not contributed to the cause of incident.

It was not clear to Members whether the PA23 was on an NDB or an ILS approach as there was conflicting information from its pilot and from the controller. However, apart from affecting the DA/MDA and therefore the distance out at the commencement of the go-around and resultant height over the airfield, this was of little consequence. The PA23 pilot had been flying in accordance with the published procedures for a normal (but practise single-engined) go-around from an instrument approach and his flightpath should have been predictable to APP.

ATC specialist members were of the opinion that the path of the R44 should also have anticipated by APP since the pilot flew exactly as he had been directed (by APP). Members were unable to determine

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why the situational awareness of the controller had become degraded to the extent that he did not anticipate and prevent the confliction.

Both pilots had seen the other ac, in the case of the R44 pilot just in time to take effective avoiding action. The PA23 pilot saw the R44 during a period of high workload but judged that avoiding action was unnecessary as it was going to pass down the right (the R44 pilot had apparently already made a turn to the left). Members considered that although the turn made by the R44 pilot had prevented there being an actual risk of collision, safety had not been assured due to the lateness of his reaction and the split attention of the PA23 instructor, both of whom understandably assumed that they had been deconflicted by ATC.

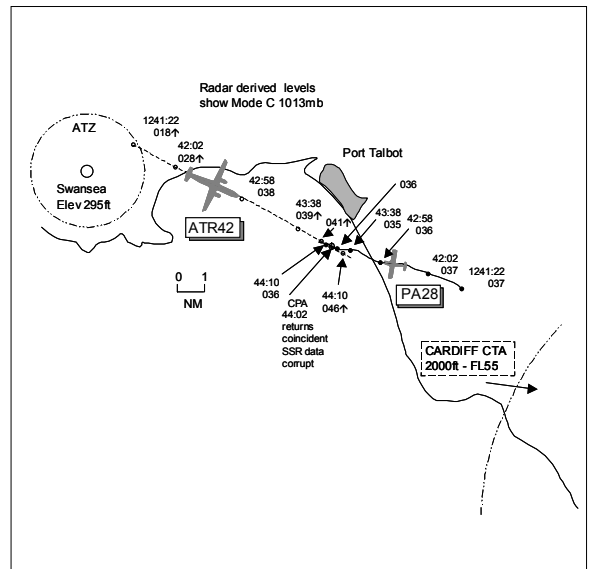
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Cambridge APP directed the R44 into conflict with the PA23.

Degree of Risk: B.

AIRPROX REPORT NO 94/04

Date/Time: 27 May 1244
Position: 5134N 00350W
 (10nm ESE Swansea)
Airspace: LFIR (Class: G)
Reporting Ac Reported Ac
Type: ATR42-300 PA28
Operator: CAT Civ Pte
Alt/FL: 4000ft 4000ft
 (QNH 1022mb) (QNH)
Weather VMC CLOC VMC NR
Visibility: 8km >10km
Reported Separation:
 NR Nil H
Recorded Separation:
 Returns merge 500-1000ft V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE ATR42 PILOT reports departing from Swansea on track to CDF NDB (120°) at 220kt and climbing to 4000ft QNH 1022mb. The Capt, PNF, had relayed information between Swansea ATC and a rescue helicopter inbound low-level to a hospital which had delayed their handover to Cardiff Radar when levelling-off at 4000ft. During his initial call to Cardiff, a TCAS TA alert was received on traffic in his 12 o'clock indicating -200ft which was followed almost immediately by a TCAS RA 'climb'. He interrupted his transmission to ATC, calling 'TCAS climb', and followed the TCAS guidance. During this manoeuvre the conflicting traffic was not acquired visually. Climbing through 4700ft, 'clear of traffic' was annunciated and he informed ATC that he was "...descending to 4000ft". The controller told him to "maintain altitude, do not descend, further traffic". He maintained 5000ft, he thought, and was formally radar identified and subsequently carried out an uneventful landing on RW12 at Cardiff.

THE PA28 PILOT reports heading 306° at 120kt en route from Cardiff to Kilkenny VFR at 3000ft RPS, he thought, and in receipt of a FIS from Swansea on 119.7MHz squawking 7000 with Mode C. Neither he nor his passenger, a pilot, could recall seeing a conflicting ac whilst approaching Swansea.

UKAB Note (1): During a subsequent telephone conversation with the UKAB Secretariat following receipt of the Swansea RT transcript, the PA28 pilot agreed that he had been flying at 4000ft and, following TI passed by Swansea ATC after his initial RT call on the ATR, he had seen the reporting ac but only as it passed overhead flying in the opposite direction. He was unable to assess the separation distance or risk.

UKAB Note (2): Met Office archive data shows the Cardiff METAR EGFF 1250Z 09009KT 9999 SCT030 19/09 Q1022=

ATSI reports that the incident took place in Class G uncontrolled airspace 10nm ESE of Swansea Airport at 1244 UTC. The ATR42 was en-route from Swansea to Cardiff on an IFR flight plan. The identity of the other flight involved was initially unknown but later revealed to be a PA28 which had departed from Cardiff on a VFR flight-plan to Kilkenny in Ireland. The Airprox occurred as the subject ac were establishing communications with, respectively, Cardiff and Swansea ATCUs.

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Following departure from Cardiff, the PA28 pilot, operating VFR, established communications with the Cardiff Radar 2 (R2) controller at 1232:22, reporting climbing to 1500ft. The controller responded by advising that a FIS would be provided after leaving the 'Zone' and requested to what level he wished to climb. The pilot replied *"...er four thousand when clear of you thanks I understand a FIS..."*. Wearing a discrete Cardiff SSR code, the PA28 pilot was instructed to follow a published VFR route and exit the Cardiff CTA at its NW boundary. A short while later, the pilot of another PA28 (AC3), a second VFR departure en-route to Kilkenny, called on the R2 frequency. Again wearing a discrete code, he was similarly notified that a FIS would be provided after leaving Cardiff's CAS. The pilot of this flight declared the intention to cruise at 4500ft. At 1234:34, with the two ac about 3nm apart, each was issued clearance to climb to 2500ft.

A little over 3min later, at 1238, R2 approved the subject PA28's climb to its requested altitude of 4000ft. While this was taking place, the Cardiff Radar 1 controller (R1) was responding to a telephone call from the Swansea ADC/APC. The latter provided a 'departure warning' on the ATR42, a pending IFR flight to Cardiff from Swansea, and requested a joining clearance for it to enter Cardiff's CAS. In accordance with a Letter of Agreement (LOA) between the two Units for such flights, the Cardiff R1 issued Swansea a discrete SSR code and a clearance for the ATR42 to enter the Cardiff CTA at 4000ft on a direct track to the Cardiff NDB 'CDF'. It is not routine practice for R1 to be advised by R2 of VFR traffic leaving the area, however, on this occasion had R1 known about the subject PA28 there would have been an opportunity to alert Swansea to the presence of this flight during the telephone conversation. Swansea airport, which is not radar equipped, lies outside CAS approximately 30nm to the NW of Cardiff and the greater portion of the ATR42's flight would be conducted in Class G airspace. (Note: 4000ft is stipulated in the LOA as it conforms to the relevant Cardiff MSA of 3900ft amsl). Under the terms of the LOA, Swansea is not required to notify Cardiff of an airborne time for such flights, it being understood this event will take place within a few minutes of the departure warning being provided. To enable Cardiff to provide the flight with a radar service at the earliest opportunity, the Swansea MATS Part 2, 4.17.2, states *"After departure the ac should be transferred to Cardiff radar as soon as it is clear of known traffic under Swansea control"*. At 1238:30, after being instructed to enter and backtrack RW04 at Swansea, the ATR42 was passed the following clearance by the Swansea controller *"After departure right turn direct Cardiff maintain altitude 4000 feet on Cardiff QNH 1022 squawk 3601 expect runway 12 (at Cardiff)"*.

By 1240, the PA28 had exited the Cardiff CTA on a NW'ly track. The Cardiff R2 controller decided to terminate the service, suggesting the flight made a call to Swansea *"...on your way past they are active..."* and provided the frequency. The pilot did not respond and the message was repeated *"...there's nothing else... (1-2 unintelligible words)... known to affect now squawk 7000 on stand-by freecall Swansea 119.7"*. The message was acknowledged and the flight finally left the frequency at 1241:22. The Cardiff R2 controller reports that when he took this action he was aware a joining clearance for the ATR42 had been issued. However, at the time the Swansea departure was not yet visible on the radar and, therefore, he considered that the PA28 would be better served by speaking to Swansea who could provide up to date TI on the ATR42 and other relevant traffic in the area. MATS Part 1, Section 1, Chapter 1, Page 2, para 5 - 'Flight Information Service', states that controllers will, subject to workload *"...provide pilots with information concerning collision hazards to ac operating in class C, D E, F or G airspace when self evident information from any source indicates that a risk of collision may exist. It is accepted that this information may be incomplete and the controller cannot assume responsibility for its issuance at all times or for its accuracy"*. As the ATR42 was known traffic to the Cardiff R2 controller, it is felt that the pilot of the PA28 could reasonably have expected to be made aware of ATR42's intentions, especially in view of the PA28's decision to cruise at the same altitude. There were opportunities for this to have been done before the PA28 left Cardiff's frequency and reflecting on the situation the controller concurred.

The ATR42 was airborne from Swansea's RW04 at 1241. However, the flight's transfer to the Cardiff R1 frequency was delayed for about 2min as the Swansea controller enlisted the pilot's help to act as a relay to a local rescue helicopter that appeared not to be receiving Swansea's calls. At 1242.01, during

this process, the subject PA28's pilot made an opening transmission to Swansea, using c/s only, but was instructed to stand-by. A minute later, at 1243:03, the Swansea controller transferred the ATR42 to the Cardiff R1 frequency. The radar recording at 1242:58 shows the ATR42 about 6nm ESE of Swansea at FL038 (4070ft QNH 1022mb), tracking SE with traffic opposite direction wearing conspicuity code 7000 at a range of 5.5nm and indicating 200ft lower on Mode C (subsequently established as the PA28).

Twenty five seconds later, at 1243:30, the Swansea controller invited the PA28 pilot to pass his details. The pilot reported that he was *"...currently four thousand feet...coasting out abeam Port Talbot like to cross your field... at four thousand feet"*. The Swansea controller immediately responded *"Er roger PA28 c/s traffic information there's an ATR42 airborne from us at four one now level at 4000 feet eastbound into Cardiff"*. The pilot replied *"Got him in sight he's just crossing overhead now"*. No further comment about the sighting was made by the pilot on the RT.

Meanwhile, the Cardiff R1 controller had observed on radar the traffic to affect the ATR42 and, as the latter had not yet arrived on frequency, addressed a 'blind' call to the flight. The pilot of the ATR42 responded immediately *"Affirm sir we're just with you and we're four thousand feet and tracking direct to Charlie Delta Fox ATR42 c/s TCAS climb"*. The controller replied *"ATR42 c/s roger unknown traffic 12 o'clock one mile indicating 3800 feet"*. In reply the pilot said *"Yeah roger we got that now we've just got an RA actually...(unintelligible words)...maintaining 4000 feet we are now four eight and clear of conflict and resuming altitude 4000 feet"*. The flight was instructed to *"squawk ident"* but maintain its current altitude because *"...there's further traffic twelve o'clock two miles opposite direction indicating 3500 feet that is known traffic at 3500 feet"*. This was acknowledged by the ATR42 pilot who reported maintaining 4700ft. This further traffic was AC3 that R2 had retained on frequency to provide T1 on the ATR42, having observed the latter airborne. Following the encounter, the ATR42 was formally placed under a RAS and positioned for a straight-in approach to RW12 at Cardiff without further incident.

The radar recording shows that in the minute or so leading up to the encounter, the ATR42 and the subject PA28 were on directly opposing tracks. From a range of 4nm until they are a little over 2.5nm apart, there is 300ft of vertical separation between them. By the time they are 0.75nm apart (1243:54), the vertical displacement is 500ft with the ATR42 indicating at FL041 Mode C (4370ft altitude) and the PA28 at FL36 (3870ft altitude). Unfortunately, when the two ac cross, the Mode C indications become corrupt and are therefore unreliable. However, it is estimated at CPA the vertical separation was between 500ft and 1000ft.

UKAB Note (3): The radar sweep 8sec after CPA at 1244:10 does show the ATR42 indicating FL46 and the PA28 at FL36.

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 during this conflict in Class G airspace, between an IFR ATR42 and VFR PA28, both crews were responsible for maintaining their own separation from other traffic. Both flights had been in receipt of an ATS from 2 adjacent units but had met 'in conflict' during the 'transfer of control' period, with neither crew being aware of each other's presence until immediately before the encounter. Cardiff ATC was the only party in possession of information on the subject ac's flight details. The Cardiff R2 was aware of the impending ATR departure from Swansea but he had not passed T1 to PA28 pilot although both flights were in potential conflict. The PA28 had reached the boundary of the Cardiff CTA and had been transferred to Swansea. This had occurred about 2min after the R1 had given a joining clearance to the Swansea ADC/APP on the ATR but the R1 had not been aware of the PA28. However, there had been an opportunity for the R2 to inform the Swansea ADC/APP of the PA28

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tracking towards them, but as the R2 had not seen the ATR on radar he had thought that the flight would be better placed talking to Swansea. Members agreed that these omissions in passing TI to Swansea ATC and the PA28 pilot had contributed to the Airprox. Unbeknown to Cardiff ATC, the ATR crew had delayed contacting them because they were relaying RT messages between Swansea ATC and a helicopter. The PA28 pilot had called Swansea and been told to 'standby' and 1min later the ATR was transferred to the Cardiff frequency. A further 30sec later the PA28 pilot was invited to pass his flight details. The ADC/APP then reacted quickly, issuing TI on the ATR although by now it was already passing overhead the PA28 when its pilot saw it. Meanwhile the Cardiff R1 had seen the conflict and made a blind call to the ATR crew who had not called on his frequency. The ATR crew had meanwhile received a TCAS TA alert followed by an RA climb command, which was followed whilst informing ATC of their actions during their initial call. Although the crew had not visually acquired the PA28, the TCAS manoeuvre had fortuitously resulted in the ATR passing the PA28 with at least 500ft of vertical separation. The prompt actions taken by the ATR crew were enough to persuade the Board that any risk of collision had been quickly and effectively removed.

Members could not understand the Cardiff R2's 'rationale' in instructing the PA28 to squawk 7000 'on standby' when he transferred the flight to Swansea. Thankfully the PA28 pilot ignored the instruction and switched his transponder on with 7000 and Mode C selected. The recommended guidance is to squawk 7000 with Mode C unless receiving an ATS from a unit, which requires a different setting, or when circumstances require the use of a Special Purposes Code or other specific conspicuity code.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G resolved by the ATR42 crew.

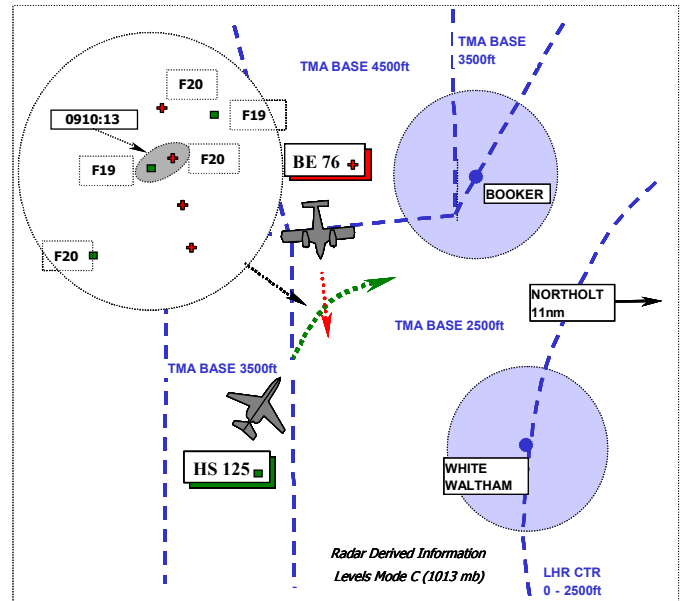
Degree of Risk: C.

Contributory Factors: Lack of TI from Cardiff R2 to:

1. The Swansea ADC/APP on the PA28
 2. The PA28 pilot on the ATR42.
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AIRPROX REPORT NO 095/04

Date/Time: 2 Jun 0910
Position: 5134N 00053W
 (3nm NE of Henley-on-Thames)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: BA125-800 BE76
Operator: Civ Exec Civ Trg
Alt/FL: 2000ft 2000ft
 (QNH 1025 mb) (QNH)
Weather IMC/VMC VMC
 CLBC CLBC
Visibility: 20km 25km
Reported Separation:
 0 V 250m H 0/200ft V 500m H
Recorded Separation:
 100ft V 120yd H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE BA 125-800 PILOT reports flying a white and silver ac with strobes and taxi lights selected on, on a positioning flight from Farnborough to Northolt, radar to radar, initially at 2400ft and 230kt on the London QNH. Headings were given by ATC to avoid the LONDON CTR. They were handed to Northolt radar at WOD and told to maintain 2400ft and a heading of 030°. At 2400ft they were IMC in cumulus cloud. Northolt [Director] reported a contact at 11 o'clock at a 'similar' altitude. Northolt Dir then instructed them to turn right onto 080° and descend to 2000ft QNH. At 2000ft they had good forward visibility and almost immediately saw a Kingair pass through their 12 o'clock, level or slightly descending, at a distance which they initially reported as 'a quarter of a mile' but which, on reflection was considerably less, perhaps 250yd and both ac were at exactly the same altitude. They reported to Northolt that they would be filing an Airprox. He was not able to take any avoiding action and assessed the risk of collision as being high.

UKAB Note (1): The transcript of the Northolt Director position shows that the HS125 was in receipt of a RIS from Farnborough LARS. It was identified and handed over to Northolt Director at 0907:53, 2min 15sec before the incident. The Farnborough LARS Controller stated in the handover brief to Northolt: "I've called that traffic to him, the one manoeuvring at Woodley yep".

THE BE76 PILOT reports flying a blue and white ac with strobes selected on squawking 7000 on a local training flight and in receipt of a FIS from Booker. While heading SW at 120-140kt flying in good VMC below CAS he saw a white low-wing twin-jet ¼ a mile away, in a turn, to their rear right. It had descended from the cloud layer above; hence he saw the ac late as it passed to their rear. No avoiding action was taken as they were heading away from other ac.

MIL ATC OPS reports that Northolt Director (Dir) was working an HS125 on a RIS flying at 2400ft on the London QNH of 1025mb. Simultaneously a BE76 was departing Wycombe Air Park VFR on a FIS from Booker and squawking 7000. At 0908:28 Dir instructed the pilot of the HS125 to turn on to a heading of 030°; Dir and the Northolt Supervisor (Sup) report that this heading was to keep the HS125 clear of the Booker ATZ. There then followed a short interchange between the HS125 pilot and Dir in which he

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requested radar vectors for a downwind join for RW25 at Northolt and at 0909:12 Dir called the BE76 to him *“traffic left, 11 o'clock, 5 miles, crossing slowly left right, similar altitude, 2400ft.”* The pilot reported *“intermittent India Mike”* so Dir instructed him to descend to 2000ft. At 0909:40 Dir called the traffic again *“10 o'clock, 3 miles...similar altitude.”* Eight sec later the HS125 pilot reported: *“looking...victor mike beneath.”* Dir responded by calling further traffic and turning the ac on to 080° to position it for recovery. The HS125 pilot then reported that he had seen the BE76 pass *“...about a quarter of a mile in front, less than that, same altitude”* and that he intended to file an Airprox.

Analysis of the Heathrow radar 0908:59 shows the HS125, indicating a Mode C of FL24, tracking 030°, 7nm W of White Waltham. At the same time the BE76 is seen 7.8nm NW of White Waltham, tracking S, indicating FL24. At 0909:12, when Dir passes TI to the HS125 pilot, the ac are 5.5nm apart and both Mode C's still indicate FL24. At 0909:16 the BE76 indicates FL23 as the ac starts its descent and shortly after this the HS125 also indicates a descent. By 0909:40 the ac are 2.7nm apart and both indicate FL22 and at 0910:09 the returns merge [see UKAB Note (2)]. At this point the HS125 indicates FL19 and the BE76 indicates FL20.

When Dir first called the BE76 to the HS125, he did so in accordance with the terms and phraseology of RIS (at JSP552 235.115.1) unaware that the HS125 was flying in intermittent IMC. The pilot did not request an upgrade to a RAS but he did report the change to his met conditions; Dir took this as a cue to offer immediate avoiding action. Unfortunately, in the location of the Airprox, there are several areas of CAS. Dir could not turn the HS125 left since it would probably have entered the Booker ATZ (2520 ft QNH) or the Benson MATZ (3226ft QNH) and the ac was already on a heading of 030° to stay clear of Booker. At 2400ft the HS125 may have been able to turn right and remain above the White Waltham ATZ but it is highly likely that the radius of turn would have resulted in the ac entering the London CTR. Furthermore it could not climb without entering the London TMA. Dir was left with only one realistic option and that was to instruct his ac to descend, and this he did promptly and to the minimum altitude allowed by the Northolt Radar Vector Chart. Although Dir did not use the phraseology *‘avoiding action’*, the pilot of the HS125 appears to have reacted straight away; it is therefore unlikely that this omission had any effect on the outcome. Unfortunately the BE76 also commenced a descent but Dir could not offer further avoiding action, so he called the BE76 to the HS125 Pilot again. Dir not only complied with the regulations for RIS, he also fulfilled his implied duty of care by offering the best avoiding action he could when it was apparent that the HS125 pilot was not in a position to employ the see and avoid principle.

UKAB Note (2): A 1nm scale recording of the Heathrow radar shows the contacts crossing, but not overlapping. Although distance calculations at such high scales can be inaccurate, the separation was calculated at about 100m.

CAA General Aviation Department comments that they believe that the HS125 pilot made an error when choosing to accept a RIS while flying in and out of IMC conditions outside of Controlled Airspace (CAS). The HS125 pilot should have requested a Radar Advisory Service or chosen a level to maintain VMC or requested a Radar Control Service within CAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members familiar with operating in the area informed the Board that the Farnborough to Northolt route was awkward, particularly in poor weather. A full IFR routing would be very convoluted due to the complexity of the CAS around Heathrow. They were unsure of the level of service that the HS125 pilot expected from ATC as the terminology he used in his report, namely *‘Radar to Radar’*, did not

adequately describe any type of ATC service (RIS or RAS being possible interpretations). Further, he did not report whether he was operating under VFR or IFR. Both controllers however were clear that they had been providing the HS125 pilot with a RIS and therefore probably assumed that he was VFR (at least until he told them otherwise). Following TI from Farnborough and a correct handover, the Northolt Dir had more than fulfilled his responsibilities under the RIS by passing accurate TI to the HS125 pilot as soon as he could and 1min before the incident. However this was of little practical use to the pilot since he was IMC and thus unable to see and avoid the other ac until it was too late to take avoiding action.

One member opined that this was a common route through very busy airspace below the base of the London TMA used both by fixed wing ac and helicopters and as a result Airprox were frequent. Accepting that major revisions to the airspace structure are most unlikely, it was not possible to suggest an alternative routing which remained CAS which offers greater protection. It was agreed however, that to plan to fly this route in poor weather was most unwise.

Although the BE76 pilot was relatively unconcerned (and did not assess the risk) by the proximity of the HS125, he did not see it until after it had passed him and was going away behind when no avoiding action was appropriate. Despite the previous TI the HS125 pilot, on the other hand, saw the BE76 earlier but only when his ac emerged below the cloud and the other ac was 350m away, directly ahead of him, closing and crossing his nose. He unsurprisingly considered the risk as being high since he saw the BE76 before their flight paths had started to diverge. It appeared however, too late for the HS125 pilot to take any avoiding action.

Members therefore, considered that although, due to the geometry and good fortune, there was no actual risk that the ac would have collided, there had been a clear erosion of the safety of both.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sighting by the BE76 pilot and a very late sighting the HS125 pilot.

Degree of Risk: B.

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Date/Time: 25 May 1551

Position: 5138N 00012E (2nm ESE of LAMBOURNE)

Airspace: LTMA (Class: A)

Reporting Ac Reported Ac

Type: MD80 CRJ

Operator: CAT CAT

Alt/FL: ↓FL80 FL96

Weather IMC IMC IBCL

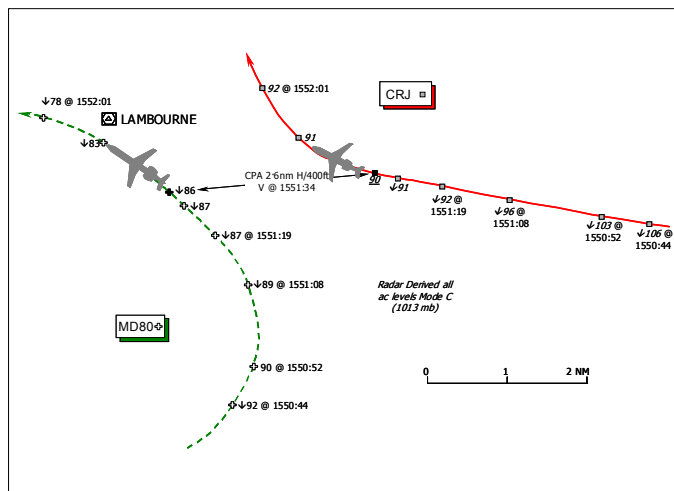
Visibility: NR NR

Reported Separation:

1-3nm H/300ft V NR

Recorded Separation:

2.6nm H/400ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MD80 PILOT reports he was holding at LAMBOURNE (LAM) in IMC descending to FL80 whilst inbound to Heathrow. ATC instructed them to turn L to LAM, then after passing LAM fly heading 275° at 220kt, whereupon TCAS gave them an “advisory” at the 2 o’clock position in the inner circle of the VSI, shown at 600ft in descent. The controller gave an instruction first to the CRJ, telling the crew to stop descent immediately and to turn. Thereafter ATC told him to descend rapidly to FL70 and turn left onto 260°. Speedbrakes and the vertical speed were set to 2000ft/min and the instructions complied with. He assessed the minimum vertical separation as 300ft at 1-3nm, but did not give an assessment of the risk.

THE CRJ PILOT provided only barest of details of his flight, which were received by the UKAB some 12 weeks after the event. He reports that he was inbound to London Heathrow and that the Airprox occurred heading 280°, E of LAM at 250kt. Whilst IMC in between cloud layers descending through FL96 a TCAS TA was enunciated and a heading change onto 340° was made. The risk was assessed as “Medium – Low”.

[UKAB Note (1): The CRJ pilot’s account did not reveal why he descended his ac below the flight’s assigned level.

THE LTCC LAMBOURNE SECTOR CONTROLLER (LAM SC) reports that the CRJ was transferred to Heathrow INT DIR in descent, to be level at FL100 before LAM. The MD80 had been observed descending below FL96 before the descent clearance to FL100 was issued to the CRJ crew. The CRJ was then seen to descend below FL100, potentially into conflict with the MD80: STCA was triggered and avoiding action given by the Heathrow INT DIR. He was advised of the avoiding action and informed TC NE DEPARTURES who potentially had traffic to the CRJ.

THE LTCC HEATHROW INTERMEDIATE DIR (INT DIR) reports that the MD80 was completing a left hand orbit to leave LAM on a heading of 275° at 220kt, descending to FL80. The CRJ crew checked-in on his frequency and was cleared to leave LAM also on a heading of 275°, at 220kt. A short time later, he observed that the CRJ was descending through FL98 and so he instructed the crew to stop descent, as they should have been maintaining FL100. He then issued avoiding action and traffic information to

both acs' crews to resolve the conflict. At some point during the "level bust" the CRJ crew mentioned erroneously that their assigned level was FL60.

THE CRJ PILOT'S company reports that their flight safety department addressed this incident to all their flight crews. Standard RT procedures were stressed and in particular for crews to report the level cleared to and their level passing to ATC.

LTCC ATCI reports that this incident occurred in the vicinity of the LAM VOR at 1551. Both ac were inbound to Heathrow via the LAM VOR, where traffic was holding up to FL90 under the control of the TC LAM SC.

Just at 1550:00, the CRJ crew was instructed by LAM SC to "*descend flight level 100 be level before LAMBOURNE*". The CRJ had a little under 10nm to run to the VOR at this point and the crew clearly and accurately acknowledged this descent clearance moments later, "*descending flight level 100 to be there before LAMBOURNE [C/S]*". Following this transmission the flight was instructed to contact Heathrow INT DIR.

The CRJ crew established contact with the TC Heathrow INT DIR just after 1550:40, reporting "*arrival good afternoon [C/S] information Alpha ????? ???? [2-3 unintelligible words] inbound to LAMBOURNE*". No report of the level to which the aircraft was descending was [apparently] made in this transmission.

INT DIR was keen to integrate the ac into the sequence that he had established off LAM and responded to the call by instructing the CRJ crew at 1550:50, "*[C/S] good afternoon leave LAMBOURNE heading...275 degrees speed 220 knots*". There was no challenge made to clarify the level to which the flight was descending before the CRJ crew acknowledged "*speed 2 20 leaving LAMBOURNE heading 275 [C/S]*". Later discussion on the incident with the INT DIR determined that he had observed that the Heathrow APPROACH Controller [sitting alongside the INT DIR and operating 'procedurally' on the same frequency] had ringed FL100 in the level box of the FPS. From this FPS marking the INT DIR was content that the crew had reported their level to the previous controller – the LAM SC. The Sector was moderately busy and INT DIR believed that the omission that had been noted was the unclear ac type report made by the CRJ crew, who were later instructed to confirm their ac type.

STCA activated against the MD80 below the CRJ at 1550:53. By 1551:08, the MD80 was descending through FL89 for FL80 and in a L turn back towards the LAM VOR in accordance with ATC instructions, with the CRJ having passed FL100 and descending through FL96. INT DIR observed the Mode C of the CRJ and instructed the crew to stop their descent, whereupon the controller requested confirmation of the flight's cleared flight level insofar as the crew understood it. The CRJ crew replied "*[C/S] flight level 60*". INT DIR repeated the instruction to the CRJ at 1551:20, "*negative stop descent now turn right heading 340*" for avoiding action. The crew acknowledged, "*heading 340 stopping descent now [C/S]*". Whereupon the INT DIR added traffic information on the MD80 below and ahead at 1551:30, "*that's avoiding action there's traffic in your 12 o'clock range 2 miles turning left west ahead of you*". Whence the CRJ crew reported level at "*90 for [C/S]*" just after 1551:30. The crew of CRJ have subsequently reported that they were IMC.

Separation between the two ac reduced to a minimum of 2.6nm horizontally and 400ft vertically at 1551:34. The INT DIR then turned his attention to the MD80, instructing the crew at 1551:40, to "*descend immediately FL70 its avoiding action turn left heading of 260*". The MD80 crew acknowledged straight away, "*we're descending immediately and turning left [C/S]*". Standard vertical separation was restored within 20secs.

Separation did not fall below the parameters that would have triggered the Separation Monitoring Function (SMF) equipment, thus it was originally thought that standard separation minima had been

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maintained. From subsequent analysis of the radar recording it was determined that separation was marginally eroded.

Following a number of previous 'level busts' which had resulted in a loss of separation during inter-sector transfer of traffic within TC, the instructions to controllers within the LTCC MATS Part 2 were specifically amended in an effort to reduce such instances. Consequently, MATS Part 2 GEN 2.8.1 is quite specific about checking levels and states that:

"All TC controllers are to confirm the cleared level of an aircraft coming under their control on first RTF contact. If this is not volunteered by the pilot it is to be requested and verified by the receiving controller before giving any executive instruction".

Whereas the avoiding action issued by INT DIR was timely and very effective, this loss of separation might have been prevented from developing if the INT DIR had challenged the CRJ crew when they did not report their cleared level.

ATSI reports that the LAM SC cleared the crew to descend to FL100, to be level before LAMBOURNE. Having obtained a clear and correct readback, the LAM SC instructed the crew to change frequency to the TC HEATHROW INT DIR.

The crew contacted the HEATHROW INT DIR, and reported that they were inbound to LAM. The controller instructed the crew to leave LAM heading 275° and maintain a speed of 220 knots, which was correctly readback, but the TC HEATHROW INT DIR did not comply with the requirements of LTCC MATS Part 2 GEN 2.8.1 and check their level assigned. A short time later, the INT DIR observed the Mode C of the CRJ indicating FL98 and so he instructed the crew to stop their descent and passed avoiding action. STCA activated between the CRJ and the MD80, which was descending through FL89 for FL80. Separation between the CRJ and the MD80 reduced below [the standard minima of 3nm/1000ft] to a minimum of 2.6nm and 400ft as the flights converged on the Lambourne VOR. Upon challenging the CRJ crew as to their cleared level after the event they replied "*flight level six zero*".

It has not been possible to establish why the crew of the CRJ thought that their cleared level was FL60. With a transition altitude of 6000ft, FL60 would not normally be allocated within the London TMA. Furthermore, although there are clear instructions contained in MATS Part 2 for controllers to establish the cleared level of an ac on first contact, it would appear that there is no similar directive to pilots instructing them, in these circumstances, to report this information.

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.

For his part the reporting MD80 pilot could only react to the avoiding action issued by the Heathrow INT DIR and the reported TCAS "advisory", which appeared to be a Traffic Alert and not an RA. The Board was dismayed that it had not been possible to determine from the CRJ pilot's incomplete and somewhat belated report why he and his co-pilot had supposed that they had been cleared to descend to FL60. Whereas the analysis provided by ATSI had made it plain that such a level would not normally be allocated within the London TMA, the inadequate report from the CRJ crew was not helpful and did not permit a full understanding from their perspective. Moreover, LTCC ATCI's comprehensive report had shown that the LAM SC had clearly instructed the CRJ crew to descend to FL100 and to be level before LAMBOURNE. That the CRJ crew continued descent below their assigned level of FL100, the Board agreed unanimously, was the cause of this Airprox.

In one pilot member's view, the RT transcript did not show 'beyond any shadow of doubt' that the CRJ crew had not reported their cleared level or their passing level when they first contacted the Heathrow INT DIR and had said "...good afternoon [C/S] information Alpha ?????? ?????? [2-3 unintelligible words] inbound to LAMBOURNE". The INT DIR apparently believed that the crew had reported their level to the LAM SC as annotated by his supporting APPROACH controller. To some pilot members the unintelligible words noted might feasibly have been a level report but to other members this seemed extremely unlikely. If the CRJ crew had said anything about their cleared level it would have been immediately obvious that they were descending erroneously to the spurious level of FL60: corrective action could have been taken at that point. But it seemed to the majority of members that no report of the level to which the CRJ was descending had apparently been made in this initial transmission. CAT pilot members were quite emphatic that the level passing and cleared level should have been reported; indeed the CRJ operator had stressed this very point to their crews. To pilot members these were essential elements of any initial RT report especially in the terminal environment. Indeed the board was briefed that examples of RT phraseology in the Radiotelephony Manual - CAP413 – included passing and cleared level information, so the Board was surprised to learn from the ATSI report that the UK AIP did not require pilots of arriving traffic to report their cleared, and passing level where necessary, as was the case for departing ac. Consequently, the Board was moved to recommend that the CAA revise the UK AIP clearly to promulgate the requirement for arriving flight crews to report *inter alia* their cleared level and, if appropriate, passing level on initial contact with a controller subsequent to an RT frequency change. Notwithstanding the foregoing, if a level report had not been made then the controllers should have challenged this (the LTCC MATS Pt 2 requirements had been written a result of occurrences such as this). Controller members agreed that the instruction to the controllers was quite specific in this respect and this Airprox could have been prevented from developing if the Heathrow INT DIR or the supporting APPROACH controller had challenged the crew of the CRJ when they did not report their cleared level. With this in mind the Board agreed that the controllers' omission had been a contributory factor.

Fortunately, the alert Heathrow INT DIR observed the CRJ's descent below their cleared level very quickly, the controller spotting it when the ac's Mode C indicated FL98 (virtually as soon as it was feasible to detect the CRJ crew's error on radar). Having spotted the problem, the INT DIR decided his priorities correctly and issued immediate instructions that both arrested the descent of the CRJ at FL90 and turned the two ac away from each other. Both acs' crews immediate compliance with this effective avoiding action achieved some 400ft vertical separation at the closest point and only a marginal erosion of horizontal separation below the standard of 3nm. In the Boards view, these actions probably forestalled an RA and certainly removed any risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The CRJ crew descended below their assigned level into conflict with the MD80.

Degree of Risk: C.

Contributory Factors: Neither the Heathrow INT DIR nor APPROACH verified the CRJ crew's cleared level on initial contact in accordance with the LTCC MATS Pt 2.

Recommendation: That the CAA revise the UK AIP clearly to promulgate the requirement for flight crews to report *inter alia* their cleared level and, if appropriate, passing level, on initial contact with a controller subsequent to an RT frequency change.

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Date/Time: 4 Jun 0948

Position: 5441N 00104W (New 150/30nm)

Airspace: Vale of York AIAA (Class: G)

Reporting Ac Reported Ac

Type: B737-300 Hawk

Operator: CAT HQ STC

Alt/FL: FL140 10,000ft
(QFE)

Weather VMC VMC CLAC

Visibility: NR 43km

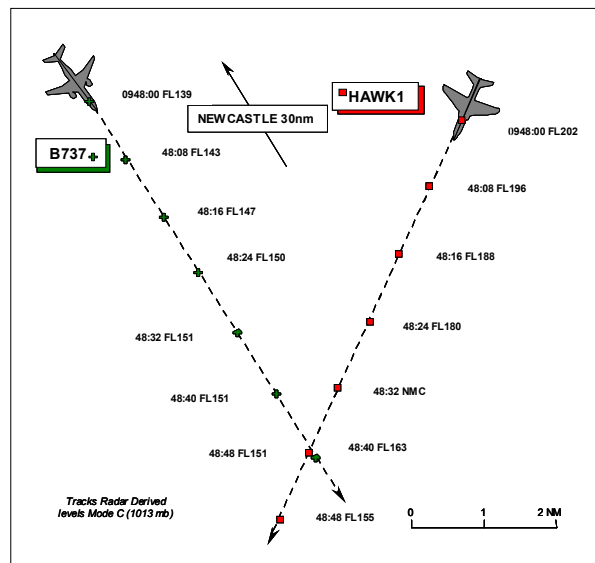
Reported Separation:

0 V .25nm H NR V 3nm H

Recorded Separation:

400ft V 1nm H (ac diverging)

1200ft V1nm H (as ac cross)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying a scheduled passenger service from Newcastle to Amsterdam in receipt of an ATS from Newcastle and squawking as directed with Mode C. He was passing FL140 in the climb to FL200 heading 150° at 310kt when he received a sudden TA and, seconds later, an RA with an “Adjust V/S” followed by “descend”. Two fighters were observed rapidly descending from FL200 through their level. He estimated the vertical separation as being nil and the horizontal separation as being approx ¼nm in their 2 o’clock position. The pilot informed ATC who had no contact with the fighters.

THE HAWK PILOT reports leading a pair of black Hawk ac with No 2 high on his left, operating VFR in the Vale of York AIAA, in receipt of a RIS from Scottish Mil and squawking as directed with Mode C. As they started a descent overhead Teesside, heading 180° at 300kt, they had received one call from ATC regarding another ac ‘right one o’clock at FL105’ but he did not see it until after it had passed. They did not see the airliner until it was 3-4nm behind them at same level. On contact with Leeming he asked how close it had been and was told ‘4 miles going away’. His No 2 saw nothing of the incident.

THE HAWK STATION COMMENTS that Leeming-based ac are familiar with operating in this busy airspace, as it is their standard arrival/departure lane. Accordingly, it is the norm for them to operate under a radar/GCI service prior to handover to Leeming ATC who then co-ordinate their recovery to Leeming with Teesside. It is disconcerting, therefore, to find that there was a potential confliction with an airliner operating in Class G airspace apparently without a radar service – otherwise he would surely have been aware that he was operating in the vicinity of ac recovering to Leeming. They are convinced that their co-ordination with both Teesside and Newcastle is robust and is vital to continued safe operations.

MIL ATC OPS reports that ScATCC (Mil) Controller 2 (CON2), a mentor and UT team, was working a pair of Hawks under a RIS inbound to Leeming. Newcastle Radar (New Rad) was working a B737 under RAS, climbing outbound from Newcastle. At 0937:45 the leader of a pair of Hawks contacted CON2 and reported “...levelling FL225” requesting a direct track to Leeming and CON2 identified the ac and offered a RIS. Initially the 2 Hawks requested separate squawks as they were about 3nm apart, but by 0939:45 the ac were in close formation. After he received the weather, the Hawk leader requested “...handover, radar to vis” and at 0946:30 CON2 told him to report ready for descent to which he responded “ready.” At 0946:45 CON2 called the B737 to the Hawks stating “...traffic right 2 o’clock, 10

miles, crossing right to left, indicating FL105 climbing.” and the leader replied “...looking and ready for descent” and CON2 instructed him to report level at FL100. At 0948:00 CON2 instructed the Hawk leader to “...squawk 0411, contact Leeming base stud 3.” No transcript of CON2’s landlines was available but the controller said that on completion of the handover to Leeming, he called New Rad and passed them TI, stating that the Hawks were in the descent to FL100 under a RIS and that he had passed them TI on the B737.

Analysis of the Claxby Radar shows the pair of Hawks, 35nm NE of Teesside at 0945:43 indicating FL224 and the B737, 25.5nm NW of Teesside indicating FL067. At 0946:30 the ac are 17.4nm apart and the Hawks still indicate FL224 while the B737 shows FL94. By 0946:45 the ac are 15nm apart; the Hawks continue to indicate FL224 and the B737 FL103. At 0947:00, shortly before the Hawks commence their descent, they are 12.5nm from the B737 which indicates FL111. When the Hawks are instructed to change frequency at 0948:00, the formation is 5.2nm from the B737, separated vertically by 6300ft, and 40sec later they pass through the B737’s 12 o’clock, a mile ahead, 1200ft above. Thereafter the ac diverge.

CON2 correctly passed TI to the Hawks about the B737 using the correct phraseology. The pilots of the Hawks were clearly content that they could see and avoid other traffic under a RIS since they requested descent immediately following the TI. At the point when CON2 handed the Hawks to Leeming, they still had 6300ft between themselves and the B737 and since the Leeming Controller accepted the handover, he must have been content that adequate TI had been passed. As CON2 did not require co-ordination against the B737, the onus was not on him to initiate any co-ordination but rested with Newcastle. Nonetheless, despite being busy, CON2 contacted New Rad to pass TI about the Hawks as a courtesy.

ATSI reports that at the time of the Airprox, the B737 was in receipt of a RAS from the Newcastle Radar 1 Controller whilst the Hawks had just changed frequency from Scottish Military to Leeming Zone. The Radar 1 controller described both the workload and traffic loading as ‘very high’ whilst the Radar 2 controller described his workload as ‘high’ but the traffic loading was ‘light/medium’. At Newcastle, the normal division of duties between Radar 1 and Radar 2 is that Radar 1 takes responsibility for all transit flights, outbounds and inbound traffic which is not routing via airway P18 while Radar 2 deals with ac inbound from airway P18 and sequencing for final approach.

Following departure from RW25, the B737 pilot established communications with the Newcastle Radar 1 at 0943:40, reporting passing 3,900ft. The controller advised that he would be providing a RAS once the ac left CAS and instructed the pilot to turn left heading 120° and climb to FL120 which he read back. The controller then turned his attention to other traffic.

Several minutes after leaving CAS, at 0946:30, the B737 pilot reported approaching FL120 and requested further climb. The controller had seen traffic (the Hawks) operating to the E of Newcastle, SW bound, displaying a Scottish Military squawk with a Mode C readout of what he thought was FL230. He instructed the B737 pilot to resume own navigation for OTR and climb to FL200, in the belief that the ac would be adequately separated from the military traffic. He then returned to resolving a confliction to the W of the CTR. At 0949:05, the B737 pilot reported that 2 fighter jets had descended through his level, triggering a TCAS RA, and shortly afterwards that he would be filing an Airprox.

The Radar 1 controller reported that he had been busy handling a number of ac. One of these, a Tucano, had declared a practice ‘PAN’ when 20nm N of Newcastle. Although the crew simply wished to route visually to the overhead before departing again to the N, this did occupy his attention for some time. Meanwhile, Radar 2 was vectoring traffic onto the ILS for RW25. Radar 1 stated that he had received approximately 3min notice that the B737 was to depart. His plan was to climb it initially to 6000ft on a heading of 210° and this was relayed to the Tower. The B737 pilot reported on frequency at 0943:40 and was instructed to turn L onto 120° and climb to FL120. He advised that this turn was designed to take it away from his other traffic and that FL120 was the maximum level that he could

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allocate ensuring that it did not enter Manchester's airspace. Meanwhile, the Hawks were approximately 33nm E of Newcastle tracking SW indicating FL225.

At 0944:00, a formation of Harriers southbound to the N of Newcastle called Radar 1, reporting descending to FL50. The controller advised that it was a common occurrence for such traffic to call Newcastle as it descended to low level and routed W of the Control Zone via the 'Hexham Gap'. At 0945:35, the Harrier formation reported levelling at FL80. The controller acknowledged this and was then occupied in passing TI on a pending departure to the Tucano, referred to earlier. At 0945:45, the departure, a JS32 for Inverness, called on frequency reporting climbing as cleared, straight ahead to 6000ft, and the controller instructed them to continue on heading and climb to FL100. At that time, the Harrier formation was 14.5nm N of Newcastle tracking S. Meanwhile, the B737 was 8nm S of the airport, passing FL63 with the Hawks in its 10 o'clock at a range of 26nm still indicating FL225.

The Radar 1 controller had seen the Hawk's squawk and taken it into account when, at 0946:33, he cleared the B737 to FL200, thus, he had thought, providing 3000ft separation. (*Note; the controller was convinced that the Hawk's Mode C had been indicating FL230: however, analysis of the radar recordings shows that it was actually FL225*). The controller then became occupied in dealing with the complex conflict developing between the Harriers, maintaining FL80, and the JS32 climbing slowly to FL100. While this was taking place, the Mode C of the Hawks indicated that they had commenced a descent.

The controller said that it is unusual for ac displaying a Scottish Military squawk to be so far S, unless they are about to turn onto a reciprocal track and route to the N. There were other similar squawks N of 55° N and the controller was expecting the Hawks to turn and rejoin those ac. If traffic is inbound to Leeming, and requiring a descent, it normally displays a Leeming squawk before it is 15nm from the coast. In this case, when he first had indications that the Hawks were descending, they were less than 10nm from the coast and had not changed to a Leeming squawk until they were almost crossing the coast.

Meanwhile, the Radar 2 controller was monitoring the overall situation as well as dealing with his own traffic. On his radar display he was using the facility that allows a 'window', with a radar picture in it, and he had placed this in the SE corner of his display. Within the 'window', he had selected the area to the S of Newcastle so that he had warning of inbound traffic from P18. Unfortunately, however the positioning of this window meant that the developing conflict between the B737 and the Hawks was not visible to him and therefore he was unable to alert Radar 1.

At 0948:35, Radar 2 answered the direct line from Scottish Military. The caller said "*Hello Newcastle, traffic information for you the aircraft just descending towards your three seven three one.....he's radar information the traffic's been called he's having to continue the descent inbound to Leeming*". At first, Radar 2 was unsure which ac the caller was referring to. Having ascertained that he was referring to the Hawks, he could see, by looking at Radar 1's display, that they were crossing from L to R in front of the B737 at a range of less than 1nm but it was now too late to resolve the conflict. At 0949:05, the pilot of the B737 transmitted "*We had two fighter jets descending through our level we had a TCAS Resolution Advisory*". Minimum separation occurred at 0948:49, when the Hawks were in the B737's 2 o'clock position at a range of 1nm, 400ft above descending.

The Radar 1 controller was asked whether he had considered limiting the RAS, or providing a RIS, but he explained that it was common practice on the unit to provide the best possible service and therefore in this case it would have been a RAS. With non-UK based crews, his experience was that to limit the service often caused more problems than were solved as frequently they did not appreciate what was meant and this resulted in a protracted dialogue on the RT. The call from Scottish Military was somewhat unusual; both controllers commented that normally such calls are very precise and in plenty of time, whereas this one came too late to be of any practical use.

The controllers both advised that, following an Airprox and subsequent accident in 1999, many military ac that are transiting the Newcastle area, call on their frequency. This does result in a high workload and RTF loading at times. In the 10min leading up to the Airprox, Radar 1 had been in communication with 12 ac, 5 of which were military, and nearly all of which required TI and/or a FIS.

This was a conflict of flight paths in the FIR but the Airprox could have been avoided if the B737 had been provided with TI and/or avoiding action on the Hawks as is required under the terms of a RAS. Accordingly, the Newcastle Radar 1 controller must accept a degree of responsibility for this Airprox. That said, being a conflict in the FIR, with all the ac involved being in receipt of an ATC service, it is assessed that responsibility for providing adequate separation did not rest solely with the Newcastle controller.

The Radar 1 controller was distracted by the developing confliction taking place to the W of his CTR between the outbound JS32 and the formation of Harriers. Although the Harriers were remaining outside CAS, it was fairly evident that the two flights might get adjacent to each other and this occupied the larger part of the controller's attention at the time. While accepting that the Harriers did not descend as the Radar 1 controller expected, and the formation initially stated, positive steps from the outset to ensure that a conflict would not arise would have resulted in extra time to concentrate on other tasks, such as monitoring the B737. Radar 2 could not see the developing confliction due to the positioning of the radar window on his display. The call from Scottish Military came too late to be of use as the two ac had virtually passed each other before the conversation was complete.

HQ STC comments that the RT calls made by the military traffic to Newcastle ATC have been mandated following the recommendations of several joint civil/military working groups trying to ease the problems generated in the past. It is suggested that if this is now overburdening the controllers concerned then the usefulness of these calls should be reconsidered.

It is surprising to see that a scheduled flight between Newcastle and Amsterdam has chosen to fly through a busy AIAA, a recognised approach path to several military airfields, and at a time when military activity is most prevalent. Whilst the CAT has every right to transit through this Class G airspace, it is increasing the risk to its passengers by doing so, especially when a Class A structure exists for their intended route. Furthermore, they were not receiving the attention that warranted such a transit from their ATC service due to a high workload.

The most alarming fact is that the Hawk did not see the airliner until it had passed. The Hawk pilot obviously did not clear his flightpath beneath his ac during the descent and placed an over-reliance on the RIS that he was receiving. The fact that he did not see the airliner is hardly surprising as it had approached from the side, and below, and would have been potentially obscured by his wingtip during the last 16 seconds of the encounter. All crews should remind themselves that looking for confliction ahead of the ac is not good enough: during descent you must look below and to the side of your flightpath. It would appear that the unexpected 'beam and below' entry has caught out this individual in this particular case.

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.

Members noted that the B737 was not following the outbound routeing from Newcastle recommended in the UK AIP ENR AD2-EGNT –1-11 para2 via FAMBO or P18 – M150 – L26. Had the B737 followed either of the 2 recommended routes, both of which avoid the Vale of York AIAA, the incident would have been prevented.

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Members considered in turn the part played by each of the parties involved in this incident. The B737 pilot had been in receipt of a RAS in Class G airspace. The report submitted by the pilot stated that he had seen the fighters at FL200. They left this altitude 48sec before the CPA so Members assumed that he had seen and tracked them for that period but had taken no action until he received a TCAS warning but with no associated avoiding action from the controller. However, when the warning was received he reacted correctly and by doing so increased the separation between his ac and the Hawks.

Despite early and accurate TI from Scottish Mil, the Hawk pilots did not see the B737 which at the time was 10,000ft below them and climbing on a crossing track. Members concurred the HQ STC comment that it is important to clear one's flightpath below before and during rapid descents. Although the Scottish Mil controller had technically fulfilled his responsibility when providing a RIS, Members considered that handing the Hawks over as they approached the confliction was unwise. At the least he should have updated the TI to the Hawk leader; stopping or asking them to reduce their rate of descent would have prevented the incident. Further, his call to Newcastle notifying them of the traffic, although not strictly required, had been far too late to allow time to give any effective avoiding action.

Members considered that the majority of the responsibility for this incident lay with the Newcastle Rad 1 Controller. They accepted that he was very busy and, for understandable reasons, received little help from his colleague on Rad 2. He did not however, take any action to alleviate the situation and reduce his workload to a more manageable level. Members noted the comments regarding military traffic passing information calls to Newcastle when in their vicinity. They considered this to be good practice based on extensive previous experience. These calls were intended as 'information calls' to assist Newcastle controllers with their air picture and only in a very few cases did the military traffic require any service at all. The Harriers, by passing slightly inaccurate information, had been a factor in the controller spending much of his time in resolving the Jetstream/Harrier confliction to the W and not noticing the evolving, and more serious, B737/Hawk confliction to the S. Notwithstanding these factors, the B737 was in receipt of a RAS and the pilot should have been given avoiding action on the Hawk which was not done.

In the event however, although there was an erosion of the separation stipulated when providing a RAS, a TCAS RA had been generated, and reacted to, preventing any risk that the ac would have collided. Further, even if no warning had been generated, the Hawks would have passed 1nm ahead of the B737 at a separation calculated as being 500ft (which is the same as that provided when flying IFR on quadrants) and although there had been an erosion of required separation there had been no significant erosion of safety margins.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Newcastle Radar 1 did not apply the conditions of a RAS.

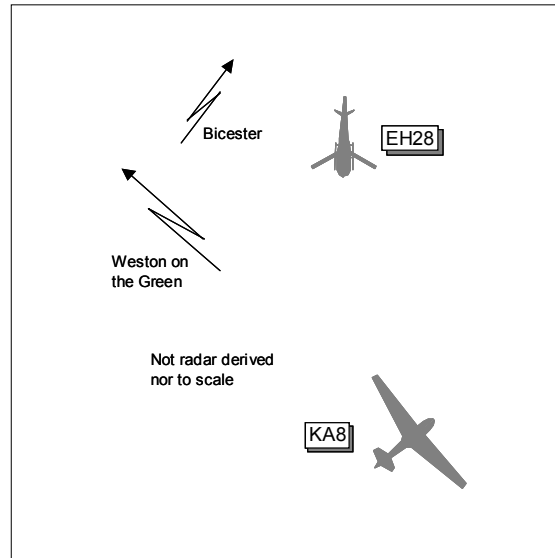
Degree of Risk: C.

Contributory Factors:

1. The ScATCC (Mil) Controller handed over the Hawks at an inappropriate time and did not update the TI.
 2. The Hawk crews did not see the B737 until after they had passed it.
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AIRPROX REPORT NO 101/04

Date/Time: 9 May 1533 (Sunday)
Position: 5152N 00112W (0.75nm SE
 Weston-on-the-Green - elev 282ft)
Airspace: Oxford AIAA (Class: G)
Reporting Ac Reported Ac
Type: KA8 Glider Enstrom EH28
Operator: Civ Club Civ Pte
Alt/FL: 350ft↓ 800ft↓
 (QFE) (QNH)
Weather VMC NR VMC CLOC
Visibility: NR >10km
Reported Separation:
 100ft V 300ft H 300ft V 1nm H
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE KA8 GLIDER PILOT reports flying solo on a local sortie from Weston on the Green (WOTG) and in communication with Launch Control on the Glider Common frequency 130.1MHz. The glider fuselage was coloured red with white wings and red tips. He had planned his cct to land in between 2 stationary gliders, 1 parked at the launch point and the other about 150m away on the NE section of the airfield; the landing direction was NW'ly. The incident occurred when he was about 400m SE of the airfield boundary, about to carry out his final turn from base leg heading 045° at 55kt and 350-400ft agl. He saw a helicopter in his 11 o'clock position range 600ft, slightly below, heading in a southerly direction between him and the airfield. He aborted his final turn and continued on base leg until clear of the recently landed, stationary glider to give himself enough clear airfield to land in. The helicopter passed about 300-400ft horizontally clear to his L at about 300ft agl, 100ft below. He assessed the risk as high if he had not aborted his final turn but this encounter had increased his workload owing to him having to reassess his options on the landing area.

THE ENSTROM EH28 PILOT reports flying inbound to Oxford from Silverstone and in communication with Oxford APPROACH 125.32MHz squawking 7000 with Mode C. The visibility was >10km in VMC and the helicopter was coloured white with tail strobe lights switched on. When N of Bicester he called Oxford Approach and obtained PPR for fuel and later, when passing Bicester, ATC advised him to approach Oxford at low level and transit to the eastern edge of the aerodrome for the heli-pads. By now he was S of Bicester heading 180° at 70kt and 800ft QNH and this was when he spotted a white glider in his 10 o'clock range 2nm flying in the opposite direction about 500ft above him. As he turned R to avoid the glider, the glider was seen to turn L towards him so he lowered the helicopter's nose, descended to 500ft and accelerated away to 110kt. The glider was seen to pass 300ft above and 1nm clear to his L. With hindsight he presumed the glider had been on a wide downwind leg and had been turning L for base leg or final approach. It appeared that the glider pilot had not seen his helicopter but his early visual acquisition and avoiding action had kept him well away from a collision path. However, this had forced him cross the WOTG boundary at low level. He assessed the risk as low.

UKAB Note (1): During a subsequent telephone conversation with the Enstrom pilot by the Secretariat, he said that during his previous flight into Silverstone he had been in communication with Brize Norton ATC who had told him that D129 was not active with parachuting. Brize Norton ATC confirmed that D129 was not active with parachuting on the day of the incident.

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UKAB Note (2): The UK AIP at ENR 5-5-3-4 promulgates Weston on the Green as a Free Fall Drop Zone 2nm radius centred on 515246N 0011320W from FL85, active normally during daylight hours. Activity notified on the day to Brize Norton ATC with an alternative contact frequency of 133.65MHz. Drops may be made from up to FL150 with LTCC permission and night parachuting frequently occurs which is normally notified by NOTAM. Also at 5-1-3-8 it is promulgated as a Danger Area EG D129, with the same coordinates and dimensions, where parachute dropping activities take place H24 from FL120 with a DAAIS available from Brize Radar on 124.27MHz.

UKAB Note (3): The UK AIP at ENR 5-5-1-6 promulgates Weston on the Green as a Glider Launching Site centred on 515249N 0011311W for winch launches where cables may be encountered to 3000ft agl during daylight hours; site elevation 282ft amsl.

UKAB Note (4): The Rules of the Air Regulations 1996 Rule 17 Rules for avoiding aerial collisions Para (5) Flight in the vicinity of an aerodrome states *Without prejudice to the provisions of rule 39, a flying machine, glider or airship while flying in the vicinity of what the commander of the aircraft knows or ought reasonably to know to be an aerodrome or moving on a aerodrome, shall unless, in the case of an aerodrome having an air traffic control unit that unit otherwise authorises:*

conform to the pattern of traffic formed by other ac intending to land at that aerodrome, or keep clear of the airspace in which the pattern is formed; and

make all turns to the left unless ground signals otherwise indicate.

UKAB Note (5): The incident occurred below recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac.

Members wondered whether the EH28 pilot, after being informed by Brize Norton ATC that D129 was not active (parachuting), had not assimilated that there was an active gliding site co-located. WOTG is clearly shown on topographical charts by a large crosshatched circle depicting the D129 Danger Area with the smaller parachuting and glider symbols displayed in the centre. The KA8 pilot had reported established on L base within the WOTG cct when he had encountered the EH28 flying in a S'y direction between him and the airfield. This led Members to agree that the EH28 pilot had flown through a notified glider site and into conflict with the KA8 and this had caused the Airprox. A pilot Member felt that WOTG should be referred to as a 'notified parachuting/gliding site'. Whilst recognising the accuracy of the point, the majority view was that as parachuting did not play any part in this Airprox, the cause should refer only to gliding. The STC military Member informed the Board that he would take an action to ensure that when there was no parachuting taking place at WOTG but gliding was in progress, both Brize Norton and Oxford ATCUs would be informed.

Members could not resolve the disparate separation distances reported by both pilots. One pilot Member believed that safety had not been ensured during the encounter owing to the KA8 pilot's lack of options to avoid the EH28 whilst being committed to land. The majority of the Board did not share this view. It was clear that both pilots had seen each other and their respective actions, when combined, had ensured that any risk of collision had been removed.

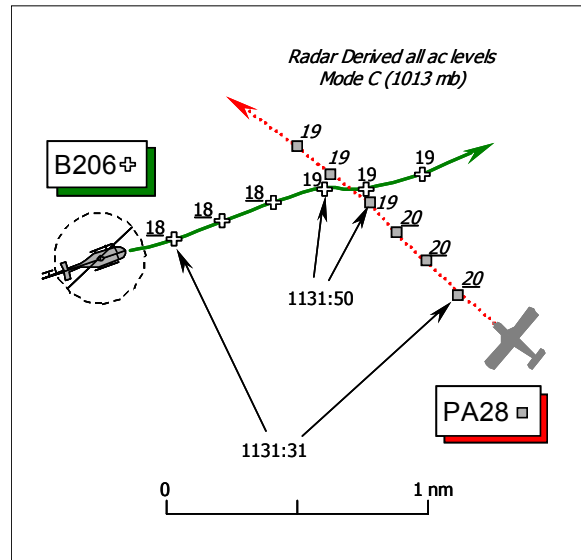
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The EH28 pilot flew through a notified gliding site and into conflict with the KA8 glider.

Degree of Risk: C.

AIRPROX REPORT NO 102/04

Date/Time: 10 Jun 1131
Position: 5221N 00023W
 (4nm NW of Grafham Water)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: JetRanger B-206 PA28-161
Operator: Civ Comm Civ Pte
Alt/FL: 2000ft 2000ft
 (RPS 1017mb) (QNH 1017mb)
Weather VMC CLBC VMC CLBC
Visibility: >10nm 20km
Reported Separation:
 Nil V/<50ft H Not seen
Recorded Separation:
 185m H/nil V

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE JET RANGER B-206 PILOT reports his helicopter has a black/silver livery and the HISL & 'pulse-lights' were on whilst in transit from Droitwich Heliport to Norwich. Flying in level cruise at 2000ft RPS (1017mb), he was about 500ft below cloud with an in-flight visibility of >10nm. The helicopter is fitted with a Skywatch ACAS I.

Whilst in receipt of an AFIS from Northampton/Sywell on 122.70MHz he was approaching a position about 5nm N of Grafham Water, heading 085° at 110kt when a TCAS TA prompted him to increase his lookout. Scanning both the TCAS display and the sky another ac appeared crossing ahead. To avoid the other ac – a white & blue single engine light ac (LA) - he carried out a breaking turn to the R as the LA crossed from R - L about 50ft away at the same altitude with a "high" risk of collision. An Airprox report was filed on RT with Sywell. Although his workload was "low", his vision was partly obscured to the R by the helicopter's door pillar. He added that the pilot of the LA appeared not to see his JetRanger even as he executed his avoiding action R break.

THE PA28-161 PILOT provided a comprehensive account of his flight, reporting that his ac is coloured white with blue & gold markings; the fin and wingtip strobes were on whilst flying a local sortie from Northampton/Sywell and in communication with SYWELL INFORMATION on 122.70MHz. A squawk of A7000 was selected with Mode C.

After departure from Sywell RW21 at about 1105, he climbed to 2000ft Sywell QNH (1017mb) and headed E, passing N of Wellingborough before turning onto 120° (M) to intercept the DAVENTRY VOR 080° radial. Maintaining 2000ft ALT for most of the flight, he turned overhead Grafham Water to head 300°(M) initially, before picking up the A14 and following the road towards Kettering. His route then took him S to rejoin RW21 at Sywell, landing at about 1153. The visibility was "very good" with 3/8 cloud cover at an estimated cloudbase of 2500ft amsl and there was some slight turbulence, but he did not see the JetRanger helicopter nor any other ac. From the Airprox position reported by the B206 pilot to the N of Grafham Water, this would correspond to the portion of his flight after he had turned his aeroplane over the reservoir, whilst he was either heading 300°(M) or tracking the A14. He did recall hearing part of a transmission talking about another ac, but if this did refer to this Airprox he did not appreciate its significance at the time.

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UKAB Note: This Airprox is illustrated clearly on the Debden Radar recording. The B206 JetRanger is shown tracking ENE maintaining 1800ft (1013mb) – equating to 1920ft QNH (1017mb). The PA28 is shown tracking NW from Grafham Water at 2000ft (1013mb). The ac converge at a position 4nm NW of Grafham Water as both ac cross the A14, indicating 1900ft Mode C. The PA28 crosses at most 0.1nm – 185m - ahead of the B206 from R – L moments after 1131:50, when the JetRanger pilot's reported avoiding action R break is just discernable.

ATSI had nothing to add.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

The crux of this Airprox was clearly visual conspicuity and acquisition in the 'see and avoid' environment of the Open FIR. Members were concerned that despite the excellent conditions and the additional high intensity 'pulse-lights' fitted to aid the conspicuity of the B206, the PA28 pilot had still not seen the helicopter at all, which was clearly part of the cause. The Board was keenly aware that even in good conditions, ac closing at the same level on conflicting headings - and hence on a constant relative bearing with little relative movement to draw attention - were very difficult to spot. Add in the obscuring effect of the ac structure (various door pillars and struts etc) against a relatively small white ac and it was immediately evident just how easy it was for another ac to approach unseen: this Airprox was a good example of just how that can happen. The radar recording had confirmed that the Airprox had occurred just as the PA28 crossed the A14 road and some Members suggested that the execution of this turn in conformity with his planned track at this navigational feature might have distracted the PA28 pilot at the critical moment as the B206 pilot took avoiding action and passed astern – a salutary lesson for all and worth repeating here.

Turning to the view from the reporting pilot's cockpit, it was also regrettable that in a reported visibility in excess of 10km and with the assistance of Skywatch, the B206 pilot had not detected the PA28 any earlier than he did. The JetRanger pilot was very close to not fulfilling his responsibility to see and avoid the PA28, as he was required to do here under the 'Rules of the Air'. A helicopter pilot Member endorsed the B206 pilot's comments about the difficulties of seeing around the Jetranger's door pillar. Nevertheless, if it was a known hazard then that had to be taken into account in a pilot's all-round scan, moving the ac if necessary in order to see around it. The helicopter pilot had not reported the range at which he sighted the aeroplane, but if it was only seen in time so that he was able to achieve a mere 50ft horizontal separation – 1½ rotor diameters - then it was an incredibly late spot indeed. However, the Debden radar recording had evinced a slightly larger distance of about 0.1nm. Even so, by any reckoning this was still a very late sighting by the B206 pilot that the Board concluded unanimously was the other part of the cause of this Airprox.

Whereas the radar recording had shown a slightly larger horizontal separation than that reported, it nevertheless confirmed the helicopter pilot's assertion that the PA28 was at the same altitude, with no measurable vertical separation reflected by the recorded Mode C indications of either ac. Though prompted by Skywatch, with only the B206 pilot aware of the presence of the other ac at these close quarters and able to take action at a very late stage with the PA28 pilot oblivious to the danger that lurked unseen to port, the Board agreed unanimously that the safety of these two ac had indeed been compromised.

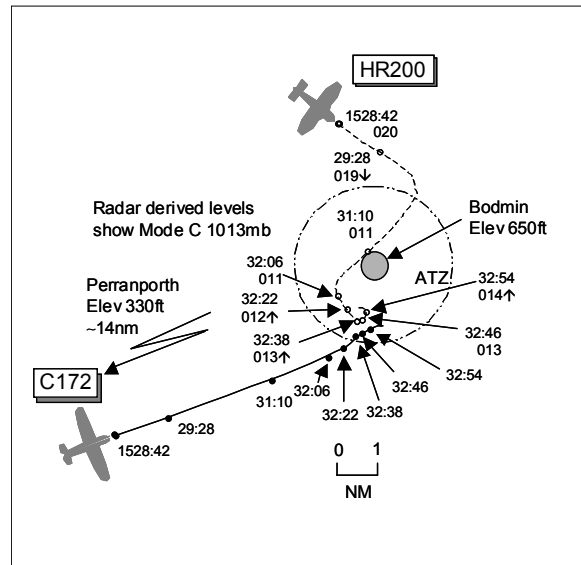
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sighting by the B206 pilot and non-sighting by the PA28 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 103/04

Date/Time: 2 Jun 1533
Position: 5028N 00441W
 (1.5nm S Bodmin - elev 650ft)
Airspace: ATZ (Class: G)
Reporting Ac Reported Ac
Type: Robin HR200 C172
Operator: Civ Pte Civ Pte
Alt/FL: 800ft 500ft↓
 (QFE) (QFE)
Weather VMC CLNC VMC
Visibility: >20km >15km
Reported Separation:
 75ft V/70yd H 1500-2000yd H
Recorded Separation:
 NR V 0.3nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE HR200 PILOT reports flying solo on a local sortie from Bodmin and in communication with Bodmin RADIO on 122.7MHz squawking 7000 with Mode C. The visibility was >20km in clear sky VMC and the ac was coloured blue/white with strobe and landing lights switched on. He had entered the LH cct for RW31 via the 'deadside', making position reports on the Bodmin frequency. He started to turn L from downwind heading 130° onto base leg at 90kt and 800ft QFE when suddenly a white coloured C172 appeared from under his starboard wing in his 2.30 position <100yd away and about 75ft lower descending; it was entering the cct straight onto base leg on a crossing track R to L. He immediately applied power and initiated a climbing turn to avoid the Cessna and transmitted an appropriate warning on the radio. He vacated the cct to compose himself before returning to land. The Cessna passed about 70yd away tracking about 060°, he could see the last 3 letters of the Cessna's registration. After landing he spoke to the Airfield Manager who gave him the C172's full registration. He assessed the risk of collision as high.

THE C172 PILOT provided a very comprehensive report. The incident occurred during a ferry flight from Perranporth to Bodmin (maintenance facility) owing to a battery-charging problem which caused a total electrical failure after about 10min operation. Prior to departure, he had twice telephoned Bodmin to obtain PPR for the non-radio flight but this had been unsuccessful; there had been no answer. Also he telephoned St Mawgan ATC to inform them of his impending flight, without radio and squawk, and that he would be transiting the area above their MATZ (3000ft or above). As he prepared the ac, the Perranporth A/G operator continued trying to contact Bodmin and, on the second attempt, managed to inform them that the C172 would be inbound non-radio and PPR was obtained. The visibility was excellent, >15km, and he elected to join on base leg at 500ft (300ft below cct height) as he assessed that this would keep his time in the cct minimal. He set the QFE (Perranporth QFE minus 10mb) and descended to 500ft whilst reducing speed to 75kt. Heading 040°, he saw another ac early downwind about 4nm away and thought that his ac would be seen by its pilot as it would appear within the latter's forward visual arc (between 10.30-1.30 relative bearing) and that it would also pass behind and above his Cessna. He continued his approach, last seeing the other ac, a Robin, as it passed his 8.30 position range about 1500-2000yd away, above his ac. He believed that after he lost sight of the Robin, it must have turned L and descended towards his ac. He then set up the ac for a flapless approach (C172 has electric flaps) onto the short RW31 (630m) in calm wind conditions. Apparently there had not been any radio broadcasts informing cct traffic of an ac inbound non-radio. Also, the Airfield Manager stated that

AIRPROX REPORT No 103/04

the reason that the telephone had gone unanswered was because he had been putting ac away. He surmised that this might also be the reason that the A/G station may not have been manned and that no broadcast had been made about his non-radio arrival - this had been his intention when PPR was requested.

UKAB Note (1): The Rules of the Air Regulations 1996 Rule 17 Rules for avoiding aerial collisions Para (5) Flight in the vicinity of an aerodrome states *Without prejudice to the provisions of rule 39, a flying machine, glider or airship while flying in the vicinity of what the commander of the aircraft knows or ought reasonably to know to be an aerodrome or moving on a aerodrome, shall unless, in the case of an aerodrome having an air traffic control unit that unit otherwise authorises:*

conform to the pattern of traffic formed by other ac intending to land at that aerodrome, or keep clear of the airspace in which the pattern is formed; and

make all turns to the left unless ground signals otherwise indicate.

UKAB Note (2): The UK AIP at AD3-EGLA-1-1 to 1-3 promulgates the Bodmin ATZ as a circle radius 2nm centred on the longest notified RW13/31 502959N 0043957W from surface to 2000ft agl active Winter 0830-1700 or SS, Summer 0830-1930 and by arrangement; the A/D is PPR. Flight procedures states cct height 800ft aal with cct directions RW03/31-LH, RW13/21-RH.

UKAB Note (3): Met Office archive data gives the QNH in the Bodmin area as 1029mb. The Bodmin aerodrome elevation is 650ft amsl (22mb) giving a calculated QFE of 1007mb.

UKAB Note (4): Analysis of the Burrington radar recording at 1528:42 shows a 7000 squawk, believed to be the HR200, 3.75nm N of Bodmin tracking 130° indicating FL020 (1820ft QFE 1007mb) whilst a primary only return, believed to be the C172, is seen 7.5nm SW of Bodmin tracking 075°. The HR200 is seen to commence descent at 1529:28 followed just under 30sec later by a R turn onto a track of 230°, levelling at FL011 (920ft QFE) (1531:10) as it passes 0.35nm NW of the aerodrome at the start of the crosswind leg. The HR200 then turns L and steadies on a track of 140° at 1532:06 (downwind leg) with the C172 in its 2 o'clock range 1.5nm on a converging/crossing track. A slight L turn by the C172 onto 060° is observed 16sec later in the HR200's 1.30 position range 1nm, which is now indicating FL012 (1020ft QFE). Two radar sweeps later (1532:38) the HR200 is indicating FL013 (1120ft QFE) climbing, having commenced a L turn, 0.4nm N of the C172. The CPA is achieved on the next sweep 8sec later (1532:46), the HR200 turning through approximately 060° 0.3nm N of, and parallel to, the C172. The subject ac are seen to diverge on the next sweep as the HR200 turns through N, indicating FL014 (1220ft QFE), 0.4nm NNW of the C172 which appears to have turned slightly R before fading from radar shortly thereafter.

UKAB Note (5): During a subsequent telephone conversation between the Secretariat and the C172 pilot to discuss the incident, the pilot expressed surprise that the Burrington primary radar could be capable of discriminating between two ac when they were flying so far from the radar head (37nm). Some track jitter is evident on the primary only return of the C172 leading up to the Airprox. The European Surveillance Standard for radar positional accuracy lists values for systematic and random errors. Broadly, slant range value of <70m is stated and azimuth, using <0.08 degree at 37nm, is just over 300ft i.e. the real target could be ±300ft different from where the target is displayed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and radar video recordings.

As the C172 pilot had made reference to the apparent non-manning of the A/G station, the ATSI advisor reminded Members of the requirements stated in CAP452 Aeronautical Radio Station Operator's Guide,

Chapter 3, Page 1, Aerodrome A/G Communications Service that *“The service, which includes an alerting, emergency and rescue services, is to be made available during the notified hours.”* The service is provided *inter alia* to allow pilots to comply with the requirement to obtain information, from the A/G operator, to enable a flight to be conducted safely. However, in this incident the C172 pilot was flying non-radio when he joined the Bodmin cct. Whilst Members acknowledged that the routing flown would have reduced the C172’s time in the cct, they believed its pilot had displayed poor airmanship in electing to join directly on L base leg, below cct height, which brought his ac into conflict with the HR200. By not carrying out a standard overhead join, the C172 pilot did not integrate safely into the cct pattern and this had caused the Airprox.

The C172 pilot had seen the HR200 downwind, as he joined on L base, crossing ahead of it from R to L, estimating it passed 1500-2000yd away, behind and above, as he lost sight of it. The HR200 pilot had only seen the C172 when it appeared in his 2.30 position, he thought about 100yd away and 75ft lower, descending. He immediately executed an avoiding action climbing turn, estimating the Cessna passed 70yd away. The radar recording had shown the subject ac at CPA about 0.3nm apart horizontally. Although the HR200 pilot’s sighting of the C172 had been late, he was undoubtedly surprised to meet another ac joining the cct, unannounced, in that cct position. However, the HR200 pilot had seen the C172 in enough time to take action to prevent an actual collision, the Board agreed that the subject ac had passed in such close proximity that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

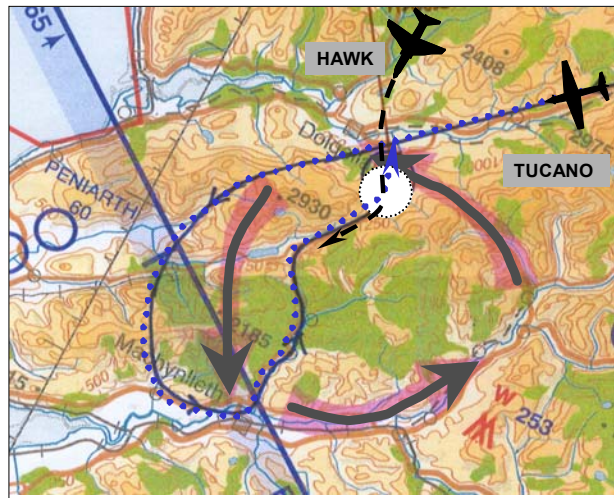
Cause: The C172 pilot did not integrate safely into the cct pattern.

Degree of Risk: B.

AIRPROX REPORT No 104/04

AIRPROX REPORT NO 104/04

Date/Time: 10 Jun 1430
Position: 5242N 00351W (Dolgellau)
Airspace: UKDLFS LFA 7 (Class: G)
Reporting Ac Reported Ac
Type: Hawk T1 Tucano T1
Operator: HQ PTC HQ PTC
Alt/FL: 250 agl 250 agl
Weather VMC CAVOK VMC CAVOK
Visibility: >10km >10km
Reported Separation:
0 H -300ft V 150ft H +150ft V
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T1 PILOT reports he was the rear seat QFI captain of a black Hawk ac on a low level Staff Continuing Training (SCT) sortie. Shortly after entering the Machynlleth Loop from the N entrance he rolled out heading 200° at 250ft agl and 450kt IAS. As he passed through the tight valley and as the terrain opened slightly, he saw the landing lights of a Tucano at approximately 1½ -2nm, heading NE against the SW flow. The Tucano was also at about 250ft agl but appeared beneath him because the valley floor descends. He pulled up sharply and passed 300ft overhead and then went into a climbing left hand turn to get out of the LFS and to remain tally. The Tucano continued on heading 020° approximately and then turned left toward Dolgellau.

He then descended back into the LFS and passed along the right side of the Tucano at 360kt and 200ft above. The Tucano then orbited around Dolgellau and re-entered the Machynlleth Loop this time heading 200° in the correct direction. He continued to extend away from the Tucano and completed his SCT uneventfully. After landing he spoke to his authorising officer and following a short discussion it was decided to file an Airprox. He considers the actual risk of collision as low as he was visual throughout.

THE TUCANO TMK1 PILOT reports flying a black ac with HISLs and landing lights selected on, with a student in the front seat on a low level instructional sortie in Wales at 240kt and 250ft agl. He was unfamiliar with the terrain in that part of LFA7, having not flown the Machynlleth Loop for some 12 years. He was heading N, flying against the flow arrow in the Machynlleth Loop towards Dolgellau in the belief that he was established in the correct valley. He had made a navigational error SE of Dolgellau that resulted in him flying further to the W than he had intended. As a consequence of this error he turned N at Machynlleth instead of continuing 4½nm to the E to follow the flow up the Eastern valleys.

Just to the S of Dolgellau, as he approached the indicated point of the Airprox, he became visual with the nose light of a Hawk on a reciprocal heading at an estimated range of 1km. He took avoiding action by descending slightly and turning to the left, rolling out on a heading of 250°. Approximately 30sec to one minute later, after exiting the loop at Dolgellau heading 250° at 250ft agl, the Hawk then approached his ac from the stern on the right hand side 30-50ft above and at an overtake of 60-80kt. He assessed the risk of collision as being medium.

THE HAWK STATION comments that this was an unexpected encounter in the Machynlleth Loop in LFA 7. The Hawk pilot first spotted the Tucano at a distance of approximately 1½--2nm and the Tucano

landing light greatly assisted the pilot in identifying the potential confliction. The Hawk pilot was convinced that the Tucano was flying against the flow arrow in the Machynlleth Loop. Due to an Airprox incident that occurred between 2 Hawk ac last year, they have mandated in No 4 FTS that a serviceable landing light is required before any sortie involving low flying. Ac landing lights are checked before each departure. The Tucano landing light was a factor in this Airprox, enabling the Hawk pilot to take avoiding action in time.

THE TUCANO STATION comments that the pilot – an inexperienced QFI – has been open and honest about his own error, that lead to this Airprox, and he has been reminded of his responsibilities when operating in the UKLFS. The simple fact of the matter is that he did not maintain sufficient situational awareness, whilst supervising his student pilot, which resulted in them flying against the flow and into conflict with the Hawk.

UKAB Note (1): The incident was not seen on the recordings of the Clew Hill or the Burrington radars.

HQ PTC comments that they were pleased that the Tucano Unit has unequivocally admitted to the human error and gratified that both parties were able to recognise it and take appropriate action promptly. The part played both ac's forward facing lights is a significant lesson that should not be lost in selecting future training ac. However, we do not approve of ad hoc visidents [visual identification procedures]: they could be a potentially dangerous distraction from looking out for other traffic in the LFS – and there can, in any case, have been no doubt as to the Tucano's Unit. The re-alignment of the westerly of the Machynlleth Loop flow arrows might clarify things for infrequent users.

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 ac operating authority.

The Board noted and endorsed the PTC comment, particularly regarding landing lights as an aid to visual acquisition. Members welcomed the frankness of the Tucano Instructor's report and agreed that the sole cause of the incident had been his navigational error. However, due to the early acquisition and avoidance of the other ac by the respective pilots, assisted in both cases by the landing lights, there had not been any risk of collision.

There was a brief discussion by the Board regarding the depiction of the one-way system on the LFC. It was agreed by OC MFAC Sqn that this aspect would be reviewed.

UKAB Note (2): OC MFAC Sqn has reviewed the positioning of the 'Flow Arrows' on the LFC. These will be moved to improve clarity on the next reprint.

PART C: ASSESSMENT OF CAUSE AND RISK

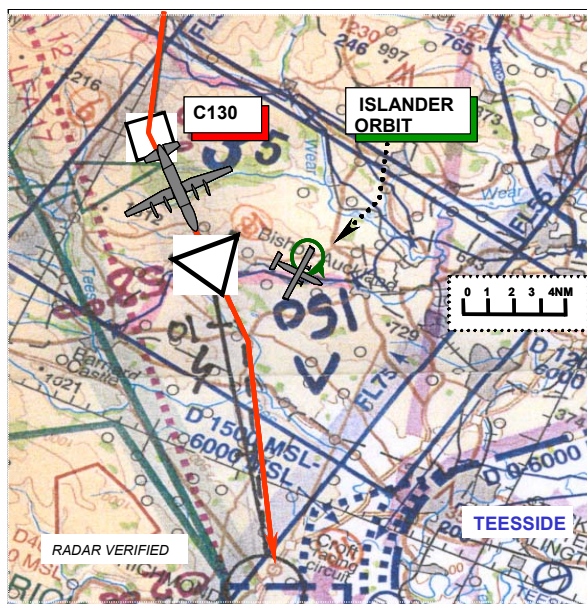
Cause: A navigation error by the Tucano instructor caused him to fly against the Machynlleth flow system into conflict with the Hawk.

Degree of Risk: C.

AIRPROX REPORT No 105/04

AIRPROX REPORT NO 105/04

Date/Time: 28 May 2150 (Friday Night)
Position: 5438N 00148W(17nm WNW Teesside - elev ~500 ft)
Airspace: London FIR/UKNLFS
Region 4AS (Class: G)
Reporting Ac Reported Ac
Type: BN2B Islander C130 Hercules
Operator: Civ Comm HQ STC
Alt/FL: 2000ft 250ft agl
(QNH 1029mb) (RPS 1025mb)
Weather VMC CLOC VMC CLOC
Visibility: >10km >5.5km
Reported Separation:
200ft V/500m H NK
Recorded Separation:
400ft V/4.1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BN2B ISLANDER PILOT reports flying a police air operations flight that involved a thermal image search of an area, with HISL, the tail beacon and the nav lights selected on and in receipt of a FIS from Teesside Radar while squawking as directed with Mode C. While passing heading 090° in an orbit at 80kt and at 2000ft amsl on the Teesside QNH, they were advised of a contact 5nm N of them tracking N to S at 200ft below their height. One minute later they were advised that the contact had not deviated and was then 1nm N of their position on a direct track towards them. [see transcript below] He initiated an immediate climb and rolled out onto an E'ly heading and after levelling his wings he looked left and saw a C130 with his lights out pass through their port rear quarter about 500m away flying straight and level but slightly below them.

He assessed the risk of collision as being high and reported the incident the following day by telephone.

UKAB Note (1): The following is an excerpt from the transcript of the Teesside APR RT frequency:

Teesside *You may see traffic seven miles northwest of you southbound slightly below you apparently it's a Charlie one thirty that's gone en route I'll give you a shout if it gets any closer*

Islander *Roger Police XXX thanks.*

Teesside *Police XXX Teesside.*

Islander *Police XXX.*

Teesside *That Charlie one thirty from you bearing two eight zero degrees four miles three hundred feet below you tracking towards you now.*

Islander *That's understood er I'm unhappy with that what I'm going to do I'm going to move south a couple of miles XXX.*

Teesside *Er Police XXX Roger I'll keep you advised he has been tracking north to south er generally he went round to the west of Newcastle I think he is aiming for the gap between er Teesside and Leeming.*

Islander *I'll go east.*

Teesside *Good idea.*

Teesside*Police XXX he's turned right onto a southerly heading he's three miles due west of you if you want to turn er left onto a westerly heading you'll probably see him disappearing off to the south.*

Teesside *Roger XXX.*

Islander *????? I don't think he's showing any lights XXX.*

Teesside *Er XXX Roger er from you bearing two four zero degrees at three miles now he's southbound a thousand feet below you.*

Islander *Roger Police XXX thanks.*

Teesside *And Police XXX you're clear.*

Islander *Thanks XXX*

THE C-130 HERCULES PILOT reports flying at 210kt and 250ft agl on an initial NVG qualification check sortie for the captain and a Cat renewal for the co-pilot. The sortie was correctly booked into Night Flying Region 4AS. They were squawking 7001 with Mode C, the weather was good but completely dark and the anti-collision and formation lights were selected on, the Nav lights to dim and flash and the HISLs selected off since they interfered with the NVGs.

He did not see any other ac in the reported position.

UKAB Note (1): Due to the discrepancy in the C130 lighting regime reported between the Islander and Hercules pilots the station was contacted by the UKAB and asked to confirm the lighting status. They confirmed the Captain's report and stated that this was in accordance with their SOPs.

TEESSIDE ATC reports that the Islander departed SVFR to N before turning NW and establishing in an orbit about 10nm NW of Teesside. He saw a low-level 7001 SSR code, which had earlier been on a Newcastle squawk when it skirted the W edge of Newcastle's zone so he called Newcastle ATC who advised him that the ac was a C130 that had gone en-route. He passed TI to the Islander pilot when the ac was at a range of 7nm and again at 3nm. The Islander pilot said that he couldn't see the ac and would therefore turn away to the S. He suggested that he go N as the 7001 ac would almost certainly be heading for the Leeming-Teesside 'gap'. The Islander turned L onto N and climbed to approx 2000ft amsl. The C130 passed approx 3nm SW of the Islander, tracking SE'ly and passing between Leeming and Teesside. The Islander operator called Teesside ATC the following morning to advise that an Airprox was being filed.

THE C130 STATION commented that the ac was lit in accordance with the SOPs laid down in their guide to tactical operations. The C130 was operating correctly within the UKNLFS and the pilot did not see the Islander.

ATSI reports that the Islander was operating approximately 14nm NW of Teesside Airport, squawking 7015 and displaying a Mode C readout of FL17 (approximately 2180ft amsl). The Teesside Controller passed TI to the Islander pilot on what proved to be the C130, keeping this updated. At approximately

AIRPROX REPORT No 105/04

2156:15, the radar showed that the C130 had turned L, from its previous S'ly track, onto a SE one towards the Islander, which was orbiting 7nm to the E. Further TI was passed and the Islander pilot advised that he was "...going to move south a couple of miles...". At that time, the C130 was squawking 7001 and displayed a Mode C readout of FL12 (approximately 1380ft amsl). The Islander was then tracking E with the C130 approximately 4nm to the W tracking SE. The Mode C of the C130 indicated a descent and separation reduced to 4.1nm and 400ft at 2157:40. This was the minimum separation between the two ac. The Islander then turned L, from an E'ly heading, back onto a S one as the C130 turned slightly R onto a more S'ly heading, away from the Islander, with a Mode C readout of FL05 (980ft amsl). The Islander pilot did not state that he was visual with the C130 and added that the ac did not appear to be showing any lights. No mention was made at the time of an Airprox but one was filed the following day.

Although no level of air traffic service was requested by the Islander pilot, nor specified by the controller, the controller effectively provided a RIS in Class G airspace and fulfilled the requirements of that service.

UKAB Note (2): An independent analysis of the Gt Dun Fell radar recording confirms the ATSI analysis above.

UKAB Note (3): The military regulations for operating without lights or with no Navigation or Anti-Collision lights are at JSP 550 Regulation 323 which refers to the UK Mil AIP Vol3 for Low level operations. This states:

'Exercises with navigation lights only are to be cleared through MFAC Sqn, SO2 LF who will publish appropriate NOTAM navigation warnings only'.

The RAF Lyneham Flying Order Book Order C12 (Aircraft Lighting) states:

- a. Navigation Lights Only (Bright Flash). If the Captain plans to use navigation lights only (eg TALO Leader), he is to include this fact in the route UKLB NOTAM request.
- b. No Lights et seq'.

Although the regulations for lights out activity are clear, we have been unable to find any MOD wide regulation or dispensation regarding reduced lighting operations. No NOTAM was requested by Lyneham for this flight.

HQ STC comments that the RAF Hercules force have, until this Airprox, been using a standard operating procedure (SOP) of flying with their Nav lights set to "DIM" when night low-flying on NVGs. This SOP was in accordance with the RAF Lyneham Flying Order Book. However, there was an assumption amongst the force that the MOD had an exemption to operate with reduced lighting; discussions with DAS(LA) revealed that there was no such exemption. HQ 2 Group, the owners of the ac in this incident, have taken action to amend Hercules C130 night SOPs to ensure that nav-lights are set to "ON" (full brightness) with immediate effect. They will only utilise the "DIM" setting at night on the lead ac of a pair of forming Hercules - otherwise the brighter lights will dazzle the forming Hercules. The trail, or forming, Hercules will have their nav lights at full brightness. All other air-work with unusual lighting at night will be subject to NOTAM action.

Further work on this matter is being staffed and procedures for using "DIM" lighting will be discussed at forthcoming meeting on low flying issues. This Airprox and No 143/04 will be raised at this meeting.

With reference to the Airprox, it is hardly surprising that the C130 crew have no recollection of an ac orbiting some 400ft above them, 4.1nm distant and, bearing in mind the relative distance, that the Islander pilot did not see the C130 at Low Level. It is suspected that the C130's use of 'DIM' lighting, coupled with the inability of the Islander to see these lights at range, had disconcerted the Islander crew

sufficiently to file an Airprox. It is probable also that, at that range, and low angle above the horizon, the Islander was lost amongst the background of cultural lighting in the Teesside area.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was satisfied that both ac had been operating legitimately, VFR at night in good weather but in almost complete darkness, in Class G airspace; the C130 at 250ft agl and the Islander slightly higher at just over 1000ft agl (initially).

Members noted that the Islander pilot had wisely opted to use an ATS from Teesside and that APR had provided him with a very good service, giving substantially more useful information than the minimum required for a FIS.

There was discussion by Members as to whether or not the Islander pilot had actually seen the C130 (if he did, he did not say so in his RT discussion with Teesside at the time) or whether he had been so concerned by the situation that he believed that he had seen it. There were discrepancies between the TI range of the C130 he reported and those actually passed by APR, as taken from the transcript of the Teesside RTF. The latter agree to within 1nm with the separation distances and positions noted at the same times, from recording of the Great Dun Fell radar. This recording confirms that the minimum separation horizontally between the ac did not reduce below 4.1nm and that the C130 was 400ft below the height of Islander. This being the case, expert advice to the Board was that, if the C130 had no external lights illuminated (as the Islander pilot reported) then it would have been extremely unlikely that he would have been able to see it with the naked eye while it was flying at 250ft agl, 4.1nm away in rolling terrain with little cultural lighting, in the natural light conditions (including no moonlight) which prevailed at the time.

Members did not dispute that the Islander pilot believed that his ac had been in considerable danger due to the proximity of the C130. With the benefit of hindsight and recordings however, the available facts showed the 2 ac to have been separated by a substantial distance, both laterally and vertically. Based primarily on the radar recording and that there was no doubt that the contacts shown were those of the 2 ac involved, the Board concluded that there had been no risk that the ac would have collided. Further, although it may be of concern as a general principle, in this particular incident the reduced lighting configuration of the C130 had not been a significant factor. Notwithstanding, in the context of this Airprox and 143/04, discussion followed regarding night low-level operations with reduced lighting.

While accepting that military ac are exempt from the external lighting requirements of the Air Navigation Order (ANO) and that the regulations for operations with no lights are clear and unambiguous, Members noted the apparently confused regulatory situation regarding the operation at night of military ac with **reduced** lighting. Although the Board fully accepted that low-level training at night was an essential military skill, Members considered that the MOD had a duty to ensure that military ac conducting such flights (including operations with external lighting below that specified in the ANO for their civilian counterparts) should be the subject of NOTAM action. For such NOTAMs to be of use to non-military pilots it is imperative that current distribution procedures be revised. HQ STC advised, on behalf of the MOD, that work is ongoing to resolve these current difficulties. The Board welcomed the pre-emptive action taken by HQ STC to improve flight safety as a result of this and another similar incident [see Airprox 105/04]. The US 3 AF advisor to the Board undertook to ensure that US forces operating in the UKNLFS were informed of these procedures. Members also noted the open approach to the promulgation of information concerning night low-level training taken by the MOD through the MOD/ESH (Emergency Services Helicopter) Working Group.

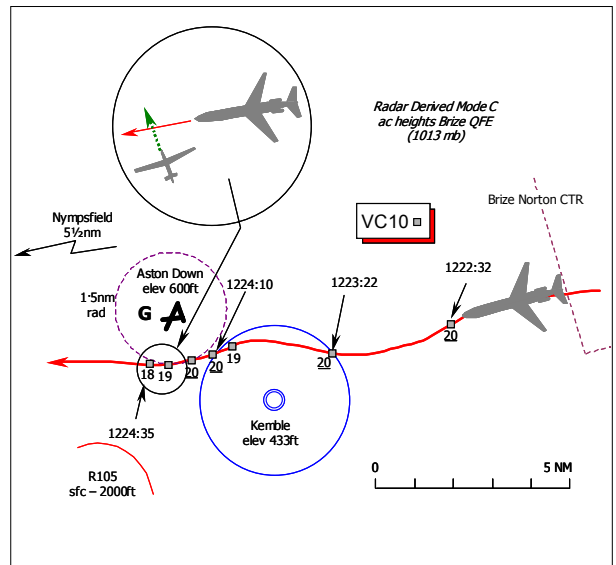
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A mistaken impression of the separation by the Islander pilot.

Degree of Risk: C.

AIRPROX REPORT NO 106/04

Date/Time: 15 Jun 1224
Position: 5141N 00238W (1½nm S of Aston Down Glider Site - elev 600 ft)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: ASW15 Glider VC10K4
Operator: N/K HQ STC
Alt/FL: 2500ft 2000ft
 QNH QFE (1013mb)
Weather VMC CLOC VMC CLOC
Visibility: 20nm Good
Reported Separation:
 200ft V/nil H 400ft V/1½-2nm H
Recorded Separation:
 Not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE ASW15 GLIDER PILOT reports his glider is coloured white overall. He was conducting general handling at an altitude of 2500ft just to the S of the Aston Down glider site boundary, and there were several other gliders from Aston Down and Nympsfield operating in the local area, soaring at all altitudes up to the cloud base of about 3500ft amsl. At the time of the Airprox he was flying straight and level heading 350° at 40kt just after straightening out from a circling L turn, with another glider 3-400ft above him and some 1000ft below cloud with an in-flight visibility of 20nm. Whereupon a greyish VC10 was spotted at 2 o'clock, some 500yd away, approaching obliquely from R – L. The jet passed about 200ft directly below his glider with a “considerable” risk of a collision, but no avoiding action was taken as he opined there was no point. He added that the VC10 flew close to both glider sites at some 15-1700ft agl.

THE VC10K4 PILOT reports his ac has a grey camouflage scheme but the HISLs were on. Whilst outbound from Brize Norton he was in receipt of a RIS from Brize Norton APPROACH (APP) and squawking the assigned code with Mode C; TCAS is fitted but neither an RA nor TA was enunciated during the period of the Airprox.

Flying at 2000ft Brize QFE (1013mb), [Brize Norton elev-288ft] heading W reportedly into sun, at 250kt, some 1000ft below cloud and “good” in-flight visibility, APP called traffic to him at a range of about 4nm. An ac - a white low-wing glider - was acquired visually at the reported range and was flying either at about the same altitude or slightly above his ac. As his current heading would have kept his jet clear of the glider he maintained his course, but the glider then manoeuvred towards his ac. Therefore, he initiated a descent to increase the clearance below the glider and descended overall about 180ft. He added that it was difficult to assess the minimum separation, but estimated it was about 400ft vertically and 1½ - 2nm horizontally and assessed the risk as “low – medium”.

MIL ATC OPS reports that the VC10 departed Brize Norton for Air-to-Air Refuelling Area (AARA) 10. The outbound VC10 crew contacted Brize Norton APP at 1219:34, APP identified the ac within the Class D Brize CTR and stated “once passing 1500ft you're cleared left or right turn own navigation”, which was acknowledged. At 1219:52 APP informed the VC10 crew that “...it is very, very busy around the Nympsfield Glider Site, multiple contacts there”. APP advised the VC10 crew when they exited the Class D CTR and placed the flight under a RIS at 1221:54. Traffic information was passed to the VC10

AIRPROX REPORT No 106/04

crew at 1221:56, "...traffic right 10'clock, 6miles, looks to be south east bound, indicating 800ft above". Just under 1min later at 1222:53, an update on the previously reported traffic was given within traffic information passed by APP at 1223:05, "...further traffic 12 o'clock, 5 miles, southbound, no height, possible Kemble visual circuit". The VC10 crew reported having the conflicting traffic on TCAS, 800ft below. At 1223:38, further information was passed to the VC10 as "traffic right 20'clock, 5miles, manoeuvring 3 contacts, no height possible glider". The VC10 reported visual at 1223:45. APP limited the RIS from all around at 1223:59, due to "high traffic density and also altitude from below." Prior to transfer to the next ATSU, APP passed updated information as "traffic left 11o'clock, 2miles, manoeuvring no height, 3 contacts" and again at 1224:31 as "...multiple contacts, right 20'clock through to 11o'clock various,(transmission broken). There's about 12 contacts there, no height information, all gliders". The VC10 reported "visual with several and taking avoiding action". More traffic information was passed at 1225:50, as "further contact left 11o'clock, 2miles, manoeuvring. Your current track should take you clear." The VC10 was transferred to Filton at 1226:00.

[UKAB Note (1): The Heathrow, Debden and Pease Pottage radar recordings' were reviewed but unfortunately did not show the Airprox. The Clee Hill SSR [primary out of service] clearly shows the VC10 after departure from Brize Norton, however, the glider was not shown as no transponder is fitted. Analysis of the Clee Hill SSR shows the VC10 climbing out of Brize Norton at 1219:54, squawking A3733 at 1600ft Mode C (1013mb, that is also the value of the QFE), tracking 260°. The VC10 levels at 2000ft Mode C at 1220:45. The VC10 starts a L turn SW'ly at 1222:32, and at 1223:04 the ac is shown making a R turn back onto a W'ly track. The VC10 crosses the Kemble ATZ boundary at 1223:22, level at 2000ft Brize QFE to pass 1½nm N of Kemble. At 1224:10, when the ac is NNW of Kemble, the VC10 is shown in a L turn SW'ly again and the Mode C descends to 1900ft for 1 sweep before returning to 2000ft. The VC10 is shown passing 1½nm S abeam Aston Down at 2000ft QFE then at 1224:27; the Mode C indicates 1900ft momentarily before descending further to 1800ft for one sweep at 1224:35, which is when the Airprox might have occurred, before climbing back to 1900ft and maintaining that height westbound. The VC10 then commences a R turn back onto a W'ly heading and changes squawk to A4274.]

The VC10 had departed Brize Norton on a SW'ly heading, climbing to 2000ft QFE (1013mb), routing towards AARA10. Upon vacating Brize Norton Class D airspace the VC10 was placed under a RIS and released own navigation. The crew was initially informed of numerous contacts operating in the Nymphsfield area, which was well to the W of their position at the time. However, APP appears to have passed detailed and relevant traffic information to the VC10 crew about the position of gliders operating in the Aston Down area. It is impossible to ascertain whether the information was accurate as the gliders do not show on the recording, but the crew of the VC10 was visual with the gliders at 4nm after which the VC10 crew advised "taking avoiding action"; the pilot reports taking a 200ft descent after the glider manoeuvred towards the VC10. This coincides with the fluctuation of the VC10's Mode C indication at 1224:27. Brize Norton do not have Aston Down Gliding Site marked on their radar map and were therefore unable to provide accurate information as to the VC10's position in relation to the glider site.

[UKAB Note (2): The UK AIP at ENR 5-5-1-1, promulgates that Aston Down Glider launching site is active during daylight hours for winch and aerotow launches which may attain a height of 3000ft agl, above the site elevation of 600ft amsl.

UKAB Note (3): The extant UK Mil AIP at Vol 3 UKDLFS Pt 1-2-2-5 stipulated that Aston Down Glider Site - GS10 - was to be avoided by 1.5nm [below 2000ft msd] and noted that gliders operate up to 3000ft agl.

It was also noted that the Mil AIP states that Kemble – CA11 - is to be avoided by "2nm Weekends and PH...0800-1700 Summer" which might imply to some pilots that the ATZ is only active at weekends and on Public Holidays, which is not the case. This Airprox occurred on a Tuesday.

The civilian UK AIP at ENR AD2-EGBP-1-3 notifies the Kemble ATZ as a radius of 2nm centred on RW08/26 extending from the surface to 2000ft above the aerodrome elevation of 433ft amsl. Active in Summer 0800-1700].

HQ STC comments that the VC10's crew's selected route and altitude was misguided due to the likelihood of conflict with GA and glider traffic. Furthermore, the busy nature of this airspace should be of no surprise to Brize-based aircrew. From the report it is probable that the VC10 was avoiding another glider rather than the one that reported the Airprox.

It is disappointing that the RAF has installed TCAS on the VC10, at great expense, only to conflict with another airspace user operating without a transponder; thus restricting the utility of the TCAS fitment. Moreover, with known poor visual and radar conspicuity on gliders, the options to 'see and avoid' are usually limited to a very short range (if at all) and useful potential conflict information from ATC is unlikely.

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 incident occurred on a good summer soaring day when there were many gliders operating from Aston Down and Nympsfield and almost certainly gliders from sites many miles away, flying cross-country flights using waypoints in that area at which to turn. It was mentioned that 60 gliders are based at each of the two sites and up to 30 additional gliders might visit the sites on a busy day. With this in mind, the Board was somewhat puzzled as to why the VC10 crew had elected to transit to AARA10 in the SW, within the low-level environment, and route so close to these busy sport-flying locations. The STC member said there was no readily apparent reason for flying in this large, relatively unwieldy ac at these heights so close to Kemble and the two glider sites. He added that the execution of this departure from Brize was perhaps somewhat unwise. It was evident that the VC10 crew had been warned by APP about the presence of aerodrome cct traffic at Kemble and the large number of gliders operating around Nympsfield so it might have been more appropriate to give these locations a wider berth. It was suggested that a fairly rapid climb with radar assistance to a level that is above cloud tops would reduce the potential for encounters such as described here. It was explained that in thermal conditions, gliders will more often be found under clouds (with a higher concentration just below cloudbase) but once above the cloudbase and atop thermic cloud the risk of encountering these unpowered ac is reduced. Similar conditions prevailed here. The gliding advisor undertook to liaise with HQ STC with a view to providing a general briefing about gliding for the benefit of military crews operating from Brize Norton and Lyneham as soon as possible. Moreover, in his view the explanatory wording in both the UK AIP and the UK Mil AIP was somewhat misleading as some aircrew might get the impression from the warning about the respective activities that it is quite safe to overfly sites at heights of more than 3000ft. Whereas both sites have winching capability on the wire to a height of 3000ft aal, aerotows to any height below cloud (but normally 4000ft) are executed and soaring gliders will be found at any height up to cloudbase, and occasionally above during wave conditions. However, despite these site-specific warnings it was stressed that gliders could legitimately be encountered anywhere in Class G airspace. The Boards advisor on military low-flying had previously undertaken to review the UK Mil AIP Vol III entry regarding the Kemble ATZ at UKAB Note (3) and had asked No1 AIDU to revise the wording to make it clearer and reflect the information published in the RAF FLIP En-Route Supplement. Furthermore, the Mil ATC Ops Advisor elected to investigate the feasibility of marking Aston Down on the Brize Norton SRE video map.

Members were all too well aware of the poor visual and radar conspicuity of white gliders made of composite materials. The Board was advised that not much could be done about STC's observation

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about SSR transponders for gliders until the technology actually becomes available commercially. The GA member commented that much has been made over the years of the potential for a lightweight transponder, but it was explained that they have not as yet been developed to the point that they can be placed into production. Nevertheless, the Mil ATC Ops report had made it plain that the controller had conscientiously called the traffic that he could see displayed to him in the vicinity of Aston Down.

From the reporting glider pilot's perspective, he was conducting his general handling sortie from his local site when he saw the VC10 500yd away ($\frac{1}{4}$ nm). At a closing speed in the order of 250kt this distance would have been covered in about 4sec. So although he opined there was no point in taking any avoiding action as the jet passed 200ft directly beneath his ac, the Board recognised he would probably have been unable to alter his glider's flightpath significantly in the time available. A gliding advisor explained that the BGA Safety Committee is currently in the process of providing advice to glider pilots on avoidance techniques when faced with conflicting traffic, but it is extremely difficult to clear away from ac with a speed differential of more than 100kt. Without recorded radar data it was impossible to resolve the anomalies in the horizontal separation reported by both pilots. The Clee Hill SSR had shown that the VC10 had passed $1\frac{1}{2}$ nm S of Aston Down, in the immediate vicinity of where the glider pilot reported he was operating at the time of the Airprox. Whereas the VC10 pilot's account had stated that $1\frac{1}{2}$ -2nm horizontal separation had existed at a minimum as he descended below a white glider, if that was the case then either the glider pilot had been mistaken, which was unlikely as there were no other VC10s in the vicinity, or the jet pilot had based his assessment on another glider which he had been avoiding whilst passing directly beneath the reporting pilot's ac that had not actually been spotted at all. In this dense traffic scenario with many gliders about this was entirely feasible and in the STC member's opinion the VC10 crew had probably not seen the subject glider: the Board was unable to reconcile this anomaly beyond doubt. The Board could only conclude, therefore, that this Airprox had resulted from a conflict on the boundary of the Aston Down Glider Avoidance Area. Given the separation reported and the probability that the VC10 crew had not seen the subject glider the Board agreed that, on the information available, the safety of the ac involved had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

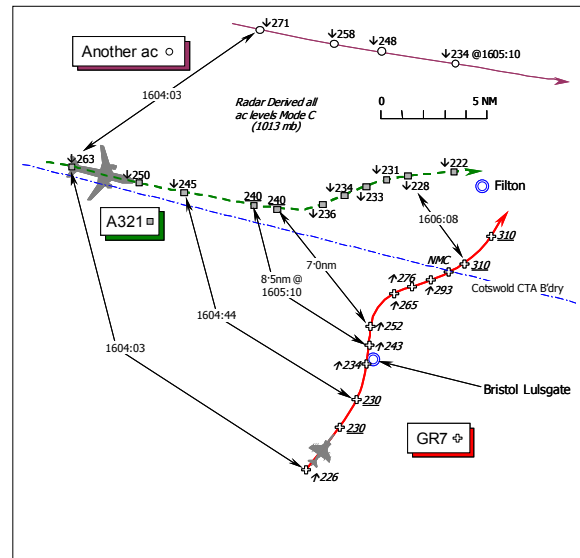
Cause: Conflict on the boundary of the Aston Down Glider Avoidance Area.

Degree of Risk: B.

AIRPROX REPORT NO 107/04

Date/Time: 3 Jun 1605
Position: 5128N 00245W (5nm SW of Filton)
Airspace: Cotswold CTA (Class: A)
Reporting Ac **Reported Ac**
Type: A321 Harrier GR7
Operator: CAT HQ STC
Alt/FL: ↓FL240 ↑FL230

Weather VMC IBCL VMC NR
Visibility: 10km NR
Reported Separation:
 200ft V/3nm H Not seen
Recorded Separation:
 Standard Separation was not eroded
 300ft V @ 8½nm H: 6000ft V @ 5.2nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE A321 PILOT, the PF, reports that he was inbound to London Heathrow and in receipt of an ATC service from LACC Swanwick whilst descending to FL240 at 300kt, when ATC called and instructed them to take immediate avoiding action. The controller advised them to turn L from their radar heading of 105° onto 060°. At the same time TCAS enunciated a TA "TRAFFIC TRAFFIC" and an ac appeared on TCAS, whereupon traffic information was given by ATC about a Harrier jet closing from the 2 o'clock position. When steady 060° the Harrier still appeared to be closing toward them "quickly" at a similar level, so although no RA was enunciated he elected to disconnect the autopilot and initiated a gentle descent down to FL236 to give separation as TCAS showed the airspace ahead and below was clear. The other ac was not acquired visually at all, but he assessed from TCAS that the Harrier had passed about 3nm away some 200ft above his ac. He reported that he would be filing an Airprox to ATC on RT and confirmed this by telephone later with the LACC SUPERVISOR.

THE HARRIER GR7 PILOT reports his ac has a green camouflage scheme, but the HISL was on whilst in transit to Wittering at 420kt in VMC, under a RCS from LATCC (Mil) and squawking the assigned code with Mode C selected on. Neither TCAS nor any other form of CWS is fitted. The other ac in the vicinity of ALVIN was not seen and no avoiding action was taken as he was under a RCS. The risk was "unknown".

THE LACC SECTOR 23 PLANNER CONTROLLER (S23 PLAN) comments that his colleague the S23TACTICAL controller (S23 TAC) asked him what the Harrier [he quoted the ac's Code/Callsign Distribution System displayed callsign] was doing. But he advised that he had no information on this flight and so S23 TAC asked him to check with the 'Military' for the flight's intentions. He confirmed by looking at the 'strips' that the A321 was descending to FL240 and the Harrier was at this time SSE of ALVIN at FL230. The LATCC (Mil) WEST telephone line then rang and he overheard the LATCC (Mil) controller clear the Harrier pilot to climb to FL250, whereupon the London (Mil) controller then requested a Cleared Flight Path (CFP) crossing of the Sector climbing to FL250. He asked the LATCC (Mil) controller if he could see the A321 some 12nm NW of the Harrier, but no reply was received and he instructed the Military Controller to turn the jet away. By this stage S23 TAC was issuing avoiding action to the A321 crew and he then overheard on the landline avoiding action being given to the Harrier pilot, whereupon the military controller rang off. The Harrier levelled at FL250, he thought, in a sweeping R turn.

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THE LACC SECTOR 23 TACTICAL CONTROLLER (S23 TAC) comments that S23 PLAN informed him that the Swindon Radar Corridor (RC) was active at FL230 until further notice. Therefore he descended the A321 to FL240, whereupon he noticed non-corridor traffic approaching CAS, South of Alvin heading NE at FL230. He pointed this out to the S23 PLAN, but shortly afterwards he noticed the other traffic – the Harrier - had begun to climb. An avoiding action L turn onto 060° was immediately given to the A321 crew and traffic information passed at a range of 8nm. When horizontal separation had reached 5nm, he thought erroneously, that the other ac was indicating FL250. The A321 pilot informed him that he would be filing a “report”.

ATSI reports that the A321 crew established communications with the LACC S23 TAC controller at 1603:00, and reported descending to FL270 heading 100°. The controller instructed the crew to descend to FL240, to effect separation against other unrelated military traffic using the activated Swindon RC at FL230. Shortly afterwards, S23 TAC became aware of traffic just S of Bristol Airport tracking N towards the southern edge of the Cotswold CTA, indicating FL228. S23 TAC ‘hooked’ this ac at 1604:10, when it was 15nm from the boundary of CAS. At 1604:40, the S23 PLAN received a telephone call from LATCC (Mil) Controller 33 (Con 33), [after having previously called the LACC Sector 5 PLANNER in error], requesting a CFP for the Harrier climbing from FL250 to FL310 into the UAS and routeing S - N across the UARs at ALVIN. This was the same ac that the S23 TAC had hooked 30sec earlier. At the time of the request, the Harrier was only 7nm from the edge of CAS, at FL230, in the A321 crew’s 2 o’clock at 12nm. S23 PLAN asked Con 33 whether he could see the A321 and then requested the LATCC (Mil) controller to turn the Harrier away. At 1605:10, S23 TAC passed avoiding action to the A321 crew instructing them to turn L onto 060° and advising of the Harrier in their 2 o’clock. Meanwhile, the A321 descended to an indicated FL236 Mode C, however, the pilot did not report to S23 TAC receiving any RA [UKAB Note (1): from the A321 pilot’s report he only received a TCAS TA]. Standard separation was never compromised and shortly afterwards at 1605:40, the A321 pilot was instructed to descend to FL140. The A321 pilot subsequently advised that he would be filing a report and the Harrier subsequently crossed the UARs at FL310.

Given the very short notice that S23 PLAN received from Con 33 for a CFP crossing clearance, the PLANNER’S actions were understandable and safe. Had he been advised of the ac type and realised the GR7’s performance capabilities, the response may have been different. It is noted that the unit MATS Part 2 does not specify a minimum period of notice for such crossing requests.

No civil ATC causal factors were apparent during the investigation of this Airprox.

MIL ATC OPS reports that LATCC (Mil) Con 33 was providing a RIS to the Harrier GR7, at FL220 to the S of Bristol Lulsgate, but the pilot wanted to climb to FL350 and a direct routeing to Wittering. LACC S23 were working the A321, descending inbound to Heathrow on UL9/L9, through the DAVENTRY CTA. Shortly after 1603:00, Con 33 identified the Harrier and turned the ac on to 030° to pass behind a third ac, which was routeing W - E and also descending. The Harrier pilot was then instructed by Con 33 to climb to FL310, but immediately afterwards the cleared level was changed to FL230; the pilot complied with the second instruction. At about 1604:00, Con 33 then called LACC Sector 5 PLANNER (S5 PLAN) and requested a “...clear flight path, south to north, FL230, to cross at ALVIN.” Having queried the level, S5 PLAN then stated “...that’s Sector 23 zone.” Shortly after 1604:00 Con 33 instructed the GR7 pilot to turn R 30° and then climb to FL310 adding an instruction to “...expedite climb.” Con 33 then called S23 PLAN and requested “...clear flight path south to north, ALVIN, FL250 climbing, my traffic overhead Bristol tracking north”. There was a short interchange while S23 PLAN confirmed the intended level of the GR7 and shortly after 1605:00, S23 PLAN indicated the A321 “...northwest of him [the GR7] by 12 miles”. Con 33 reported “contact” whereupon S23 PLAN instructed Con 33 to “turn away please” and at 1605:15, Con 33 transmitted to the Harrier pilot “...avoiding action, turn right heading 060, expedite climb through FL290.” Once the GR7 has climbed sufficiently to be no longer a conflict with the A321, Con 33 turned the ac back on to a heading of 010°.

Analysis of the Burrington radar recording at 1603:28, shows the Harrier 10nm SW of Bristol Lulsgate, with 15½nm to run to CAS and indicating FL220. At 1603:55, the Airbus is shown 18½nm NW of Lulsgate, descending through FL267 Mode C, about 23nm from the point of conflict. At 1604:17 the Harrier is 9nm from CAS indicating level at FL230, whilst the Airbus is continuing its descent through FL257. When the GR7 turns left to track north at 1604:54 it is 11.75nm from the Airbus, which is indicating passing FL243. At 1605:03 the Harrier's Mode C indicates FL231 for one sweep before indicating NMC for 2 sweeps and then the Mode C returns to indicate FL256 at 1605:23. In the same time period the A321 is seen continuing its descent and at 1605:23 indicates FL240 when the ac are 6.5nm apart. At 1605:30 the Harrier commences a right turn while the Airbus makes a left turn and the ac then parallel each other, 5.5nm apart, while the Harrier continues its climb and the A320 continues its descent. By 1606:20 the GR7 is indicating FL309, the Airbus is indicating FL224 and the ac are seen turning back on track.

It is apparent from Con 33's initial vectoring of the GR7 slightly towards the A321, in order to avoid another ac, that he had not seen the potential conflict between the Harrier and the Airbus. This omission was compounded by calling the wrong LACC sector for co-ordination, although the confusion probably arose because the GR7 wanted to climb into S5's airspace (FL270 and above) and the ac he thought he was in conflict with was descending from S5's airspace. In reality the GR7 was within S23's airspace (FL265 and below) and, since the Airbus was descending into S23, it had already been handed over to that sector. Fortunately, the S23 controllers' spotted the conflict and both S23TAC and Con 33 passed effective avoiding action thereby resolving the conflict. Appropriate action has taken by LATCC (Mil).

HQ STC comments that confusion during coordination had caused the potential for conflict. However, both controllers had recognized this potential and, through their subsequent avoiding action, the risk of collision was removed.

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 apparent from the Mil ATC Ops analysis that Con 33 had not seen the conflict that developed between the Harrier and the Airbus initially: his attention appeared to have been diverted by the presence of another ac and also by erroneously calling LACC Sector 5 to request a CFP. The GR7 was within S23's airspace who should have been called in the first instance for the CFP as the Airbus was descending into this Sector's airspace and had already been transferred to S23 TAC's control. Once Con 33 realised his mistake he still endeavoured to achieve co-ordination with S23 PLAN, but it was effectively too late. The only sensible recourse was to take avoiding action that was wisely affirmed by S23 PLAN. Although calling the wrong Sector did potentially mask the conflict and delayed its resolution somewhat, once contact was established with S23 it did allow controller-controller co-ordinated resolution by ensuring that S23 was aware of Con 33's plan for the GR7. Con 33's avoiding action turn and expedited climb instruction to the GR7 pilot was evidently effective and ensured that standard separation was not eroded. Furthermore, it prevented either a TCAS RA or STCA from being triggered.

The A321 pilot had reported that he had reacted to a TCAS TA by commencing a descent below his cleared level. The UK AIP makes it quite clear that pilots must not manoeuvre their ac solely in response to a TA. CAT pilot members stressed that, in general, TCAS is seeking to provide separation in the vertical plane so it was unwise to descend below the level assigned by ATC based on a visual surveillance of the airspace ahead and interpretation of the position of other traffic displayed on TCAS in azimuth. ATCO members also pointed out that traffic without SSR might have been crossing CAS legitimately on a crossing clearance, or another ac's transponder might have failed, rendering such

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traffic effectively invisible to TCAS, but potentially unknown to other crews. Though both are fortunately rare occurrences, Members highlighted the need for strict compliance with promulgated procedures.

The Harrier pilot was evidently not overtly concerned by the event, but from the reporting pilot's perspective he thought that the Harrier had closed to a minimum separation of 200ft vertically and 3nm horizontally, which was the basis for his report. The Board was somewhat perplexed by this, but it was clear that the A321 pilot's assessment was a significant underestimate of the separation that was actually evinced by the radar recording. Whilst it was clear that the Harrier had actually climbed through the A321's level, this was evidently in response to the instructions from Con 33 and occurred at a range in excess of 8.5nm. Given the prompt avoiding action and traffic information passed by S23 TAC and the adept application of a turn and climb by Con 33, standard separation was never compromised. Moreover, the Harrier pilot's swift reaction to the R turn and climb ensured that 6000ft of vertical separation was effected before horizontal separation dropped below 5nm. Therefore, the Board concluded unanimously that this was a sighting report of traffic displayed on TCAS to the A321 pilot where no risk of a collision had existed.

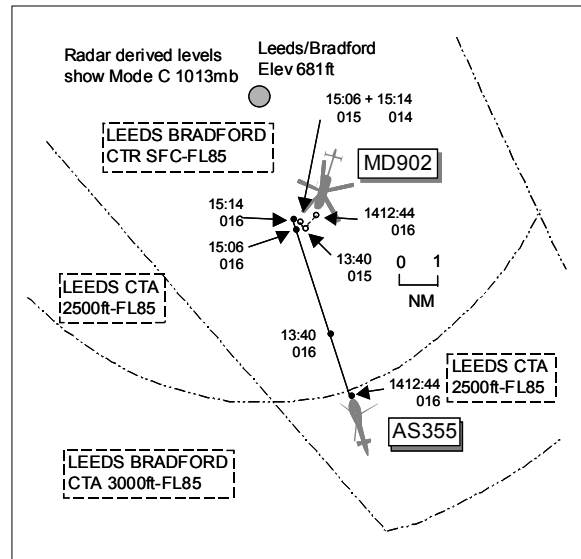
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 108/04

Date/Time: 9 Jun 1415
Position: 5349N 00138W (3nm SSE Leeds/Bradford - elev 681ft)
Airspace: CTR (Class: D)
Reporting Ac Reported Ac
Type: MD902 Explorer AS355
Operator: Civ Comm Civ Comm
Alt/FL: 1300ft 2000ft
 (QNH 1016mb) (QNH)
Weather VMC CLBC VMC NR
Visibility: 30km >10km
Reported Separation:
 50ft V 100m H 700ft V 300-400m H
Recorded Separation:
 100-200ft V 0-15nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE MD902 PILOT reports heading 310° stationary in a hover at 1300ft QNH 1016mb 3nm SSE of Leeds/Bradford and in receipt of a FIS from Leeds/Bradford APPROACH on 123.75MHz squawking a discrete code with Mode C. The visibility was 30km 2700ft below cloud in VMC and helicopter was coloured white/blue with nav, anti-collision and strobe lights all switched on. ATC told him of helicopter traffic transiting to them from the S which was duly noted on TCAS. His focus of attention was out of the cockpit down to the starboard side. After an unknown length of time TCAS gave an alert and, upon looking in, the display indicated the other ac close to his port side. Upon looking L across the cockpit he saw a helicopter flying straight and level emerge from behind and slightly above (50ft) the front L door crossing L to R about 100m away. He did not manoeuvre but transmitted *"too close, too close"* on the approach frequency. The rear R observer saw a shadow passing the rear L door and looked up to see the helicopter continuing over the head of the front L observer who noted the type and colour (AS355 coloured blue/white). He assessed the risk as high.

THE AS355 PILOT reports inbound to Coney Park, 1nm N of Leeds/Bradford, heading 360° at 110kt at 2000ft QNH and in receipt of a RIS from Leeds/Bradford on 123.75MHz squawking an assigned code with Mode C. The visibility was >10km in VMC and the helicopter was coloured blue/white with anti-collision light switched on. The radar controller told him of other traffic and he visually acquired it, a black/white coloured MD902, 3-4km ahead about 700ft below. He heard ATC inform the MD902 pilot of his presence and he maintained visual contact with the helicopter for the next 2-3min until it passed 300-400m to his R about 700ft below. He believed that there was absolutely no risk.

THE LEEDS/BRADFORD APR reports that the MD902 was operating over Leeds City centre with the AS355 inbound from the S VFR to Coney Park. TI was passed to pilots of both ac, the AS355 pilot reporting visual with the Explorer. Shortly after the AS355 was transferred to Tower, he heard the MD902 pilot transmit *"too close, too close"* over the RT.

ATSI reports that the Airprox occurred within the Leeds CTR (Class D airspace). Both helicopters were receiving an Approach Control Service from the Leeds Approach/Approach Radar Controller. The MATS Part 1, Section 3, Chapter 1, Page 2, states that *"Controllers at aerodromes located in Class C, D and E airspace are to pass traffic information.....to VFR flights on other VFR flights"*. On this occasion, the AS355 was informed (1413:10) of *"helicopter traffic right one o'clock range of er three and*

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a half miles not above altitude two thousand feet". In turn, the Explorer pilot was given TI (1414:30) on *"helicopter traffic south of you routeing northbound to the southern boundary".* The AS355 pilot reported visual with the traffic before being transferred to the Tower frequency. The controller complied with the procedure stated in MATS Part 1.

UKAB Note (1): The Leeds/Bradford QNH was 1016mb.

UKAB Note (2): Analysis of the Claxby radar recording at 1412:44 shows the AS355 entering the Leeds/Bradford CTR 8nm SSE of the airport tracking 340° squawking 2675 indicating FL016 (1690ft QNH 1016mb) which is maintained throughout. At the same time the MD902 is just R of its 12 o'clock range 5nm in a slow R turn passing heading 220° squawking 7376 indicating FL016. Just under 1min later the MD902 steadies on a NW'ly track and enters a hover at FL015 (1590ft QNH) 3nm ahead of, and 100ft below, the converging AS355. The AS355 is seen at 1415:06 0.2nm SW of, and 100ft above, the stationary MD902 and 8sec later 0.2nm NW of, and now 200ft above the MD902 which is now indicating FL014 (1490ft QNH). The CPA occurs between these 2 radar sweeps, the estimated horizontal separation is 0.15nm.

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 the benefit of recorded radar data, it was evident the AS355 pilot's estimation of vertical separation, 700ft, had been overly optimistic. After the controller had passed TI to both crews, the AS355 pilot had visually acquired the MD902 and had chosen to continue, selecting the separation distance whilst maintaining visual contact. It was clear from the geometry of the encounter that it would have been difficult for the MD902 pilot to see the approaching AS355 from his rear L quarter. After TCAS had given an alert, the MD902 pilot had been concerned when he sighted the AS355 as it passed 50ft above and to his L. This had caused the Airprox.

Members thought that the AS355 pilot should have afforded the MD902 a larger margin of separation distance when giving way, either vertically or by turning R to pass well behind it, as the MD902 pilot's intentions were unknown. The MD902 was established in a hover from which the pilot would have eventually transitioned ahead into forward flight. However, at the end of the day, the AS355 pilot had always been in a position to manoeuvre to avoid a collision which led the Board to conclude that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The AS355 pilot flew close enough to the MD902 to cause concern its pilot.

Degree of Risk: C.

AIRPROX REPORT NO 109/04

Date/Time: 9 Jun 1345
Position: 5230N 00110E (10nm SW Norwich)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: C17 Glider
Operator: HQ STC Civ Club
Alt/FL: 2000ft 1850ft
(RPS) (amsl)
Weather VMC CLBC VMC CLBC
Visibility: >10km >10km

Reported Separation:

1-200ft V1/2nm H 0 V/<200yd H

Recorded Separation:

Not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE C17 PILOT reports that he was leader of a formation of 11 ac, operating as 5 elements with 2nm spacing, heading 300° at 280kt at 2000ft on a route leading to a timed formation flypast at RAF Waddington. Four gliders, he thought, were operating from Old Buckenham airfield, were spotted on the nose at a distance of 1nm and due to the size of the formation, they were unable to take avoiding action. The gliders flew right through all the elements of the formation.

UKAB Note (1): The gliders were traced to Tibenham airfield.

UKAB Note (2): The flight was the subject of NOTAM action. This gave the composition, route, height and timings for the formation. It also stated that the formation would not be able to comply with the rules of the air.

THE GLIDER PILOT provided a brief report that he was flying a red and white glider thermalling over Tibenham airfield at 1850ft and 45kt. He first saw a large formation of large military ac at 2-300yd at about the same height and 200yd horizontally displaced. He turned away from it, dived and accelerated.

THE DCFI OF THE GLIDING CLUB sent a comprehensive report including an input from the pilot who was identified as being the closest to the formation.

On the day of the incident, the Wednesday flying group prepared for the day as normal. One of the members attempted to download the NOTAMs for the day using the club computer, but unfortunately he could not access the information as it refused him access to the Internet. As the day was not forecast to be a good soaring day and no cross-country flights were planned, the decision was made only to operate locally from RW 26.

The DCFI was not at airfield that morning but returned and, at approximately 1330, took a phone call from Marham ATC requesting the telephone number of Priory Farm. He asked why they wanted it and the caller said that they wished to inform them of some jet activity. He enquired what jet activity as they were only just over a mile away and was told that there was a practice formation of jets later that day. The DCFI told Marham ATC that they had about 5 gliders airborne at that time and asked what time the ac were expected. He was told 'in about 5 minutes time' but this reply was drowned by the sound of the

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formation passing overhead. He looked out the window and reported to Marham that the formation had missed all of their ac. He immediately went to the field and asked the duty instructor if he had been aware of any activity. The instructor reported the problem obtaining the NOTAMs and that he had therefore not been aware of any activity. The DCFI then returned and downloaded the NOTAMs on his personal laptop and then plotted the route on the map and found the formation should have passed 1nm to the N of them. He then called Marham ATC and asked why they had not been informed that such a large formation was going to pass so close to them and within their published winch launch height and was told that that it had all been planned properly and that an ACN was sent to the club for the attention of their CFI. He was also told that there was a Hawk 8nm in front of the formation clearing the route. No one at Tibenham reported seeing the Hawk ac so he thought it possible that it flew the planned route and did not report any gliders.

No ACN was received from the Airspace Utilisation Section but subsequently they found that it had been wrongly addressed and had actually been sent to Priory Farm (also wrongly addressed). He passed the correct addresses to the UKAB who forwarded them to AUS. Further investigation also revealed that there were deficiencies with the Club computer system.

MIL ATC OPS reports that the Marham Watchman radar was unserviceable and Marham Zone was providing a service from the SSR at Honington. The formation lead ac was identified and placed under a FIS by Marham Zone controller at 1340:06. TI was immediately passed as "*C/S 1, traffic left 11 o'clock range 7 miles passing down your left hand side, indicating 1000ft*". Further traffic was called by an unknown callsign, believed to be an F3, at 1342:15 as "*C/S XXX you've got traffic on the nose, low, no confliction 12 o'clock*". Further TI was passed, again by the unknown callsign, at 1342:35 "*C/S XXX you've got traffic left 11 o'clock, glider, right to left, high*". At 1342:45 traffic was called by an unknown callsign was passed on "*C/S XXX you've got traffic my left, 4 o'clock, level and one my left 9 o'clock over, behind me*". The C17 pilot acknowledged the call and no further relevant TI calls are made.

Analysis of the Debden Radar shows the C17 at 1340:11, [2½ min before the lead ac passes Tibenham] SW of Bungay heading 290°; there are 2 contacts painting near Tibenham with one fading almost immediately and one 7000 squawk indicating FL020. This latter contact is believed to be the subject glider heading NW before turning right to the SE. [This contact could be the Tug.]

At 1340.43 the contact is heading 120° at FL019, 11.1nm from the lead C17 of the formation. The C17 formation and glider contact converge and at 7.5nm, time 1341.24, the contact is observed at FL011 having slowly descended on heading. At 1341.33 the contact turns right through south at FL010 and 6.6nm, the descent is observed to continue to FL009 at 6.1nm; the contact then fades at 1341.45 and no further contact is observed in the Tibenham area during the formation transit to the NW.

The Marham Zone Controller declared his workload at the time of the Airprox to be low; in addition, the Controller was working SSR only under the terms of a FIS. A NOTAM was issued for the practice formation flypast, so the glider club should have been aware of the activity.

HQ STC comments that the ACN and NOTAMs were written for the protection of all air users; ignorance of them is no excuse. There were several other means of obtaining NOTAMs available to the Gliding Club including FAX and telephone. Any ac flying in the UK FIR without first checking the NOTAMs would be in contravention of Article 43 of the ANO - Pre-flight action by the commander of ac. Under the article ac commanders are to satisfy themselves "*that the flight can safely be made, **taking into account the latest information available** as to the route and aerodrome to be used, the weather reports and forecasts available and any alternative course of action which can be adopted in case flights cannot be completed as planned*".

The plan for these formations took into account both the size of the formation, including its inability to make tight turns, and current airspace restrictions. However, consideration would also be given to minimise the disruption to other air users. The Hawk was utilised to watch out for other ac and also to

act as a 'whip', which is positioning the forming ac into a symmetrical formation with even spacing. Therefore, it may not have seen the gliders at the time, especially given the known problem of glider conspicuity and their lack of SSR equipment. There would have been an assumption by all the crews involved in the flypast that other air users would keep clear of this large and unwieldy formation. The fact that this long and wide formation was 1nm S of the planned track is hardly surprising and all air users would be well advised to avoid similarly notified formations by a large margin in the future.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members considered that permitting flying to take place – and indeed flying - without first checking warnings and NOTAMs was inexcusable. The checking and if appropriate onward dissemination of NOTAMs is a clear and prime responsibility of all pilots and supervisors of flying, the Duty Flying Instructor in this case. Although adherence to NOTAMs is not mandatory, the Board had no reason to believe that a significant gliding club such as this would not have paid them due regard. The Board reminded pilots that there are several means of receiving NOTAMs, as outlined in the HQ STC report, other than the Internet. However, Members accepted that proper prioritisation of large numbers of sometimes irrelevant NOTAMs can be very time-consuming.

Members were unclear regarding the responsibilities of AUS and the status of ACNs. The UKAB Secretariat was tasked by the Board to clarify the situation and append the findings to this report. The status of the gliding site was also unclear to Members.

It was explained that Tibenham is a notified glider site in the UK AIP (Civil) (HJ, up to 3000ft agl) and for civil ac there is no promulgated avoidance for glider sites, only a warning of their activity. The information is mirrored in the UK Mil AIP (Vol3 – The UKLFS) but, although Vol3 promulgates the Tibenham glider site as being active up to 3000ft, and as such attracts a 2nm avoidance (mandatory for military ac), the maximum extent of the UKLFS and therefore the top height of the avoidance area is 2000ft agl. Since the formation was deliberately planned not to utilise the UKLFS neither the pilots nor the planners would have had any reason to consult the UK Mil AIP Vol3. As with other glider sites operating above 2000ft, Tibenham is not promulgated in any other section of the UK Mil AIP. Having said that, since the lead crew would most probably have been planning on, and visually navigating using, a Low Flying Chart (LFC), they would have been aware of the existence of Tibenham, albeit not that it operated up to 3000ft. In any case, the prime purpose of glider avoidance areas is to give protection to gliders when they are launching and are relatively vulnerable; in this case the gliders were not launching but soaring when the formation passed. When soaring the sole means of avoiding other ac is good lookout.

The ACN notified the formation route as being 2½ nm either side of the published centre lines and from 1-4000ft; this could have penetrated the Tibenham (military) avoidance area. Although there is no regulatory requirement for pilots to avoid the formation's published route, it would be most unwise not to do so. Members had no reason to believe that, had the Gliding Club received the ACN, they would not have paid it due regard. Members were astonished that there had been no prior consultation between AUS and Tibenham which is a major glider-operating airfield. Had this been the case it would also have provided the Club some warning of the formation with or without the NOTAM or the ACN. The UKAB Secretariat was tasked to ascertain whose responsibility it is to ensure that the AUS distribution list is accurate and also to establish the consultation process prior to the issuing of an ACN.

Members were surprised that the glider pilot was not aware of the C17 and following formation until it was 2-300yd away since its engines would probably have been audible by then. Although the formation

AIRPROX REPORT No 109/04

leader saw the glider earlier than the glider pilot, there was virtually nothing he could have done to alleviate the situation in the circumstances. The accompanying Hawk would have found it very difficult to see any gliders, paragliders or even slow ac, given the height and speed differences. Further, the main task of the Hawk at that stage of the formation's flight would have been to direct the individual elements into precisely the correct formation positions rather than to look for non-participating ac ahead. Members therefore agreed unanimously that it is not sensible for non-participants to fly anywhere in the vicinity of this type of unwieldy formation.

ATC members considered that using Marham's SSR-only capability to provide a service to the formation was unwise, as it would not reveal any non-squawking ac. Given that the Marham primary radar had become unserviceable at short notice, other suitable agencies were available locally.

The Gliding Advisor undertook to forward this incident to the BGA Directorate and Safety Committee so that the lessons can be distributed widely through the gliding community. Further, he informed the Board that new methods of downloading, sorting and prioritising NOTAMs were being explored by the BGA.

Both pilots saw the opposing ac. However, due to the relative lateness of both sightings and the lack of manoeuvre capability open to the lead C17 pilot, the Board determined that, although there had been no actual risk that the ac would have collided (any of them), clearly there had been a compromise to the safety of both ac actually involved and potentially to other formation members and gliders.

UKAB Post-meeting Note: AUS were contacted as directed and the following is a synopsis of their response:

There is no 'acknowledgement of receipt' system for ACNs sent out as hard copy. E-mail and fax copies are instantaneous and 'receipt' can be seen. All in the AUS database of addressees are encouraged to provide fax numbers and/or e-mail addresses.

AUS do not consider that a workable 'receipt acknowledgement' system could be developed or would be useful since many hundreds of ACNs are processed per year. The aim is to send out ACNs 28 days in advance of an activity but many are revised or amended and are sent at much shorter notice. In all such cases it would be likely that the activity would have taken place before any 'receipt acknowledgement' was received. Further, AUS emphasize that it is a **NOTAM** that provides **notification** of the event to airspace users and not an ACN, the latter being only a record of the airspace co-ordination arrangements.

In any Unusual Aerial Activity (UAA) taking place within, or passing through, airspace for which a particular agency is responsible then that agency will be included in the negotiations prior to an ACN being agreed and issued. [Tibenham has no such airspace]. ACNs are developed normally only for those UAA which either require some form of co-ordination regarding activity in managed airspace or activity that requires ATS provision or separation from other traffic in receipt of an ATS. Minor airfields in the vicinity of a UAA are not normally included in any prior co-ordination discussion unless the airspace for which the airfield is responsible is to be utilised by the UAA. Nevertheless, airfields are included in the information distribution list of the ACN if considered relevant - as was the case with Tibenham.

The AUS address database can only be as accurate as the information passed by their customers or that available from Flight Information Publications. If there is any change to the person to contact or to any other details for an airfield then it is their responsibility to inform the CAA/AUS. AUS review their database regularly each year as a matter of course but would not have the capacity to check each address in the database with postal address lists. From a Flight Safety Management perspective, AUS has an existing process to ensure that when a NOTAM is raised it is made available to all through AIS.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the vicinity of a notified gliding site which was on the route notified for a very large formation.

Degree of Risk: B.

Contributory Factors:

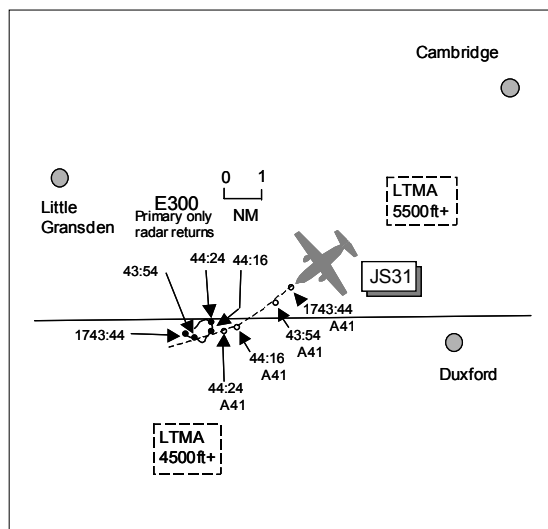
Gliding activity was taking place without the NOTAMs having been checked.

The Gliding Club did not receive the ACN.

AIRPROX REPORT No 110/04

AIRPROX REPORT NO 110/04

Date/Time: 10 Jun 1744
Position: 5206N 00003W (7nm NW BKY)
Airspace: LFIR (Class: G)
Reporting Ac Reported Ac
Type: JS31 E300 Extra
Operator: Civ Comm Civ Trg
Alt/FL: ↑4000ft 500-4000ft
(QNH 1016mb) (QNH)
Weather VMC CLBC VMC CLOC
Visibility: >10km 'Good'
Reported Separation:
Nil V <0.5nm H Not seen
Recorded Separation:
0.45nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JS31 PILOT reports outbound from Cambridge IFR climbing to 4000ft QNH 1016mb at 160kt and in receipt of a RIS from Stansted DIRECTOR on 126.95MHZ squawking 5030 with Mode C. During initial climb out on Cambridge RW heading 233° at 7nm, he was advised of pop-up traffic ahead at 0.5nm which was seen as low wing monoplane, possibly a YAK51, coloured white/red. On initial contact it was climbing and manoeuvring but then levelled at the same altitude and carried out aerobatic flick manoeuvres whilst it moved to their R, passing <0.5nm away flying in the opposite direction; it appeared that the other pilot was unaware of their presence. Next it was seen to manoeuvre to their R, back to their 4 o'clock position, apparently taking a look before peeling backwards and descending. He had not carried out avoiding action, keeping course whilst evaluating in which direction the other ac would manoeuvre next. He had been concerned that if they had manoeuvred it may have resulted in further conflict if he had become unsighted. Luckily the final manoeuvre taken by its pilot had taken it away from their flight path, which is when he thought that their ac had been sighted. He assessed the risk as very high.

THE E300 EXTRA PILOT reports flying a local aerobatic sortie from Little Gransden operating between 500ft and 4000ft not in communication with any agency squawking 7004 with Mode C. The visibility was good in VMC and the ac was coloured red/silver with strobe lights switched on. During the aerobatic sequence the only traffic that he saw was a twin-engined ac flying about 0.5nm away on a 300° track.

ATSI reports that the incident took place at 1744 UTC in Class G airspace, approximately 9nm SW of Cambridge Airport. The JS31 had recently departed Cambridge for Warton on an IFR flight-plan and at the time of the incident was in receipt of a RIS from the LTCC Stansted Final Director. The other ac was initially considered as 'unknown' but later identified as an Extra 300 that was airborne from Little Gransden, a local general aviation airfield. The Cambridge 1720 UTC weather was reported as 26015KT 9999 SCT040 22/14 Q1016=

The JS31 was airborne from RW23 at 1740 on an IFR flight-plan to join CAS to the NW of BKY en-route to Warton. It had been agreed that LTCC would provide the flight with a radar service prior to entry into CAS and at 1741:40 it established communications with the Stansted Final Director (FIN). The pilot reported climbing to 3000ft on the RW heading and the controller responded by instructing the flight to 'squawk ident' and climb to altitude 4000ft. One minute later the flight was informed that it was identified and was now being provided with a RIS, which the pilot read back. A RIS is a radar service available

to flights outside controlled airspace and is described in MATS Part1, Section 1, Chapter 5, Page 3, Para 1.5, as *“...an air traffic radar service in which the controller shall inform the pilot of the bearing, distance and if known, the level of the conflicting traffic. No avoiding action shall be offered. The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information.”*

At 1743:53, the JS31, now level at 4000ft, was instructed to turn R onto a heading of 260°, to facilitate the flight's entry into CAS. After receiving the pilot's read back the FIN then attended to traffic in CAS that he had been vectoring for an approach to Stansted. Immediately after these exchanges, which probably lasted about 15sec, his attention was drawn to unknown traffic, not squawking, ahead of the JS31's flight path. At 1744:15, he transmitted *“...JS31 c/s pop up half past twelve half a mile possibly a glider”*, the pilot responding immediately *“...JS31 c/s is visual with that aerobatic”*. This is acknowledged by the controller who then says *“...subject that one on your right climb to altitude 5000 feet”*.

An analysis of the radar recording was undertaken using the same radar source as that employed by the FIN at the time ('Stansted 10cm'). It shows the 'unknown' ac (later identified as the subject Extra 300) first appearing as a credible primary return in the JS31's 1 o'clock position, range 3nm, at 1743:44, 31 seconds before TI was issued by the FIN. (Note: A return on the 'unknown' is just detectable earlier, after scrutiny, but the 'trail dots' of another flight largely obscures its presence.) The turn onto a heading of 260° issued to the JS31 crew, occurring 9sec later (1743:53), did not appear to take into account the presence of the 'unknown', now at 2.7nm in the same relative position (1 o'clock). A further 22sec passes and then at 1744:15, the FIN transmits the warning to the JS31 crew. At this point the 'unknown' is at a range of 1nm in a tight L turn. It was fortunate that the pilot of the JS31 immediately acquired the traffic visually as a turn onto the assigned heading, if fully completed, would have brought the flight directly towards the 'unknown'. The unknown traffic continues turning L, ultimately completing an orbit in a position a little less than 0.5nm to the N of the JS31, which, by now, is establishing on its assigned heading. A short while later, the unknown traffic can be seen displaying the 'Special Purpose' transponder code 7004, but with NMC height readout. The UK AIP ENR 1-6-2-1, para 2.4 - Aerobatic Manoeuvres states: *“The use of Special Purpose Code 7004 shall be for solo or formation aerobatics, whilst displaying, practising or training for a display or for aerobatics training or general aerobatic practice. Any civil or military pilot may use this code whilst conducting aerobatic manoeuvres. Unless a discrete code has already been assigned, pilots of transponder equipped aircraft should select code 7004, together with mode C, five minutes before commencement of their aerobatic manoeuvres until they cease and resume normal operations. Pilots are encouraged to contact ATCUs and advise them of the vertical, lateral and temporal limits within which they will be operating and using the SSR code 7004”*.

UKAB Note (1): The radar recording shows the E300 manoeuvring overhead Bassingbourn disused airfield. An ac, later traced as a PA34, is seen to transit over Bassingbourn at 1742:45 indicating 3000ft altitude on a track of 290°. The Airprox CPA occurs at 1744:24, the subject ac separated by 0.45nm which is maintained for the next two radar sweeps as the E300 turns to parallel the JS31. Later at 1748:55, Mode C is seen on the E300's 7004 squawk.

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 agreed that this had been a conflict in Class G airspace, with both crews responsible for 'see and avoid'. After levelling at 4000ft and following TI from the Stansted FIN, the JS31 crew had seen the E300 about 0.5nm ahead climbing from below. This had been a late sighting which had been a part

AIRPROX REPORT No 110/04

cause of the Airprox. Pilot members wondered whether the E300 pilot had seen the reporting ac, as the radar revealed a PA34 twin-engined ac had transited the area on a 290° track at 3000ft 1min 45sec before the Airprox. Although the E300 pilot would have been concentrating on the aerobatic task, there was an equal onus on him to avoid other ac whilst manoeuvring. From the information available and on the balance of probability, Members agreed that the E300 had probably not seen the JS31 which was a second part cause of the Airprox. It was evident that the primary only return of the E300 had not been noticed by the Stansted FIN until late in the day: its pilot had reported squawking 7004 code but this had only appeared on the controller's display, for whatever reason, after the Airprox. The aerobatic Special Purpose Code would undoubtedly have made the E300 more conspicuous to the FIN at an earlier stage, as well as to other pilots on TCAS, and the non-display of the SSR code was cited as a contributory factor. Also, the E300 pilot had not contacted an adjacent ATCU, as recommended by the AIP. Both Cambridge ATC and Stansted were aware of the JS31's flight path and should have been able to provide TI on the flight to the E300 pilot. This was also deemed to be a contributory factor.

Moving onto risk, the FIN's TI had allowed the JS31 crew to visually acquire the E300. Owing to the latter's profile, the JS31 crew had not manoeuvred, being concerned that further conflict may have ensued if they had lost sight of it. The E300 was seen to pass <0.5nm away to their R, whilst performing aerobatics, before turning out of conflict. The recorded radar had revealed 0.45nm separation at CPA, although this distance was purely fortuitous as the JS31 was apparently not seen by the E300 pilot. Whilst the JS31 crew were always in a position to manoeuvre to avoid an actual collision, the Board agreed that safety had not been assured during this encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the JS31 crew and probable non-sighting by the E300 pilot.

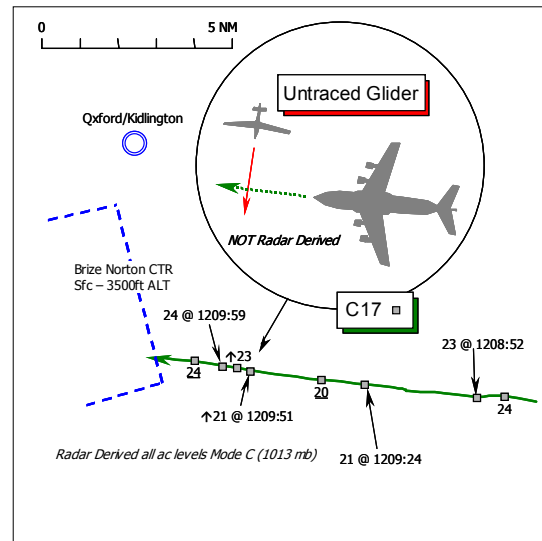
Degree of Risk: B.

Contributory Factors:

1. The E300's transponder code 7004 was not displayed.
 2. The E300 pilot did not contact an adjacent ATCU.
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AIRPROX REPORT NO 111/04

Date/Time: 12 Jun 1210 (Saturday)
Position: 5144N 00114W (Oxford)
Airspace: Oxford AIAA (Class: G)
Reporting Ac **Reported Ac**
Type: C17 Untraced Glider
Operator: HQ STC NK
Alt/FL: 2200ft NK
 (QFE 1023mb)
Weather VMC CLBC NK
Visibility: NR NK
Reported Separation:
 50-100ft V1/2nm H NR
Recorded Separation:
 Not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE C17 GLOBEMASTER PILOT reports that he was flying inbound to Brize Norton some 2000ft clear below cloud in VMC for a single ac recovery after participating in a formation flypast over London. He was in receipt of a RIS from Brize Norton on 133.75MHz and squawking A7040 with Mode C; TCAS is fitted but neither an RA nor TA was enunciated during the period of the Airprox. The ac has a grey camouflage scheme, but the HISLs were on.

Whilst heading 280° toward Brize flying at 2200ft Brize QFE (1023mb) in a shallow descent at 300kt prior to recovery, a white low wing Glider was spotted very late about 1/2nm away as it appeared from under the nose. He immediately pulled up to avoid the glider as it crossed 1/2nm ahead from R-L. The minimum vertical separation was 50-100ft and he added if avoiding action had not been taken the risk of a collision would have been "high".

AIS (MIL) reports that on this day the Clee Hill primary radar source was out of service and although the Heathrow and Debden recordings were checked neither the subject glider nor the Airprox are shown on the recordings. Despite exhaustive enquiries and extensive procedural tracing action they have been unable to identify the reported glider.

UKAB Note (1): UK NOTAM H3440/04 promulgated the routeing of the multi-ac formation from the forming up point through the London CTR to Northwood, where the formation was detailed for "dispersal en-route – 1230". No further detail was included in the NOTAM regarding the routeing of the dispersed elements after the formation break.

MIL ATC OPS reports that the C17 had been the lead ac in a mixed formation of military ac that was recovering to Brize Norton independently after a flypast overhead London. The C17 was identified and placed under a RIS by BRIZE APPROACH (APP) at 1206:47. Traffic information was immediately passed as "[C/S] traffic 12o'clock 3nm 2 contacts no height information". The same traffic was called again at 1207:00, as "previously reported traffic, 2 contacts still to the west of you by 1mile now manoeuvring". Further traffic information was passed by APP at 1207:30, on traffic "north 2miles, manoeuvring 2 contacts no height". The C17 reported visual with this contact. At 1208:38 traffic information was passed on "traffic 12o'clock 4miles manoeuvring, no height information", to which the crew replied "...looking". But moments later at 1208:57, the C17 crew reported "...descending to 2000ft 1023 [mb] to remain clear of that traffic". [UKAB Note (2): This was not apparently the subject glider.

AIRPROX REPORT No 111/04

No comment was made on RT about an avoiding action pull-up which was shown later at 1209:51]. After providing a general warning to other formation elements about sighting traffic over Oxford, the C17 crew switched to Brize TOWER at 1210:46.

[UKAB Note (3): The Heathrow Radar recording shows the C17 at 1206:30, 6nm NNE of Wycombe Air Park, squawking A7040 and indicating 2400ft Mode C, tracking 290°, the C17's Mode C fluctuates between 24-2500ft for the next minute. After a right turn onto a track of 280°, the C17's Mode C descends to 2400ft at 1207:45 and maintains this level and track for over 1min until 1208:52, just after this the crew report "*descending...to remain clear of that traffic*", whereupon the C17 is first shown in a slow descent through 2300ft Mode C (1013mb), down to 2100ft at 1209:24. After this the ac maintains 2000ft (1013mb), before at 1209:51 a sharp climb is evident through 2100ft. The C17's Mode C rises to a maximum of 2400ft at 1209:59, evincing the C17 pilot's reported avoiding action 'pull-up'. This level is maintained until the C17 enters the Brize Norton CTR. No radar contacts that might be the reported glider are evident at all on the radar recording. The C17 crew commence their descent into Brize Norton at 1210:35 when well clear of the vicinity of the Airprox.]

APP declared his workload at the time of the Airprox as medium to high. The C17 was returning from a flypast overhead London via Princes Risborough and Aylesbury and the crew contacted APP 6nm NNE of Wycombe Air Park, which was hosting a gliding competition that was generating a high level of background tracks on APP's Radar. These background tracks are not displayed on the Heathrow Radar recording. Accurate and relevant traffic information was passed by APP to the C17 on multiple tracks as the C17 transited through the area. The ac upon which traffic information was passed to the crew at 1208:38, is not displayed on the Heathrow Radar recording. However, the C17 crew reported visual with the ac almost immediately after APP had passed the location of the conflicting traffic at "*12 o'clock, 4nm*". Nevertheless, a primary contact is displayed for 1 sweep in the C17's 4 o'clock at ½nm at 1208:45. This contact was not called by APP as when the conflicting contact appears on the radar the C17 is west of the contact, diverging. No further conflicting traffic is evident on radar and no further traffic information is passed to the C17.

It is questionable that with the high level of background tracks around the vicinity of the Airprox location a limitation in service would have warranted, especially when coupled with the controller's workload. However, APP has provided accurate, relevant and timely traffic information to the C17 as it transited through the area. As the glider remains untraced and is not evident on the radar recording, it is impossible to ascertain the exact location of the Airprox.

HQ STC comments that this Airprox once again illustrates the poor visual and radar conspicuity of gliders. The C-17 pilot did not see the glider until very late and without a transponder in the glider the C-17's TCAS was rendered redundant. Furthermore, it is proposed that the glider would have been wise to talk to Brize ZONE (if fitted with a radio) whilst flying across the main approach into Brize Norton at 2000ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report solely from the pilot of the C17, 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.

Some considered that HQ STC's suggestion that glider pilots might call on the RT when intending to cross the approach was a sound idea. An advisor commented that in this vicinity on a Saturday afternoon in summer with good thermal conditions and a weekend competition in progress at Booker, this area could potentially be the haunt of a considerable number of gliders at any one time. (Indeed, the particular glider might be based 100nm away). The advisor further noted that during competition times this could result in 20-30 gliders streaming across the approach path with implications for ATC if

an RTF call became a requirement. Under the auspices of the BGA, he would encourage more glider pilots to call the major ATSU's (where gliders are so fitted) in an effort to enhance safety for all. The Board was advised that not much could be done about STC's observation about SSR transponders for gliders until the technology actually becomes available commercially. Much has been made over the years of the potential for a lightweight transponder. It was explained that the research phase is understood to be substantially complete and that DTI have made funding support available to industry. One aspect that might prove helpful though was that the advisor had raised with the BGA Safety Committee the issue of a glider pilots' understanding of the nature of the airspace. His view was that glider pilots generally tend to think of airspace as straightforward blocks of airspace. If they thought more about the runways/approaches and certain types of letdown procedures used by powered ac, it might enable them to sensibly route clear of inbound traffic more easily.

For the C17 pilot's part he was returning VFR to base and the NOTAM and ACN had promulgated the unusual aerial activity, which was the reason for his sortie. The flypast route, perhaps understandably, was not promulgated to other airspace users nor was the detail about the formation ac returning independently into Brize Norton. Nevertheless, the routeing via Princes Risborough was in accord with the established agreements with Northolt and it is common for traffic exiting the CTR, VFR into the FIR, to route this way. It was emphasised that the NOTAM warning was not relevant to this single ac recovery and afforded no 'protection' whatsoever here. With hindsight, some Members thought it might have been better had the NOTAM given more information about how the formation planned to break-up and where the ac intended to route thereafter. Others thought that a long descent at these altitudes at 300kt on a weekend increased the potential for a conflict with GA traffic and gliders. Flying this large, relatively unwieldy ac slower (wherever feasible) might give a better chance of visual acquisition and avoidance in the 'see and avoid' environment of Class G airspace. Civilian pilot Members, whilst aware that military pilots were exempt from the general speed restriction, said that the more usual maximum of 250kt for civilian ac below 10,000ft might give more opportunity to see other ac. The conscientious Brize APPROACH controller was evidently providing copious traffic information, which had undoubtedly helped in this dense traffic scenario, but it was unclear if it had facilitated visual acquisition of the subject glider. Fortunately, the alert C17 crew spotted the glider and just managed to climb above it, which it would appear had prevented a collision. Unfortunately, despite the considerable work by AIS (Mil) it had not been possible to trace the pilot of this particular glider. With only the C17 pilot's perspective on which to base their assessment, the Board could only conclude rather unsatisfactorily that this Airprox had resulted from a conflict with an untraced glider that had been resolved by the C17 crew. Given the reported very late sighting at a range of only ½nm, the C17 pilot did well to climb above the glider in his very large ac, so the Board agreed that the safety of the ac had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

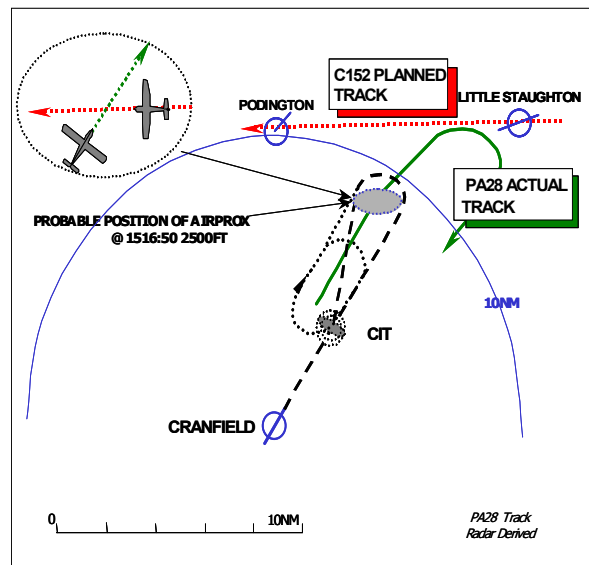
Cause: Conflict with an untraced glider, resolved by the C17 crew.

Degree of Risk: B.

AIRPROX REPORT No 113/04

AIRPROX REPORT NO 113/04

Date/Time: 20 Jun 1520 (Sunday)
Position: 5241N 00028W
(9m NNE Cranfield - elev 358 ft)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: PA28 C152
Operator: Civ Pte Civ Trg
Alt/FL: 2500ft 2500ft
(QNH 1004 mb) (QNH 1005 mb)
Weather Inter IMC RAIN VMC CLBC
Visibility: ~8km 20-30km
Reported Separation:
0V 30ft H Not seen
Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports flying a white ac with red and blue stripes with nav lights, beacon and landing lights selected on, on an IFR flight from Teesside to Cranfield. He was intermittently IMC in rain showers and was squawking 7017 [at the time Cranfield Conspicuity] with Mode C and was in receipt of an Approach Control Service from Cranfield APP. While heading 035° at 130kt and having just levelled at 2500ft 1min 30sec outbound on the ILS procedure for RW22, [the pilot reported his position as commencing the base turn on the RT] he saw a white C152 with blue stripes crossing from R to L, just above him at a slant range of approximately 30ft and on a track of 260°. [He was able to read the ac registration]. The ac transited the published IAP, he thought, which is clearly marked on ½mil GA charts with a chevron, without contacting the controlling ATSU. He immediately dived his ac and applied right bank and assessed the risk of collision as being imminent/high.

THE C152 PILOT reports flying a blue and white ac with HISLs on on a local training flight from Bourn squawking 7000 with no Mode C and listening out with Cranfield APP [on the same frequency as the PA28]. At the time of the reported Airprox he was heading 265° at 85kt and was tracking from Bourn to Salcey Forest, about 2nm N of the planned track. Just before St Neots he changed frequency from Little Staughton but heard no reply to their call: shortly afterwards he changed frequency to Cranfield APP. Their ground speed was ~70kts (wind ~270°/15) and when they were abeam Podington [10nm N of Cranfield] they had been listening out for between 9 and 10 minutes but heard no calls. When about 1 to 2nm SW of Podington [the APP Controller reported that he said 4nm S in the telephone call to them] they heard the pilot of another ac calling Cranfield, stating that he wished to file an Airprox with a blue and white Cessna 152 reg G XXXX. He was surprised and asked his student if he had seen anything. The student commented that he believed he had seen a 'white flash' passing from left to right immediately below that could have been another ac. They continued their flight towards Salcey Forest and then turned to the N tracking towards Oundle (track 025°) and thence back to Bourn landing at 1705 local. He then rang Cranfield ATC to establish if he had indeed been involved in an AIRPROX, giving a contact telephone number.

SATCO Cranfield reports that he was informed that the PA28 pilot had reported an Airprox with another ac while on the approach to Cranfield. The other ac was believed to be a C152 reg G XXXX and the pilot of which, on hearing the Airprox being reported, realised that he may have been involved. The pilot

contacted ATC after landing: his details were recorded. The SATCO contacted both pilots, as he was unsure as to whether an AIRPROX was to be filed.

The PA28 pilot described the incident [as in his report above]. It was established that the other pilot believed to be involved had been in the vicinity, on an instructional flight with a student pilot operating out of Bourn. They had not seen the reporting ac and confirmed that he had been listening out on Cranfield APP but did not call Cranfield, as it was 'quiet'. He informed the SATCO that he was aware of the Cranfield instrument approach, as he had been an instructor there some ten years previously. He believed that the reporting ac had not been anywhere near the ILS pattern. The SATCO asked that notwithstanding this incident, he would appreciate a call on APP if he was listening out in order to inform other ac of his presence.

ATSI reports that there were no apparent ATC causal factors in this incident. The PA28 was receiving an Approach Control service from Cranfield which is not radar equipped. The C152 was not known to APP as it was only listening out on the frequency.

UKAB Note (1): The PA28 can be seen on the recording of the Debden Radar throughout the Instrument pattern. The ac flies the pattern as described by its pilot but drifts to the E by about 1nm and extends to 13nm (9½ nm from the Cranfield LCTR) before turning in. Although this is 4nm further outbound than the promulgated pattern, from the timings on the RT transcript the PA28 pilot reported the Airprox to APP when he was in a position 028° 9½nm from the airfield and still tracking outbound. The C152 does not paint on primary or secondary at any time. However an unidentified primary return shows very intermittently just to the W of the reported position (tracking slowly to the W) just after the time that the PA28 pilot reported the incident to Cranfield APP. If this were the C152 then back-plotting the ac track would verify the diagram of the incident provided by the PA28 pilot. Although there is a slight discrepancy in the positions reported, this can probably be explained by the time lag of the 2 pilots' verbal reports to 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, a radar video recording, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Although unable to resolve positively the differences in the reported positions, the Board had little doubt that the C152 had been the other ac involved, stemming mainly from its registration and colour scheme.

The Board determined that both ac had been operating legitimately in Class G airspace and, in the absence of any radar assistance, 'see and avoid' was the sole means of collision avoidance. Although accepting that no radar assistance would have been available at the height that the respective ac were operating, this does not absolve the respective pilots from their obligation to avoid other ac even if they are flying on a published IFR approach.

Despite his distance from Cranfield, the Board considered that the C512 instructor might have been unwise in not calling them and informing them of his position and intentions. Had he done so this could have been relayed to the PA28 pilot allowing him to make an informed decision as to whether or not it was safe to proceed with his approach in IMC conditions. Members accepted however that such calls to non radar-equipped airfields can be of limited value to the pilot making them. Additionally the LARS provider for the area is Brize Norton and at 2500ft the C152 would have been below their radar coverage. In such circumstances, it can therefore be difficult to decide which airfield to call. In this instance the C152 was equidistant between Sywell and Cranfield: Cranfield can be exceptionally busy and at these times information calls can serve to distract APP from their primary function. Nevertheless

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in this instance an information call by the C152 instructor could have prevented this incident even allowing for the fact that the PA28 was outside the pictorial representation of the published approach.

The closeness of this occurrence and the fact that neither pilot saw the opposing ac in time to take effective avoiding action was of major concern and the Board determined that only good fortune had prevented the ac from actually colliding and even then by the smallest of margins.

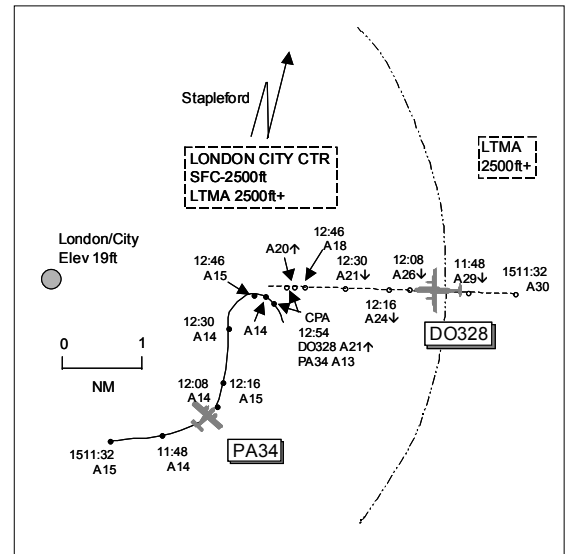
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the C152 pilot and very late sighting by the PA28 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 114/04

Date/Time: 27 Jun 1513 (Sunday)
Position: 5130N 00008E
 (5nm E London/City - elev 19ft)
Airspace: London City CTR (Class: D)
Reporting Ac Reported Ac
Type: Do328 PA34
Operator: CAT Civ Comm
Alt/FL: 1750ft↓ 1500ft
 (QNH 1016mb) (QNH 1016mb)
Weather VMC CLBC VMC CLBC
Visibility: >10km 10km
Reported Separation:
 200ft V nil H 500ft V 1nm H
Recorded Separation:
 300ft V 0.65nm or 800ft V 0.25nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE Do328 PILOT reports established on the ILS at London/City descending from 3000ft QNH 1016mb heading 270° at 160kt and in receipt of an ATS from City TOWER on 118.07MHz squawking 5110 with Mode C. Approaching 2000ft a TCAS contact was observed in his 11 o'clock range 2nm. No warnings were received at this stage and the other ac, a white coloured PA34, was visually acquired at about 1500ft in level flight and in a R turn towards him on a reciprocal heading which he assessed to be on a collision course: he immediately initiated a go-around. By now, his altitude was 1750ft and separation had reduced to 1nm and TCAS indicated -200ft, during which an amber TA alert illuminated followed immediately by a red RA with aural "monitor vertical speed". Shortly afterwards a "climb" command was announced and the PA34 passed immediately underneath his ac, still in a R turn, with a very high risk of collision. He commented the TCAS RA had occurred very late, after his 'avoiding action' go-around had been taken.

THE PA34 PILOT reports flying a local sortie VFR from Stapleford at 1500ft QNH 1016mb at 120kt and in receipt of a RCS from City TOWER on 118.07MHz squawking 7055 with Mode C. The controller told him to fly from Vauxhall Bridge eastbound S of the River Thames. When about 1.5nm E of City airport and S of the river heading E, ATC asked if he was visual with an ac on final, which he confirmed, and then instructed him to fly to the City overhead and on to the Lee Valley Lakes. Maintaining visual contact with the traffic he started his L turn towards City airport but when passing through N he found that he was getting close to the extended C/L, owing to a strong SW'ly wind, and in front of another ac (the Do328) on a 3nm final about 1000ft above. He immediately initiated a R turn to avoid passing in front of and to get to the S of the Do328's flight path. However, shortly thereafter the Do328 was seen to initiate a go-around, estimating it passed 500ft above and 1nm clear to his L. He did not assess the risk but said that had he continued his L turn, he would have been in front of the Do328.

KAB Note (1): The London/City METAR shows EGLC 1450Z 22013KT 190V250 9999 SCT045 22/10 Q1016=

ATSI reports that the Airprox occurred within the London City CTR (Class D airspace). The Do328 was inbound IFR on the ILS for RW28 and the PA34 was transiting VFR, both ac being under the control of the London City ADC. The controller fulfilled his basic responsibilities, stated in MATS Part 1, with respect to the minimum ATC services to be provided in Class D airspace i.e. "pass traffic information to

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IFR flights on VFR flights and give traffic avoidance advice if requested, pass traffic information to VFR flights on IFR flights and other VFR flights". The PA34 pilot was given TI about the Do328 and reported visual; the Do328 pilot was warned about the PA34 crossing ahead, when the two ac were 3nm apart.

The PA34 pilot, who was heading E, S of the airport, was instructed (1511:45) to cross through the overhead, in front of the Do328. The radar recording indicates that this was a sound plan at that stage (the PA34 was 2.4nm SSE of the airport with the Do328 at about 5nm, groundspeeds were similar) provided the PA34 turned straight away. However, the PA34 was approximately 2.6nm SE of the airport before he commenced his L turn. TI was passed to the pilot of the Do328, at 1512:08, as the PA34 was in the L turn 3nm away. At this stage, the radar recording shows that there was now some doubt as to whether the PA34 would be able to pass safely ahead of the Do328. Furthermore, instead of routeing towards the overhead, the PA34 tracked N, into conflict with the Do328. At 1512:16, when the ac were 2.4nm apart, the PA34 was tracking N, 2.5nm SE of the airport, at 1500ft, the Do328 was on the ILS at 4.3nm descending through 2400ft. The ADC asked the pilot of the PA34 if he was visual with the Do328. The pilot replied that he was and, then (1512:30), that he would hold on the S side 'just in case'.

[UKAB Note (2): The London/City RT transcript reveals that just over 1min prior to the instruction given to the PA34 pilot to cross through the overhead, the pilot had requested routeing direct to Stapleford. At this time another ac, AC3, not the subject Do328 was on final approach to RW28 for a go-around. The controller transmitted, just before 1510:40 *"yeah that would make life easier then er once you see the one in the go around then you can er continue northbound direct to Stapleford"* which was correctly read back, having previously been passed TI on AC3 and reported visual with it. At this stage the PA34 is 2.4nm SSW of London/City with AC3 positioned just over 1nm final on RW28. The Do328 pilot then makes his initial call (1510:50) reporting *"...localiser established seven point one d"*. Thirty seconds later (1511:30) the PA34 pilot transmits *"and PA34 c/s can I cross to the north now"* which was not acknowledged, the radar shows the 'go-around traffic 0.5nm W of London/City tracking W climbing through 1200ft QNH. The PA34 pilot then calls *"...tower PA34 c/s"* to which the controller replies (1511:45) *"PA34 c/s if you cross er now directly through the overhead erm I've traffic on the five mile final for runway two eight to land"*. The pilot replies *"cross to the north side PA34 c/s"*.]

Having passed appropriate information/instructions to the PA34 pilot, the ADC had no reason to believe that the situation was not resolved. However, realising that the pilot was not complying with the ATC routeing, it would have been prudent for the ADC to have issued revised instructions to deconflict the two ac. This may, at least, have prevented the Do328 having to carry out a go around. Having said this, there is no provision in the City MATS Part 2, to allow the ADC use of the ATM to *"monitor the progress of overflying aircraft identified by approach radar control to ensure that they do not conflict with the tracks of arriving or departing aircraft"*. MATS Part 1, Section 2, Chapter 1, Page 12, applies. The only authorised use of the ATM, relevant to this incident (City MATS Part 2) is to *"Provide information to aircraft on the position of other aircraft carrying out an instrument approach"*.

UKAB Note (3): The Heathrow radar recording shortly after 1512:30 shows the PA34 squawking 7055 turning R from a N'y track at altitude 1400ft with the Do328 1.5nm to its NE tracking W descending through altitude 2100ft. Minimum vertical separation is seen at 1512:46, the PA34 turning through E at 1500ft in the Do328's 1130 position range 0.65nm and 300ft below. The next radar sweep shows the Do328 climbing through 2000ft altitude with the PA34 indicating 1400ft, with the CPA occurring 4sec later, 800ft/0.25nm, the PA34 turning through heading 130° and diverging from the Do328 climbing through 2100ft altitude.

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 Board were mindful that this incident occurred in Class D airspace where ATC had fulfilled the basic responsibilities required with respect to the IFR Do328 and VFR PA34. One ATCO Member initially believed that the ATC plan, to turn the PA34 towards the overhead, had been poor. However, after further discussion and correlating the RT transcript with the radar recording, the Member agreed that the ATC plan should have worked. That it did not was owing to poor execution by the PA34 pilot. Earlier, he had been given a 'provisional' clearance to cross the FAT behind AC3 on a 'go-around', which was ahead of the Do328. However, a short while after the Do328 crew made their initial call, the PA34 pilot then asked for clarification of the crossing clearance. A 15sec delay occurred before the ADC then instructed the PA34 pilot to route via the overhead but this was not readback correctly. Members agreed that the pilot's read back of "*cross to the north side...*" should have been challenged by the ADC to reinforce the required routing needed to ensure that the PA34 would not conflict with the Do328. This was considered to have contributed to the Airprox. However, Members disagreed with the ATSI statement that the PA34 was slow to turn as the recorded radar shows the ac turning L almost immediately after the ADC instructs the flight to route to the overhead. However, the PA34 pilot did not comply with the instruction, rolling out on a N'y track and placing the subject ac in conflict which had caused the Airprox.

The PA34 pilot saw the approaching Do328 and elected not to turn in front of it but to stay to the S of the FAT. After informing ATC and whilst maintaining visual contact with the Do328, the PA34 pilot turned sharply R to avoid it and during his manoeuvring, he saw the Do328 execute a go-around, eventually passing 500ft above and 1nm clear of his ac. The Do328 crew had been given TI on the PA34 which was seen on TCAS, and then visually acquired, in their 11 o'clock range 2nm at 1500ft on a reciprocal heading. Assessing that it was on a collision course, the Do328 crew immediately executed a go-around during which TCAS gave a TA alert followed by an RA 'climb' warning, the PA34 passing underneath their ac. The radar recording reveals that during the resolution of the conflict, the PA34 pilot had also descended 200ft, the subject ac passing at the CPA with 800ft vertical and 0.25nm horizontal separation. The action taken by both crews, when combined, was, in the end, 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 PA34 pilot did not comply with the ATC instruction and flew into conflict with the Do328.

Degree of Risk: C.

Contributory Factors: The London/City ADC did not challenge an incorrect readback.

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Date/Time: 24 Jun 0811

Position: 5044N 00309W (10nm E of Exeter)

Airspace: London FIR (Class: G)

Reporting Ac Reported Ac

Type: Hawk (A) Hawk (B)

Operator: CinC Fleet CinC Fleet

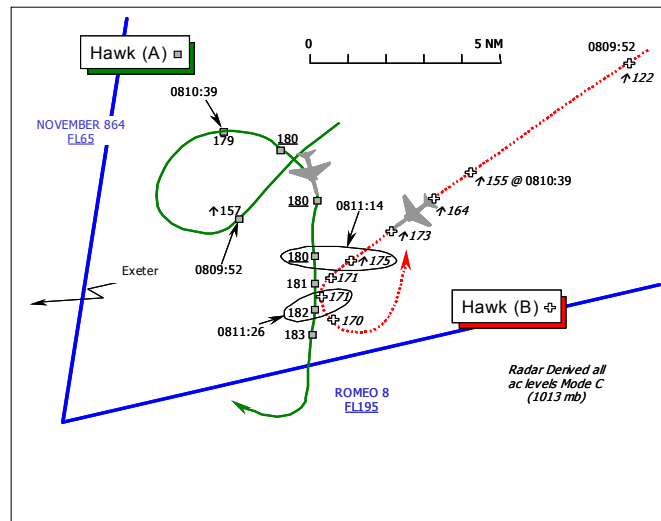
Alt/FL: FL180 FL170↓

Weather VMC CLOC VMC CLOC

Visibility: Unlimited Unlimited

Reported Separation:
400ft V below/
¼nm H 400ft V /¼nm H

Recorded Separation:
500ft V/O-4nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF HAWK (A) reports his ac has a black colour scheme and the HISLs were on whilst outbound from Yeovilton for a sortie in the Plymouth Exercise Areas (EXAS). Neither TCAS nor any other form of CWS is fitted. His intended departure details had been passed to ATC on GROUND and encompassed a L turn after take-off onto a heading of 240° and climb to FL180, prior to a radar handover to PLYMOUTH MIL to commence his exercise. After take-off from RW27 at 0805, as planned, he departed under a RIS from Yeovilton APPROACH (APP) and levelled at FL180 in VMC some 10000ft clear of cloud and in unlimited visibility. Approximately 2nm NE of the boundary of N864, still SW bound, he was instructed to “contact” PLYMOUTH MILITARY. To stay outside of controlled airspace he immediately entered a right hand orbit at 350kt, maintaining FL180, before he contacted PLYMOUTH MIL and informed them of his intentions. Whilst turning R through S, another Hawk was spotted briefly ½nm away at the apex of a bunt as the pilot of the other ac - Hawk (B) - took avoiding action. Because of the “late spot” he was unable to take any avoiding action himself. The other Hawk passed ¼nm away some 400ft below his ac with an “actual” risk of a collision. He added that the late handover to PLYMOUTH MIL from APP without any clearance to cross CAS were all contributory factors.

THE PILOT OF HAWK (B) reports his departure for a sortie in the Plymouth Exercise Areas (EXAs) was pre-noted to Yeovilton GROUND for a L turn heading 240° and climb to FL240 with a handover to PLYMOUTH MIL. After a timed take off 5min after Hawk (A), he thought, he set course outbound heading 250° at 350kt under a RIS from APP, but no traffic information regarding Hawk (A) was received. Whilst in the climb through FL160 he believed he had been handed over to PLYMOUTH MIL by APP. But on initial contact with PLYMOUTH MIL, the controller instructed him to level at FL170 and traffic information about Hawk (A) was passed. Simultaneously, he became visual and with no relative movement of the other ac in relation to his jet and a rapid decrease in range he assessed there was an actual risk of collision so he bunted to avoid the other Hawk, topping out at about FL176 before descending down to FL170 as cleared by PLYMOUTH MIL.

THE HAWK PILOTS’ STATION comments that this was an unfortunate incident in Class G airspace where both ac, flown by experienced pilots, came into conflict following a decision by a trainee controller to effectively ‘freecall’ the ac across to the next ATSU in relatively close proximity to CAS. The trainee controller’s Mentor, an experienced ATCO, had become distracted with an unfamiliar foreign ac departure and subsequent airways joining clearance, which was complex. The Mentor missed the

significance of a critical call from the pilot of Hawk (A) "turning right for the airway" and as such did not appreciate that the ac was now turning and would eventually conflict with the second outbound jet - Hawk (B). In addition, the Mentor believed PLYMOUTH MIL would take both Hawks through the airway. Moreover, as he had checked the airway for conflicting traffic and saw none, he assumed the late transfer would not cause a problem. The SUPERVISOR (SUP) assumed the APP Mentor had the situation under control, both with the foreign ac and the Hawks although arguably, he could have been more proactive in assisting APP. The Hawk pilots both thought they had been handed over to PLYMOUTH MIL when in fact no handover had taken place. The pilot of Hawk (B), although aware of the other Hawk (A) had launched shortly afterwards and was climbing through his level, and assumed Hawk (B) would be kept clear of him as he conducted his turn. Hawk pilot (B), although climbing through the level of Hawk (A), did not expect (A) to turn towards him and like the APP Mentor, did not assimilate the call from the pilot of Hawk (A), "turning right for the airway". This could have been misinterpreted as a positioning turn to cross the airways and therefore was reasonably discounted. Several lessons have been learnt and all those involved fully re-briefed. This Airprox highlights the need for Mentors to ensure they monitor ALL the actions of trainees in their charge and for Supervisors to ensure they maintain awareness over developing situations. It also highlights the need for aircrew to remain vigilant and maintain good look out especially when receiving the lowest form of radar service - a RIS.

MIL ATC OPS reports that the Yeovilton RT recordings were 58min 25sec ahead of the Burrington Radar timebase, therefore timings in this report have been adjusted accordingly to match the Burrington timings. The ATSU will, henceforth, ensure that the ATC voice recorder timings are monitored and corrected daily.

Yeovilton APPROACH (APP) was manned by a trainee and an experienced mentor who had been in position for less than 15min. They were expecting to work an Antonov, flown by a foreign crew unfamiliar with UK airspace, for an airways join at SAM, in addition to two Hawks: (Hawk (A) and Hawk (B), who were departing Yeovilton independently and would both need to cross airway N864. At 0807:18, whilst APP was still trying to establish two-way RT with the Antonov crew, Hawk (A) called on departure, was identified placed under a RIS and instructed to climb to FL180. Eventually at 0807:56, after prolonged exchanges, APP managed to identify the Antonov and placed it under a RAS. Shortly afterwards, at 0808:17, APP identified Hawk (B) and again placed the flight under a RIS, in the climb to FL240. There was no traffic to affect either Hawk and for the next 2min APP was experiencing a busy and frustrating time as they arranged the CAS joining clearance for the Antonov crew and then found that the pilot had changed his desired joining level from FL190 to FL90. But FL90 was not high enough for a join at SAM, resulting in the clearance being cancelled so APP found themselves trying to explain this situation to the foreign crew. In the meantime, the APP trainee had [erroneously] instructed the APP Assistant (APP Asst) to pre-note both Hawks to Exeter RADAR for an airways crossing. Exeter advised the APP Asst that the Hawks would not be passing through airspace within their responsibility and that the Hawk pilots should call PLYMOUTH MIL. The APP Asst then pre-noted PLYMOUTH MIL, was issued squawks for the Hawks and instructed to "...call back for handover." At 0808:40, APP had established that the Antonov pilot intended to level at FL90 and instructed the pilot to "*remain clear of controlled airspace.*" Immediately afterwards Hawk (A) was instructed to select the pre-notified PLYMOUTH MIL squawk and "*...continue with ,er, Plymouth 124x15.*" The pilot acknowledged this and reported "*coming right for the airway.*" At 0811:00, APP instructed Hawk (B) to change squawk and also continue with PLYMOUTH MIL; APP then continued to try and achieve an agreement and airways joining clearance for the Antonov. Consequently, APP would have been expecting PLYMOUTH MIL to put Hawk (A) back on track. When PLYMOUTH MIL established 2-way RT with both Hawk pilots they attempted to stop Hawk (B) at FL170 and to pass traffic information, but by this time the Airprox was imminent.

[UKAB Note (1): Analysis of the Burrington and Jersey Radar recording at 0805:05, shows the Antonov 3¼nm W of Yeovilton and tracking SW. Shortly afterwards the ac makes a L turn towards SAM and continues climbing. At 0806:59, Hawk (A) is shown 4½nm W of Yeovilton, heading SW and climbing through 1800ft Mode C (1013mb). Shortly afterwards, at 0808:08 Hawk (B) appears 4nm SW of Yeovilton, following Hawk (A)'s track and indicating a climb through 2300ft Mode C (1013mb). Both jets maintain their respective courses and at 0809:53, Hawk (A) indicating FL156 Mode C changes squawk

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to A1670 [for Plymouth (Mil)]. At this point Hawk (A) is 3.75nm E of the boundary of Airway N864 and 4½nm N of the boundary of R8. Shortly afterwards, when Hawk (A) is 1.75nm from CAS climbing through FL165, it commences a right hand orbit. At the same time Hawk (B) is 10.75nm behind Hawk (A) indicating FL138. At 0810:24, Hawk (B) changes squawk, to A1666 indicating FL144 Mode C. At 0810:53, Hawk (A) levels at FL180 still in its right hand orbit, whilst Hawk (B) is passing FL164, tracking SW and some 4.3nm ESE of Hawk (A). Shortly afterwards at 0811:02, the ac are 2.2nm apart with Hawk (A) indicating FL180 and Hawk (B) indicating FL173 climbing. Thereafter both ac continue to close and the point of minimum vertical separation occurs at 0811:14, as Hawk (B) ascends to a maximum of FL175, at the apex of the reported avoiding action bunt, 500ft beneath Hawk (A), which maintains FL180 at a range of 1nm. Hawk (A) draws ½ nm ahead of Hawk (B) crossing from R – L as the latter turns L. The point of minimum horizontal separation occurs on the next sweep with Hawk (B) turning L, 0.4nm off Hawk (A)'s port quarter with 1100ft of vertical separation evident as Hawk (A) climbs slightly through FL182 and Hawk (B) descends through FL171, whereupon both ac continue to diverge.]

Throughout this incident, APP was struggling to divide their attention between all their ac as a result of the complex and difficult problems that the Antonov was presenting in busy airspace close to CAS. The APP Mentor and the SUP became overly involved in establishing what it was that the Antonov crew wished to do. This resulted in no traffic information being passed to either Hawk pilot on the position of the other jet. Due to the very late prenote of both Hawks to PLYMOUTH MIL, APP opted to instruct the pilots to freecall PLYMOUTH MIL although they did not actually use the term "freecall" in the transmissions as required by JSP552 915 Serial 15 (2). APP did not give the pilot of Hawk (A) any information on his position in relation to Hawk (B) or CAS. Accordingly, the pilot elected to initiate a R turn himself, to avoid the airway and it was this orbit that brought him in to conflict with the second Hawk. APP should have effected the handover to PLYMOUTH MIL much earlier, or alternatively, should have freecalled the ac earlier in order to give PLYMOUTH MIL sufficient time to take positive control of the situation. In addition, when the pilot of Hawk (A) reported turning R, APP could have passed traffic information about Hawk (B), though it was not initially apparent that Hawk (A)'s pilot was intending to make a full orbit. A combination of factors resulted in this Airprox: APP did not maintain an adequate division of attention during a period of labour intensive controlling. The Mentor and trainee were distracted by the difficulties encountered attempting to apply basic control instructions to the Antonov crew that was further complicated by the difficulties associated with the airways joining clearance for this foreign-crewed ac.

CinC FLEET comments that traffic information from Yeovilton and/or an earlier handover to PLYMOUTH MIL would have helped resolve this conflict. Alternatively, as the airway was clear the Yeovilton APP controller had the option of taking the Hawks through N864 under RC. None of these options were taken due to the distraction provided by the Antonov. The level of Radar Room Supervision must be questioned (RNAs employ a Radar Supervisor permanently in the Radar room) as the Supervisor is employed to assist and guide the APP controller in order to prevent such occurrences, especially during busy and complex control periods. Had a handover to Plymouth Mil been completed in good time or the crossing of N864 been completed by the Yeovilton APP controller then the pilot of Hawk (A) would not have instigated the turn away from CAS (good airmanship by the pilot) and the Airprox would have been avoided. Despite the lack of availability of the Portland Radar the PLYMOUTH MIL controller was able to provide a normal airways crossing service. Above FL60 the Hawks were in radar coverage of the Cambridge Radar head (located at Wembury on the S Devon coast) which was available to the PLYMOUTH MIL controller. Additionally, had a timely handover occurred, the option to obtain a procedural crossing could have been taken. The positive side of this Airprox is that all parties have learned valuable lessons.

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.

During the investigation of this Airprox it had been reported, incorrectly, that the operating capability of PLYMOUTH MIL had been adversely affected by the unserviceability of the Portland remote radar head. This is but one of the radar sources used by this ATSU in the provision of airways crossings. The CinC Fleet Member reaffirmed that the subject Hawks were both within the solid coverage of the radar head situated at HMS Cambridge and a full RCS could have been provided if a hand-over had been effected in the appropriate timescale. Therefore, the unit's airways crossing capability was not degraded and so this aspect did warrant inclusion in a NOTAM that had been issued about the LARS provided by PLYMOUTH MIL.

It was apparent to the Board that the catalyst to the difficulties encountered here by the Hawk pilots stemmed from ATC's evident concentration on the Antonov joining CAS out to the E to the detriment of the ATS provided to their westbound home based traffic. The Mil ATC Ops analysis had made it plain that APP should have afforded a greater division of attention to the situation of both Hawks; either an earlier free-call to PLYMOUTH MIL, well clear of CAS, or a radar crossing of N864 could have forestalled this close quarters situation. Alternatively, a stop-off of Hawk (B)'s climb coupled with a pre-warning by APP of the other ac out to starboard would have helped the pilot of (B) gain greater situational awareness. A controller Member suggested that the APP Mentor did not have the situation 'under control' and should have been given better direction by the Supervisor. The Board agreed with the Member from CinC Fleet who opined that the supervisory aspects of this occurrence had a significant bearing on the Airprox. There were lessons here for all ATC Supervisors who should ensure that their controllers were given suitable guidance and every assistance necessary. It was all too easy for controllers to become engrossed in the task at hand to the detriment of the 'big picture'. Very often supervisors can 'take a step backwards' and achieve a clearer overview of the whole scenario that has the potential to recognise pitfalls and forestall avoidable situations at the critical moment. Whilst it is impossible to foresee every eventuality, the Board agreed that timely intervention here might well have produced an entirely different outcome. The ability to afford good 'supervision' over an ATC Watch is a very important skill that cannot be acquired in short order and should not be underestimated – experience is key, which also holds true for those charged with training others in professional air traffic control skills. The Board was well aware from other incidents that even the most experienced of mentors can allow themselves to be drawn into difficult situations as a result of their trainee's actions which can often quickly trap the unwary. Mentors should be in no doubt that they can only allow their trainees to go so far and be prepared to take over the instant it starts to go wrong. That point is a very individual judgement based on a myriad of factors but can be no further than the mentor is capable of retrieving themselves – a dynamic and extremely difficult aspect to judge accurately and probably the most difficult task set before any controller given the responsibility of schooling trainee controllers in the 'live' environment. Training must not be allowed to have a detrimental impact on the ATS provided overall. Here was a salutary lesson of what can go awry when distracted by the unusual.

Nevertheless, it had been shown that in the period leading up to the Airprox the pilots of both Hawks were in receipt of a RIS, essentially a VFR service where having been given traffic information pilots must maintain their own visual separation. Having been placed in the situation of rapidly approaching CAS, with no crossing clearance, no hand-over effected to PLYMOUTH MIL and no clue offered by APP of whether he could safely penetrate, the pilot of Hawk (A) wisely elected to turn away from the airway. No conflict with Hawk (B) existed up until this point and the pilot of (A) was patently unaware of its close proximity as it caught him up whilst approaching rapidly from the NE and below his ac. Thus Hawk (A)'s pilot found himself in a very difficult situation when he suddenly spotted (B) apparently during the latter pilot's avoiding action 'bunt'. Fortunately, (B) had switched in time to allow the PLYMOUTH MIL controller to pass traffic information to him about (A), which he spotted simultaneously. Moreover, the controller had recognised the predicament and instructed (B) to level below (A), but only just in time because the bunt still resulted in the ac ascending to FL175 – just 500ft below the other jet. The CinC Fleet Member said that (B)'s pilot felt it was too close to do anything else and he was concerned in case he lost sight of the other jet. Thus in originating a turn away from CAS the pilot of Hawk (A) had unwittingly turned about into conflict with (B), about which he had not been pre-warned at the time because APP had not appreciated that he would turn away from CAS. This turn placed (A) directly in

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the path of (B) whose pilot saw the other jet only just in time to take avoiding action. In the weather conditions that prevailed it seemed to the Board that each ac might have been spotted by the other pilot somewhat earlier, but this was not the case. Weighing all these factors carefully the Board agreed, unanimously, that this Airprox had resulted from a conflict in the FIR, resolved by the pilot of Hawk (B)'s avoiding action. Nonetheless, contributory factors were the APP mentor's preoccupation with the Antonov to the E, which distracted him from the situation developing in the W between these two jets and which could well have been forestalled by the intervention of the ATC Supervisor.

Turning to risk, the Members were aware of the high closure rate of these two ac, both flying at 350kt. This coupled with the rate of climb of (B), as (A) flew into its path, left little time for the PLYMOUTH MIL controller to forewarn the pilots and for (B) to react. The pilot of (A) saw (B) too late to do anything as he reported (B) was already taking action when spotted. It was fortunate that the pilot of (B) was able to bunt 500ft below the level of (A) at a range of 1nm, according to the radar recordings. Following (B)'s sighting and avoiding action L turn horizontal separation had reduced to a minimum of 0.4nm. This had effectively removed the actual risk of a collision at close quarters, but it was all very late so the Board concluded that safety was not assured.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the pilot of Hawk (B).

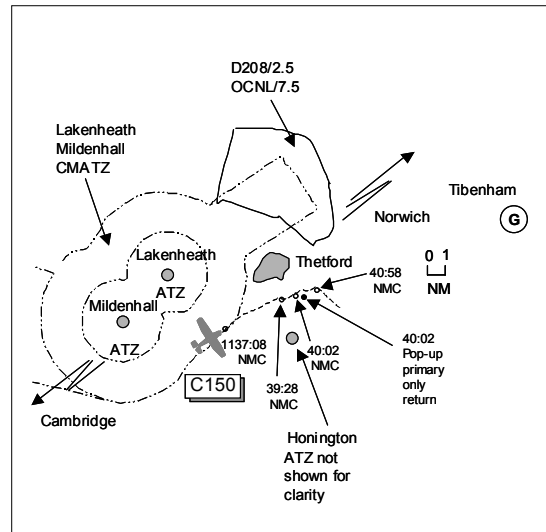
Degree of Risk: B.

Contributory Factors:

1. The APP Mentor became distracted by the Antonov's CAS join.
 2. Apparent lack of intervention by the ATC Supervisor.
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Date/Time: 29 Jun 1139
Position: 5223N 00045E (2nm S of Thetford)
Airspace: LFIR (Class: G)
Reporting Ac Reported Ac
Type: C150 7x Gliders
Operator: Civ Pte Civ Pte
Alt/FL: 2500ft NR
 (QNH 1024mb)
Weather VMC CLBC NK
Visibility: 25km
Reported Separation:
 50ft V & H NR
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE C150 PILOT reports en route to Norwich heading 060° at 100kt and in receipt of a FIS from Lakenheath APPROACH on 128.9MHz squawking 0451 NMC. The visibility was 25km, 500-700ft below cloud in VMC and the ac was coloured red/white and blue. He had free-called Lakenheath passing Newmarket and was assigned a transponder code and given clearance to transit the MATZ, remaining clear of the Mildenhall and Lakenheath ATZs. Cruising at 2500ft QNH 1024mb the controller was very good and gave information on traffic in the area despite only requesting a FIS. About 3nm S of Thetford he spotted a glider 100m away just to his L, flying in the opposite direction and slightly above his level but descending, appearing as if it had descended from cloud or from behind a cloud. It was possible that he had not seen it earlier owing to its small profile and colour allowing it to blend into the cloud background. He pointed this glider out to his colleague, another instructor, as he turned R to avoid it, passing close enough to see that it was dumping water ballast. As the glider disappeared from view just above his LH wing, both he and his colleague became aware of multiple gliders head-on to them at various altitudes, just above and below. Over the next 15sec, he had to turn either way and at first climb then descend to remain clear of individual gliders, 2 of which passed within 50ft of them, 1 slightly L and below and the other slightly R and above, both once again dumping ballast. They were again difficult to spot because of their small frontal area and he believed he would have seen them earlier if he had not concentrated so much on the first glider. Despite the fact that they must have seen his ac, not one glider made any attempt at evasive manoeuvring, that he could detect, with all remaining on a steady reciprocal headings. It appeared that they were racing and were relying on him to avoid them. Once the gliders had cleared away, he reported their presence to Lakenheath.

The controller said that the gliders were not showing on his radar and he was mindful that he was only in receipt of a FIS. Shortly after this he spotted another group of 5 gliders in his 12 o'clock and then another group of 6 in his 10 o'clock; both groups were circling in thermals, the second group were doing so on the final approach to Lakenheath's RW. ATC then offered, and he accepted, radar vectors to the E towards Diss and then towards Norwich. He assessed the risk of collision as high owing to a number of reasons. Firstly, his late sighting of the first glider; secondly because of possible missed sightings of any glider that went undetected when he manoeuvred to avoid others; thirdly the apparent inability/unwillingness of any of the gliders to take avoiding action and fourthly the non-communication by any of the gliders with Lakenheath Approach.

AIRPROX REPORT No 116/04

UKAB Note (1): During a subsequent telephone conversation with the UKAB Secretariat, the C150 pilot confirmed that he had been aware of an ACN and NOTAM issued for a gliding competition from Tibenham and he had planned to route well clear of the Tibenham area. Prior to a flight earlier that day from Norwich to Cambridge, he had telephoned the published number to obtain further information on nominated cross-country routes, timings and activities but there had been no answer.

AIS MIL reports that the CFI of the Gliding Club at Tibenham was contacted and he was attempting to establish the identity of the reported gliders; a copy of a CA1094 Report Form was e-mailed. However, no reports have been received and enquiries through the gliding advisor to UKAB have not shed any light as yet on the identity. Information is still awaited.

MIL ATC OPS reports that the C150 was transiting from Cambridge to Norwich at 2500ft. The C150 pilot called Lakenheath Approach (APP) at 1127:51; APP issued a Mode A0451 and requested "*ident*". At 1128:24, APP informed the C150 pilot "*radar contact 2 miles SW of Newmarket, say your altitude maintaining and your destination*". The C150 pilot responds that he was passing "*2300 for 2500 inbound from Norwich, to Norwich from Cambridge*". After a request from APP the C150 pilot declared he required a "*FIS and his own transit*." At 1128:56 APP placed the C150 under a FIS and approved a MATZ penetration whilst remaining clear of the Lakenheath and Mildenhall ATZs. At 1131:08, APP reported that the C150's transponder was intermittent. TI was passed to the C150 pilot at 1133:57 as "*traffic for you sir, 9 o'clock and 10 miles turning southeast bound, that is a HR 200, 2500ft*". This TI was updated at 1134:34 by reaffirming that the conflicting traffic was "*maintaining 2900*". At 1140:03 the C150 pilot reports that he had "*just had multiple air misses with six to seven gliders just south of Thetford, heading west at about 2600ft*". APP replied that he was "*picking up some faint targets now, uh looks like one in your 12 o'clock at 3 miles*". The C150 pilot responded that they were "*now visual with another 3 orbiting in a thermal 2500 uh we're now got another four-five in my left 10 o'clock, another six or seven now in my 6 o'clock heading west, south of your field and south of Thetford*." APP offered a suggested heading of 150° to "*remain south of that*" and an offer to vector the aircraft just S of Tibenham. The C150 pilot reported turning R at 1140:58 and APP immediately suggested a heading of 090° on course. The pilot reported taking the vector and at 1142:44 that he would be filing an Airprox.

[UKAB Note (2): Analysis of the Debden Radar recording at 1137:08 shows the C150 5nm SE of Lakenheath tracking NE squawking 0451 with NMC with several contacts visible in the Tibenham area, 16-23nm ahead. The C150 continues to track in a NE direction until 1139:28 when a R turn is observed onto a track of 085°. A primary only contact pops-up for 1 radar sweep at 1140:02 in the C150's 1 o'clock range 0-6nm which coincides with a L turn by the C150 onto a heading of 070°. However, this pop up return appears at the time when the C150 pilot reports having already had multiple air misses (sic) and is therefore not believed to be one of the reported 7 gliders. Later at 1140:58, the C150 is seen making a hard R turn onto 150° as suggested by the Lakenheath controller but no primary contacts are observed in the vicinity at this time.]

The C150's intended track would route him close to Tibenham Airfield, which is an active glider site up to 3000ft agl. An ACN and a NOTAM had been issued regarding a gliding competition to be held at Tibenham involving up to 50 gliders, from dawn to dusk at all levels. APP had been providing the C150 with a FIS with the stipulation that the ac should remain clear of the Lakenheath and Mildenhall ATZs. APP was aware of the gliding activity at Tibenham but the Airprox took place some 16nm from Tibenham, which would suggest that the gliders were carrying out cross-country routes. The Glider Competition Director had not contacted Lakenheath Air Traffic to inform them that the gliders would be operating away from Tibenham or which cross country routes they would be taking. This situation has been resolved for next year. The gliders were not painting on radar giving APP no opportunity to warn the C150 of the confliction. The Unit has taken the appropriate action against the likelihood of this scenario reoccurring.

UKAB Note (3): The ACN Activity No 04-06-0183 and NOTAM H4387/04 promulgate a major British Gliding Association gliding competition between 26th June 0930 and 4th July 1900 including cross-

country routes within 5nm radius 5227N 00109E (Tibenham AD, Norfolk) up to 50 gliders and 8 tug ac. Gliders will normally operate below the inversion level or between the tops of any cumulus clouds and 500ft agl. After launching most participants may be concentrated in the airspace around and just downwind of the launch site or on the first leg of the cross-country route. Information on routes for the day and likely take-off times was available from Glider Contest Control on a dedicated telephone number.

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 gliding advisor informed Members that with the good weather conditions on the day, there was always a high possibility of glider activity which was compounded by the NOTAM'd competition involving large numbers of gliders following a similar route. Members noted that the wording used in the ACN and NOTAM "...including cross-country routes within 5nm radius..." was inaccurate, which was felt to be misleading to pilots and inadequate to ensure safety. This was considered to be a contributory factor to this incident. A second contributory factor was that the C150 pilot had telephoned the promulgated Glider Contest Control number, to obtain further information on cross-country routes, but, for whatever reason, there had been no answer. The C150 pilot was cognisant that the area around Tibenham would be very active but, without up to date knowledge of the cross-country routes, he was taken by surprise when he came into conflict with multiple gliders close to Thetford, well SW of the glider site. This had caused the Airprox.

The Board was advised that the ATSU at Lakenheath was also unaware of the glider cross-country route nor were the gliders showing on radar. The controller was thus unable to provide the C150 pilot with accurate and timely TI. Members noted that steps had been taken to ensure that better coordination takes place between the Lakenheath ATSU and the Gliding Competition Director in the future. With no reports from the glider pilots, it was not known which if any of them saw the C150 nor whether the gliders were in fact manoeuvred to avoid it. The Board was advised that competition gliders of this class are faster than C150 ac and can accelerate very quickly. The C150 pilot had noticed the first glider about 100m away, turned R to avoid it whilst he watched it pass to his L, slightly above but descending. Members concurred with the C150 pilot's comments with respect to target aspect/profile presented by a glider head-on and their colour/contrast against the cloud background which makes early visual acquisition very difficult.

The C150 pilot then, over a very short period, manoeuvred his ac to avoid multiple gliders flying in the opposite direction, none of which appeared to him to be attempting to avoid his ac. Two Members thought that the C150 pilot's actions had been effective in removing the actual collision risk but that the ac's safety had not been assured: this would correspond to a risk rating of 'B'. This view was not shared by the majority. Although the C150 pilot had undoubtedly threaded his way through the stream of gliders, the very late sightings had left him with few options. Despite the avoiding action taken, he had passed in very close proximity to the gliders that he had seen. The Board agreed with the C150 pilot's comments that in manoeuvring to miss the gliders as they were spotted, almost head on, other gliders may have passed undetected, and that during this encounter an actual risk of collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR with multiple gliders.

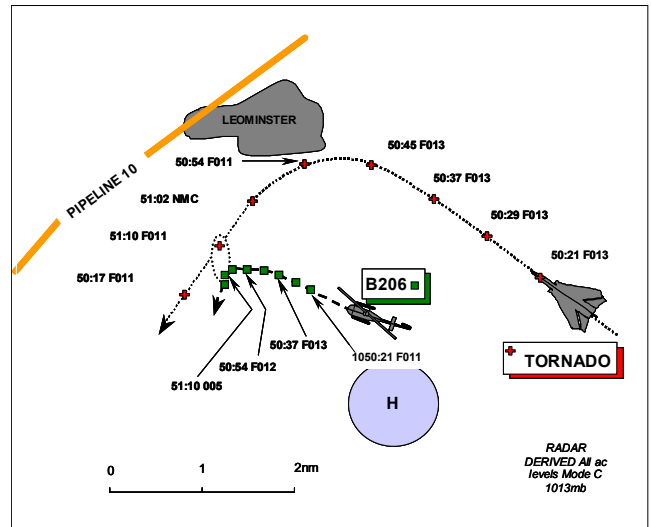
Degree of Risk: A.

Contributory Factors:

1. The ACN and NOTAM wording was not adequate to ensure safety.
 2. The Gliding Contest Control contact telephone was not manned.
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AIRPROX REPORT NO 117/04

Date/Time: 30 Jun 1050
Position: 5213N 00247W (nr Leominster)
Airspace: UKDLFS LFA7 (Class: G)
Reporting Ac Reported Ac
Type: B206 Tornado GR4
Operator: Civ Com HQ STC
Alt/FL: 500ft 7-800ft
 (QNH 1002) (RPS)
Weather VMC RAIN VMC RAIN
Visibility: 8km 10km
Reported Separation:
 300ft V 100ft H NR
Recorded Separation:
 600ft V 650m H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE B206 PILOT reports flying a black and silver ac with HISLs and nav lights selected on squawking 7000 with Mode C in receipt of an FIS from Shobdon, on a pipeline inspection in an area notified under the PINS system. He was heading 275° at 100kt and 500ft agl in reduced visibility (estimated 5km) in a rain shower when he received several non-audio TCAS indications from the area of Shobdon followed an audio TCAS warning. He then saw a Tornado in his 5 o'clock position at the same altitude in a level left turn towards his ac. He initiated a rapid descent to his left and the Tornado passed overhead and slightly to his starboard side. He assessed the risk of collision as being high.

THE TORNADO GR4 PILOT reports flying as the 'bounce' to a formation of 2 other Tornados in LFA7 with HISLs and nav lights selected on squawking 7001 with Mode C listening out on the LFS common frequency. He was at about 7-800 ft on the regional QNH heading SW at 420kt and was approximately 4min ahead of the other pair with his initial track line taking them to the N of Ludlow. However the weather N of Leominster was unfit for low flying so he routed to the SW of Leominster in the area where he understood that the Airprox was believed to have taken place, but he did not see any other ac. The whole of Wales was area notified as active under the PINS system for the day of the occurrence: however, only individual PINS [pipelines] 8, 9 and 11 were NOTAMed. Pin 10 was not specifically NOTAMed active (NOTAM ref 30 Jun 04 Y1695) but that was where the alleged Airprox took place.

THE TORNADO STATION comments that the crew of the Tornado crew were conducting a correctly planned, briefed and authorised sortie. The SFSO subsequently spoke with the Navigator (the pilot was on leave) who reported that they were ahead of the main formation and were re-routing because the weather was unfit for low flying on their planned route. They were flying at approximately 7-800ft, which is above their normal operating altitude and makes sighting of other ac at low level more difficult. Although this was the top of the recommended height band for helicopters, PIN 10 was not individually NOTAMed. Neither crewmember saw another ac and unfortunately the Head-Up Display camera was inoperative. The crew provided the pertinent segment of map printed from the Mission Planning System, with the track deviation marked. The Station declined to comment on the PINs issue apart from pointing out that notifying an area the size of Wales as being subject to pipeline inspection with the expectation that this will aid deconfliction is totally ill-advised. The ac was in Class G airspace, with the crew maintaining a good look out and working hard to enable the formation to achieve their training objectives.

AIRPROX REPORT No 117/04

UKAB Note (1): At the time of the incident the following PINS were active for the S of England:

Areas D1, E1, 2, 3, 8, 9, 10 and 11; F1, 2, 3 and 4; G1, 2 and 3 and J2, 3 and 4 (a triangle from Barnstaple, Scunthorpe, Llandudno, Barnstaple) and Pipelines 8, 9 and 11 (all well to the E of the Area). The Airprox occurred in Area F3.

UKAB Note (2): Both ac can be seen on the Clee Hill radar recording throughout the incident which occurs 1½ nm S of Leominster. On the sweep 8sec prior to the CPA, the B206 can be seen commencing a hard avoiding turn to the left away from the Tornado and descending from FL012 to FL005. The ac were separated by ~650m and 600ft as they passed.

HQ STC comments that this Airprox demonstrates once again the limitations of PINS. However, it is hoped that an improved system will be instigated following the work of the PINS Working Group.

Of more worry is why the Tornado crew did not see the Jet Ranger. It is believed that several factors conspired against the Tornado crew in detecting the helicopter:

- a. The small size of the Jet Ranger.
- b. The colour of the Jet Ranger (Silver Grey with a Black underside) against a grey background.
- c. The poor weather (rain showers) that the Jet Ranger admitted to flying in (albeit within the legal weather minima for helicopters).
- d. The absence of a CWS fitted to the Tornado GR4.

Furthermore, the Tornado crew's decision to route around the reported bad weather was a good one but had unwittingly reduced his chance of detecting the helicopter from 'popping' out of poor weather close to their flight path. It is pleasing to see that the Jet Ranger's CWS had provided a warning for them to look and to take appropriate action to avoid a collision.

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 Tornado operating authority.

Director UKAB gave the Board a brief overview of the recent meeting of the PINS Working Group. On behalf of the helicopter expert Member who was unable to attend this Board meeting, the Director also made a short verbal report on this specific Airprox, in particular querying why the Tornado was flying above the height normally associated with fast jet activity.

The Board considered this incident to be an excellent example of how an ACAS warning, followed by appropriate avoiding action, can prevent ac operating independently in the FIR/LFS coming into close proximity with one another. Members also considered it a good example of the ineffectiveness of the current PIN system. The company conducting the pipeline inspection(s) had correctly advised their activity which was notified (under PINS), promulgated, received and briefed by the Tornado crew. However, the area notified on that occasion, being about half of England, did not realistically provide the Tornado crew with useful information as to the whereabouts of any helicopter(s).

Having said that, both pilots had a responsibility to see and avoid each other; the B206 pilot did (greatly assisted by ACAS) and the Tornado pilot did not, suggesting that there may have been a conspicuity issue. The Tornado crew would not have been helped by the lack of contrast between the apparently grey ac in the grey weather and dark background of the showery conditions. The tail on aspect of a Jet

Ranger is not much more than 1sq m and it is possible that the tail boom may have obscured its HISL. Further, the helicopter was below them and descending. Members thought that a combination of these factors may have prevented the Tornado crew from detecting the Jet Ranger and also taking avoiding action.

Since the recorded miss-distance as the ac passed, following the B206 pilot's early detection and effective avoiding manoeuvre, was 600ft vertically and 650m horizontally, the Board concluded that there had been no risk of the ac colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the B206 pilot following an ACAS warning.

Degree of Risk: C.

AIRPROX REPORT No 118/04

AIRPROX REPORT NO 118/04

Date/Time: 23 Jun 0824

Position: 5138N 00020E (8nm ESE LAM)

Airspace: LTMA (Class: A)

Reporting Ac Reported Ac

Type: B737-500(A) B737-500(B)

Operator: CAT CAT

Alt/FL: FL94↓ FL81↑

Weather IMC KLWD IMC KLWD

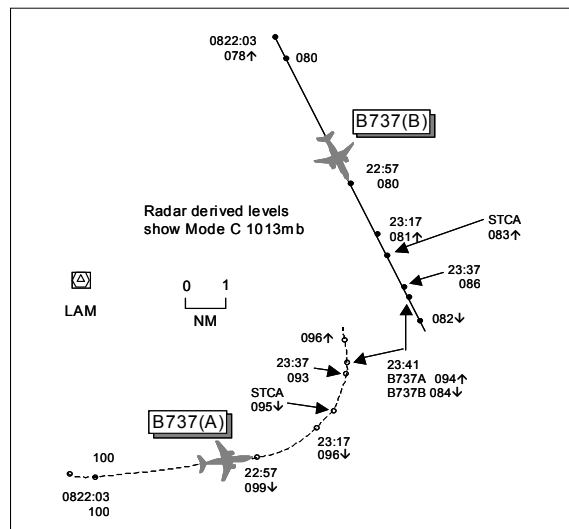
Visibility: NR NR

Reported Separation:

1.5nm H NR

Recorded Separation:

700ft V 2.8nm H or 1000ft V 2.2nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737(A) PILOT reports turning from the outbound onto the inbound leg of the LAM hold at 210kt. Approaching FL94 in a descent in cloud, TCAS gave a TA alert followed by an RA 'climb', which was followed, levelling at FL98 as traffic was seen on TCAS to pass 1.5nm away. He did not assess the risk.

THE B737(B) PILOT reports outbound from Stansted in cloud and in receipt of an ATS from London. Climbing through FL81, he was told to stop his climb as TCAS gave a TA alert followed by an RA 'descend'. He followed the instructions, only seeing the other ac on his TCAS display. He was unable to recall the exact geometry and distances involved.

THE TC NE DEPS CONTROLLER reports having just taken over the sector and decided to try and obtain a higher level for a Luton departure routing to Dover, AC3. He rang LACC Dover Sector and coordinated climb to FL210 and then climbed AC3 to FL110, prior to further coordination with TC LAM. He then noticed B737(B) just to the E of LAM VOR at FL81. As he told B737(B) crew to maintain FL80, he realised that he had confused the c/ss of both flights. He instructed B737(B) crew to maintain FL80 and that this was 'avoiding action' and then he looked to see where FL90 LAM holding traffic was. It was seen as B737(A) to the S of B737(B) by 5nm turning L so he told the crew to turn L onto 120° and considered that it was not necessary to give further 'avoiding action' phraseology. He was unsure when he confused the c/ss.

ATSI reports that the controller, who had only taken over the TC NE DEPS sector some 5min earlier, described his workload as light at the time of the Airprox. The TC NE Sector was split into NE DEPS and LAM.

When he took over the sector, B737(B), which was following a Dover 7R SID from RW23 at Stansted, had been cleared to climb to FL80. This clearance was in accordance with agreed procedures whereby ac route beneath the LAM hold at the minimum stack level (MSL). Also on frequency was another ac, AC3, which had departed from Luton and had also been cleared to climb to FL80 on a SID routing via Dover. On taking over the sector, the first transmission the oncoming SC made (0822:00) was to instruct AC3 to fly a heading of 090°. His plan was to route the flight N of the LAM holding area and to coordinate a climb to a level above the stack (holding up to FL150 at the time). Accordingly, he telephoned the LACC Sector 15 (Dover) to request a higher level for AC3 and was given FL210. This co-ordinated level was then written, in error, on B737(B)'s fps by the SC.

With the intention of instructing AC3 to climb, initially to FL110 to remain below TC Capital's airspace, the SC started to transmit to the pilot. However, as he started to transmit he noticed that the coordinated climb was annotated on B737(B)'s fps and, consequently, he readdressed the instruction to that ac: *"AC3 c/s prefix sorry B737(B) c/s climb flight level one one zero"*. The radar timed at 0822:53, as the above climb clearance was being issued, shows B737(B) at FL80 heading SE, 6.4nm ENE of LAM, in potential conflict with holding traffic. AC3, at FL79, is approximately 22nm WNW of the same VOR, well clear of the stack. The SC confirmed that he did not look at the radar display when issuing the climb clearance.

Meanwhile, B737(A) was holding at LAM, under the control of Heathrow Approach North. At 0822, it was cleared to descend from FL100 to FL90. The Support Controller reported that he was alerted to the potential conflict between the subject ac when STCA activated. He instructed B737(A) to tighten its turn, at which time the pilot reported a TCAS climb. Co-incidentally, the NE DEPS SC, noticing that B737(B) was at FL81, had routinely instructed the pilot to maintain FL80, not realising that the ac was in the process of climbing through that level. He said that it was only as he issued this instruction that he noticed that the ac was still climbing. Consequently, in the same transmission, he added *"it's avoiding action descend to maintain flight level eight zero"*. He explained that, whilst issuing the avoiding action he was looking for conflicting traffic at FL90 in the LAM hold. Initially, B737(A)'s SSR label was overlapping those of other traffic, precluding him passing an avoiding action turn or appropriate TI. Shortly afterwards, spotting B737(A)'s position, he instructed B737(B) to turn left heading 120°, whereupon the pilot reported a *"TCAS notification"*. STCA did activate but only after the SC had commenced taking action to control the situation. The minimum separation was recorded (0823:37) as 2.8nm horizontal and 700ft vertical, as the subject ac passed, starboard to starboard, with B737(A) in its L turn back to LAM. Thereafter, although horizontal separation continued to reduce to 2.2nm, vertical quickly increased to 1000ft, as B737(B) descended through FL84 and B737(A) climbed through FL94. Realising that he had instructed the wrong ac to climb, the SC then addressed the climb clearance to FL110 to the correct ac, AC3.

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 could add little to the ATSI report. The NE DEPS had planned a course of action to climb AC3 but had erroneously written the agreed coordination on the fps of B737(B). He started transmitting to AC3 to execute his plan but then readdressed the call to B737(B) crew when he noticed the apparent coordinated climb on the latter's fps. ATCO Members agreed with ATSI in that he should have backed up his plan with cross-reference to his radar display which would have revealed the potential conflict. It was clear that the Airprox was caused when the TC NE DEPS SC climbed B737(B) into conflict with B737(A).

Although the SC had been unaware of his error, he had very quickly noticed B737(B) climbing through FL81. However, after instructing the flight to maintain its level, the SC then noticed it was still climbing and gave an avoiding action descent to FL80. The Heathrow Support controller was alerted to the conflict by STCA and told B737(A) crew to tighten their turn. The B737(A) crew had received a TA alert then RA 'climb' command which was followed, TCAS indicating that the other ac passed 1.5nm clear to their R. Similarly, B737(B) crew had been told to stop their climb as well as getting firstly a TCAS TA and then an RA 'descend' warning. The crew complied with the instructions. All of these elements, when combined, led the Board to conclude that any risk of collision had been quickly and effectively removed.

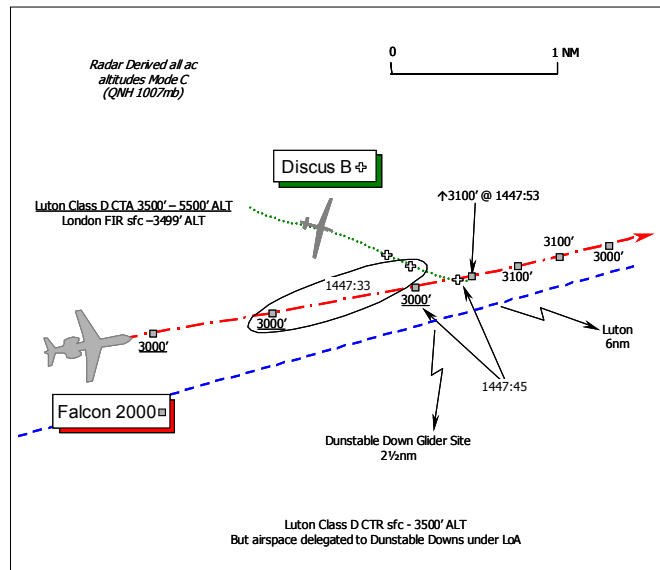
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The TC NE DEPS SC climbed B737(B) into conflict with B737(A).

Degree of Risk: C.

AIRPROX REPORT NO 119/04

Date/Time: 18 Jun 1447
Position: 5155N 00032W
 (6nm WNW of Luton - elev 526ft)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: Discus B Glider Falcon 2000
Operator: Civ Pte Civ Comm
Alt/FL: 2500ft 2500ft
 (QFE) (QNH)
Weather VMC CLBC VMC CLBC
Visibility: 20nm >10km
Reported Separation:
 200-300ft V/nil H 500ft V/nil H
Reported Separation:
 Not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE DISCUS B GLIDER PILOT reports he was thermalling at a speed of 48kt in the vicinity of Houghton Regis, about 2½nm N of Dunstable Down Glider Site after launching in his single-seat glider from Dunstable Down for a general handling flight. He was flying at 2500ft above the site elevation of 500ft amsl [equating to an altitude of about 3000ft] some 1000ft clear below cloud with an in-flight visibility of 20nm and in communication with the club on 119.9MHz. The glider has an all-white finish; no transponder is carried.

Whilst in a banked R turn he saw an executive twin-jet with rear mounted engines literally as it was passing directly overhead some 2-300ft above his circling glider, on an E'ly track. The jet had approached unseen, because of the amount of R bank applied, so no avoiding action could be taken. No other ac had been seen in the vicinity before he entered the thermalling R turn and he added that he never expected to see a commercial jet (presumably going into Luton Airport) below 3000ft (QFE) so near to the Gliding Club. If he had not been thermalling he might have had more time to spot an approaching ac, but with a head-on aspect this might have been difficult. Furthermore, the closing speed left little time for avoidance. He did not assess the risk.

THE FALCON 2000 PILOT reports his ac has a white & red colour-scheme and the HISLs were on whilst inbound to Luton from Brize Norton at 230kt and in receipt of a "Radar Approach" service from LTCC. The assigned squawk was selected with Mode C and TCAS is fitted but neither a TA nor RA was enunciated during the period of the Airprox.

Whilst eastbound about 15nm W of Luton Airport, flying at an altitude of about 2500ft, he thought, [actually 3000ft ALT] in level cruise some 3000ft below cloud, he spotted the white glider "well in time" some 3-4000m away flying in the same direction in level flight. However, he then realised it was climbing, and faster than he had expected. To avoid the glider he had to initiate a climb at a "moderate" rate, because if he had not he realised that they would be too close. The minimum vertical separation was about 500ft as they overflew the white glider and he assessed the risk as "moderate", because the glider was in sight "well before".

THE LTCC LUTON INTERMEDIATE DIRECTOR [DIR] could not recall anything of significance about the Airprox.

AIRPROX REPORT No 119/04

LTCC ATCI reports that the Falcon had been transferred to the LTCC Luton DIR on 129.55 MHz at 1442, after a handover from BRIZE RADAR. While under the control of Brize Radar the Falcon had been climbed to 5000ft ALT in accordance with its FPL, above an area of intense activity in the vicinity of Oxford. DIR specified that the Falcon be routed via WESTCOTT and descended to an altitude of 3000ft. The crew established contact with DIR descending through 3500ft, the flight was identified, placed under a RIS, the crew advised they were clear to enter CAS and instructed to leave WESTCOTT on a heading of 080°. This heading would position the ac right hand downwind for RW26 at Luton, but on a track that would take it just to the N of the Dunstable Downs Area of Intense Gliding activity.

The radar replay was reviewed using the 'Slave Mode', this replicating the radar settings and picture that were in use at the controller's radar console at the time and which on this occasion showed a number of radar contacts in the Dunstable area ahead of the projected track of the Falcon. These radar contacts had the profile of gliders but no advance warning of this activity was passed to the Falcon crew. Following identification of the Falcon, the DIR continued with other tasks which included vectoring another ac to the ILS for RW26. A police helicopter inbound to the field VFR was also in communication with DIR and there was a period of difficulty when the observed SSR code displayed by the helicopter did not match that reported by its crew. It was at the point when the helicopter crew reported crossing the M1 with the field in sight, at time 1444:31, that the radar in use by DIR was switched from the Stansted 10cm radar to the Debden 23cm radar. The helicopter's squawk problem was quickly resolved but the Debden Radar source remained selected. LTCC MATS Part 2 GEN 2.3. states that the default radar source to be used by Luton FINAL DIRECTOR and Luton INTERMEDIATE DIRECTOR is the Stansted 10cm (S10), with the Debden 23cm as the standby. It would appear that the Debden was selected to cover a short fall in low-level SSR cover of the S10 in the lee of the Chilterns. Upon switching to the Debden the radar returns previously showing in the Dunstable area on the S10 diminished significantly. Further tasks undertaken by the DIR during this period included a FIS to 2 other ac and acceptance of a release on inbound traffic. The 'Slave' radar replay showed that the controller changed the radar selection back to the S10 at 1447:34. This coincided with traffic information being passed to the Falcon crew, "[C/S] I believe there is a glider contact 12 o'clock left half a mile". The crew replied, "...yes we have him, he's passing below us". It would appear unlikely that the DIR would have had sufficient time to provide avoiding action if it had been requested by the Falcon crew. The flight then continued to an uneventful landing with nothing more being said on the RT about the Airprox.

It would appear likely that selection of the Debden radar, in lieu of the S10, deprived the Luton DIR of updated information on the glider activity, thus delaying the passing of traffic information to the Falcon crew. If the Falcon had remained at 5000ft ALT it would have entered the Class D CAS of the Luton CTA more quickly and remained above the gliding activity. However, the controller believed that 3000ft was preferable as at the higher altitude of 5000ft traffic is likely to conflict with ac through the 'gate'. The use of 4000ft was also suggested, as the base of the CTA is at 3500ft amsl. The controller considered this would create a potential conflict with OLNEY 1B SIDs which initially turn L onto the BNN R035, climbing to 5000ft ALT, followed by a R turn onto the BNN R347. The SID stipulates that OLNEY 1B departures are to be at 5000ft by BNN DME 9. This is about 2nm S of the track taken by the Falcon. In reality traffic can be expected either to be level at 5000ft or climbing to a higher level as it crosses N through the extended centreline of Luton's RW08. There is no doubt that if the Falcon had transited at a higher level it would have gained the protection of Class D CAS at an earlier stage and thus avoided the conflict with the gliding activity.

UKAB Note (1): The Heathrow 10cm radar recording shows the Falcon 2000 maintaining 3000ft QNH (1007mb) approaching the start of the downwind leg. Simultaneously, a primary contact which may or may not be the glider flown by the reporting pilot, is shown closing on a steady SE'y track and does not appear to enter a turn until after the Airprox has occurred. The glider is shown at a range of about 0.9nm at 1447:33, moments before traffic information was passed by the DIR. The glider crosses into the Falcon pilot's 12 o'clock - ¼nm at 1447:46, but the glider's radar contact is lost on the next return and is not shown again until the Falcon is well to the E. The Falcon's Mode C shows a momentary increase for three radar sweeps to 3100ft (1007mb) after the tracks have crossed. Notwithstanding the applicable

tolerances of Mode C, this may be indicative of the Falcon pilot's avoiding action climb, but only by 100ft. No deviation in the jet's course is apparent thereafter as the Falcon continues on the downwind leg for the ILS approach to RW26 at Luton.

UKAB Note (2): The UK AIP at ENR 5-5-1-1, promulgates that Dunstable Down Glider launching site is active during daylight hours for winch and aerotow launches which may attain a height of 2000ft agl, above the site elevation of 500ft amsl.

ATSI added that traffic information was passed by DIR to the Falcon crew about the glider - assuming it was the subject Discus 'B' - albeit somewhat late. As a result of this incident a TC Supplementary Instruction (SI 116/04) was issued, which included the following procedure.

"To avoid the workload and conflicts inherent in the provision of ATSOCAS (Air Traffic Services Outside Controlled Airspace), IFR aircraft which have filed a flight plan to join CAS, inbound Stansted, Luton, London City, Gatwick or Heathrow, should be afforded the protection of CAS as soon as 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, a report from the air traffic controller involved and a report from the ATSU together with comment from the ATC authority.

This Airprox occurred some 2½nm from Dunstable Down Glider site in Class G airspace close to the northern boundary of the Class D CTR. It seemed somewhat ironic to some Members that gliders operated in a portion of this CAS under a LOA with Luton when the Falcon was being vectored to the N of the CTR in the Open FIR. The BGA gliding advisor had provided written comment on this encounter and stressed that this whole area is highly active when the conditions are suitable, not just with gliding but with every type of aerial pursuit. This Airprox could just as easily have taken place anywhere along the Falcon crew's route and the promulgated parameters for winch heights around the glider site were but an indicator of gliding activity at that location. The Board understood this entirely and recognised that gliders could be encountered anywhere in Class G airspace not just in the vicinity of notified glider sites.

The Board was briefed that it was a little unclear if the contact shown on the radar recording was the subject Discus B glider. The Members were well aware of the difficulties associated with acquiring a good radar contact on this type of ac: the composite structure, size and small reflective area at some aspects are not conducive to efficient radar detection. Furthermore, the reporting Discus pilot says he was in a banked R turn which did not align with the contact shown on the radar recording. It may have been that this part of the track was just before he commenced his thermalling turns as it was explained that this contact, although fading from radar at the critical moment, did subsequently conduct a series of tight turns, which he might have just started. Radar conspicuity was clearly a relevant topic here as the LTCC report had highlighted that gliders had been showing ahead of the Falcon and had been displayed to the controller. It was unfortunate that no warning of this activity had been given at that stage to the Falcon's crew. Of the two radar sources in use by the LTCC DIR, it was the 10cm wavelength Stansted S10 that had displayed the contact subsequently reported to the Falcon crew, albeit at the close range of ½nm – but apparently it was not shown by the longer-range 23cm Debden source. A civilian ATCO Member pointed out that although the LTCC MATS Part 2 might specify that the S10 was the "Default Radar Service" this did not imply that a controller must use that radar head all the time. Indeed the controller Member explained that the LTCC MATS Part 2, at GEN 2.3 states that "*The radar service(s) selected for use should normally be the most appropriate geographically sited, subject to satisfactory performance. Nevertheless, with the exception of Surveillance Radar Approaches, all Terminal Control functions may be provided by alternative Terminal Control radar services within*

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coverage and separation limits". Thus the key point here was that the radar head selected should be the most suitable for the task at hand and the Member contended that this was what the DIR had done whilst working the helicopter. It was just an unfortunate coincidence that the Debden had been selected about 3min before the Airprox and had not displayed the glider. However, other Members noted that as soon as DIR switched back to the 10cm source, at about 1147:34, traffic information was given, some 10sec before the Falcon overflew the glider. This was apparently after the Falcon crew had already seen the glider, from a range of about 3-4000m. It was this sighting that crucially enabled the crew to climb above the Discus B. Although the Falcon pilot had reported a separation of 500ft, the radar recording only showed a 100ft climb for a short period, albeit less than the glider pilot had reported himself, but given the applicable tolerances of Mode C data this was not surprising. Comment had been made about entering the Falcon into CAS earlier, possibly by routeing the jet at higher altitudes. However, a civilian controller Member intimately familiar with this airspace opined that any traffic entering CAS below 5000ft would conflict with SID profiles. In general the lower the inbound altitude, the more quickly departing traffic will clear through it and he explained that jet crews will be requesting the lowest practicable levels in order to make a gradual descent onto the ILS procedure.

From the glider pilot's perspective there was nothing he could do as he only saw the jet directly above his ac as the Falcon overflew his circling glider – which the GA Member viewed as a very late sighting indeed. The jet was there to be seen and should have been readily apparent from some way off, but the gliding advisor had opined that although the Falcon was operating below 250kt it was still too fast in an area of high-density gliding. Other Members contended that it was not unreasonable and such speeds such as the Falcon's 230kt here are the norm for jets when marshalling in instrument patterns. Even so, the alert Falcon crew had seen the glider – possibly a glint from the wing as the glider had turned might have helped here – and avoided it in reasonable time. This led the Board to conclude, unanimously, that this Airprox had resulted from a conflict in Class G airspace resolved by the Falcon crew, whose prompt sighting and avoiding action climb had removed the risk of a collision in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the Falcon 2000 crew.

Degree of Risk: C.
