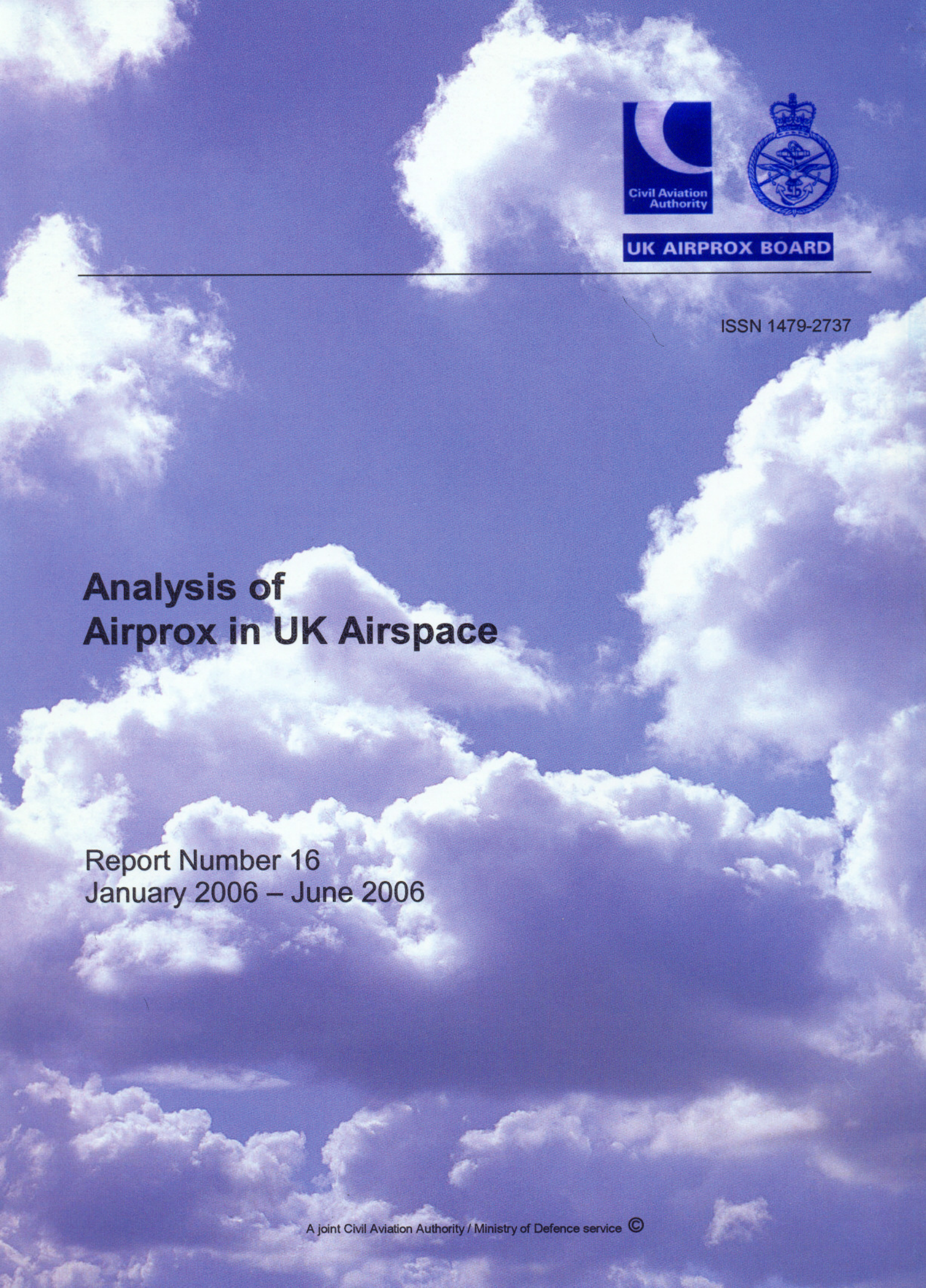

UK AIRPROX BOARD

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Analysis of Airprox in UK Airspace

Report Number 16
January 2006 – June 2006

Sixteenth Report by the UK Airprox Board:

‘Analysis of Airprox in UK Airspace’

(January 2006 to June 2006)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

The primary purpose of this, the sixteenth Report from the UK Airprox Board (UKAB), is to promote air safety awareness and understanding of Airprox. "Book 16" covers the first six months of 2006 in detail, containing findings on the 79 Airprox which were reported as occurring within UK airspace in that period and which were fully investigated and assessed by the Airprox Board.

The count of 79 incidents during the first six months of 2006 is 17 fewer than the average of comparable figures in each of the previous five years. The Table below shows the details. The reader is invited to note that the figure of 79 is the lowest total in the dataset. Also at their lowest values are the figures for Risk A and Risk B occurrences in the first six months of 2006, at four and 21 respectively. These facts need to be kept in mind when reviewing other data, especially percentages, in this Report.

Risk Category	2001	2002	2003	2004	2005	2006
A	16	7	6	8	13	4
B	23	27	29	30	26	21
C	57	56	49	66	53	54
D	5	2	1	5	0	0
Totals:	101	92	85	109	92	79

Although this Report is primarily concerned with aircraft operations across a wide spectrum of aerial activities, it is understandable that people generally are interested in the safety of commercial air transport (CAT). Of the four Risk Category A events in the first half of 2006, none involved a CAT aircraft. Of the 21 Risk Category B events, five involved at least one CAT aircraft. Whilst the number of Airprox in Risk Category B where at least one aircraft was military is in line with the five-year average, the corresponding number in Risk Category A is two compared with an average of six.

Readers of "Book 14" may recall my reference to the three things which, without proper forethought, are of little use in safety terms to pilots. These are: fuel in the bowser; runway behind you and airspace above you. On the basis of experience at UKAB, I would add "transponder on standby" to the list. During 2007, UKAB will continue to communicate this message.

Tribute is again paid to those who report their Airprox experiences honestly and openly. The Board and Secretariat respect people's feelings, disidentifying reports and focussing on the available facts of an incident to arrive at fair, impartial conclusions on cause and risk. If the collective effort of reporters, investigators and the Board helps to make flying safer, then all involved will have felt their efforts worthwhile.

Peter Hunt

Director, UKAB

CONTENTS

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. The UKAB itself is comprised of two sections: a Board comprised of civilian and military Members the work of which is supported by the second section, a small Secretariat. The Board is chaired and the Secretariat is led by the Director UKAB who reports directly to the Chairman CAA and the 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 Area Control, Terminal Control and Airfield Control, military and civil;
- Commercial Air Transport (CAT) flying, both fixed and rotary wing;
- General Aviation (GA) flying, including gliders; 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 analysing the main causal factor(s);
- Assess the risk levels involved;
- Make Safety Recommendations where appropriate to reduce the risk of incident recurrence; and
- Publish and distribute full reports, identifying lessons.

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.

AIRPROX DEFINITION

An Airprox is a situation in which, in the opinion of a pilot or controller, the distance between aircraft as well as their relative positions and speed was such that the safety of the aircraft involved was or may have been compromised.

THE UKAB DATA SET

The UKAB Airprox database comprises a set of records each of which relates 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 the set of records is then possible to produce information such as is published in this Report.

Note:

Prior to "Book 13", certain Tables included figures for 'Unknown' aircraft. Subsequently, numbers of 'Unknown' aircraft are added to 'Untraced' aircraft and weather balloons to produce a new category, 'Other'. All figures in the relevant Tables have been adjusted accordingly, including those for prior years.

PUBLICATION OF REPORTS

A key UKAB objective is to communicate effectively the lessons identified from Airprox events. Bi-annual 'hardcopy' Reports continue to be the primary means of communication, supported by presentations at flight safety meetings, cd-roms and the internet. The UKAB internet website is updated at least every month. The latest statistics are added, for example, as are details of the most recent set of Reports assessed by the Board.

The UKAB website address is www.airproxboard.org.uk

THIS REPORT

On pages 6 to 10, this Report follows established practice by giving a broad overview on general trends and then examines in more detail some specific results for each of the three principal airspace user groups, Commercial Air Transport (CAT); General Aviation (GA) and Military.

Some events, reported as Airprox and therefore assigned a reference number by the Secretariat, are subsequently withdrawn and are thus not subject to full investigation and assessment by the Board. Please note that only the reporter can withdraw an Airprox.

HALF-YEAR COMPARISONS 2005 AND 2006

A total of 79 Airprox were reported and opened for full investigation in the period 1 January to 30 June 2006. Tables 1 and 2 below give month-by-month data for the main three airspace user groups. The figures in the columns headed 'Totals' are shown in pie-chart format in Figures 1 and 2 from which it can be seen that the proportion of Airprox where civil aircraft met civil aircraft (Civ~Civ) is higher, year on year, with a commensurate drop in the category Civ~Mil. The figure for military encounters with other military aircraft (Mil~Mil) has dropped to 5% against 7% in 2005 whereas for Civ~Mil the proportion is down from 43% to 37%. Care needs to be taken when drawing conclusions because the corresponding total number of Airprox is down from 92 to 79, a fall of 14%.

User Group Mix: January - June 2005

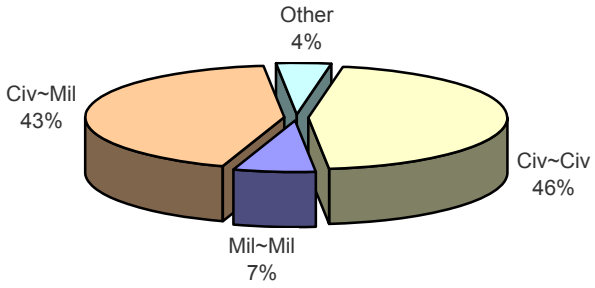


Figure 1

User Group Mix: January - June 2006

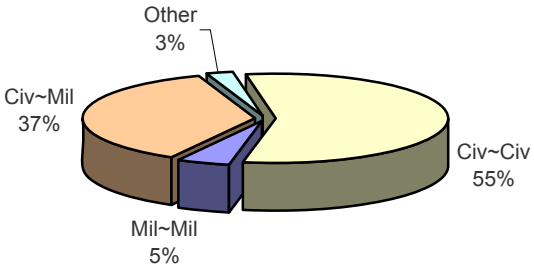


Figure 2

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	2	0	1	1	0	2	6
Civ~Mil	8	6	7	8	5	6	40
Civ~Civ	2	2	10	8	10	10	42
Other	0	0	0	0	2	2	4
Totals	12	8	18	17	17	20	92

Table 1

2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	1	1	1	0	0	1	4
Civ~Mil	3	7	7	2	3	7	29
Civ~Civ	7	4	2	11	6	14	44
Other	0	0	0	0	0	2	2
Totals	11	12	10	13	9	24	79

Table 2

The totals in Tables 1 and 2 can be broken out as in Tables 3 and 4 below, these showing in more detail how the various user groups interacted during the first six months of 2006 (Table 4) with data for the same period in 2005 for comparison (Table 3). Virtually all figures are down, year on year, except for CAT~CAT and CAT~GA. The numbers in these two categories need to be read in conjunction with the figures given later in this Report from which it will be seen that the CAT and GA Risk profiles for Jan~Jun 2006 are essentially unchanged year-on-year except that there has been a significant fall in the number of GA Risk Category A events.

Mix details for 2005 (Jan-Jun):	
CAT~CAT	6
CAT~GA	13
GA~GA	23
CAT~Mil	20
GA~Mil	20
Mil~Mil	6
CAT~Unknown	1
GA~Unknown	1
Mil~Unknown	2
	92

Table 3

Mix details for 2006 (Jan-Jun):	
CAT~CAT	11
CAT~GA	19
GA~GA	14
CAT~Mil	12
GA~Mil	17
Mil~Mil	4
CAT~Unknown	1
GA~Unknown	0
Mil~Unknown	1
	79

Table 4

AIRSPACE IN WHICH THE CONFLICTIONS TOOK PLACE - JANUARY TO JUNE 2006

Figure 3 (below) shows the various classes of airspace in which Airprox events occurred in the first six months of 2006. When comparing Jan-Jun 2006 with the same period in 2005, the number of incidents in Class G airspace, the 'Open FIR', in the altitude band from ground level to 3,000ft has dropped slightly from 28 to 24. In percentage terms this change matches the drop in the total number of Airprox in the two six-month periods. However, the overall percentage of Airprox occurring in Classes F and G is down on previous years, being (2006) 65% as against (2005 and 2004) 75% of the total. That this is so may well be connected with the reduction in GA and military Airprox numbers, these two groups making significant use of Classes F and G airspace.

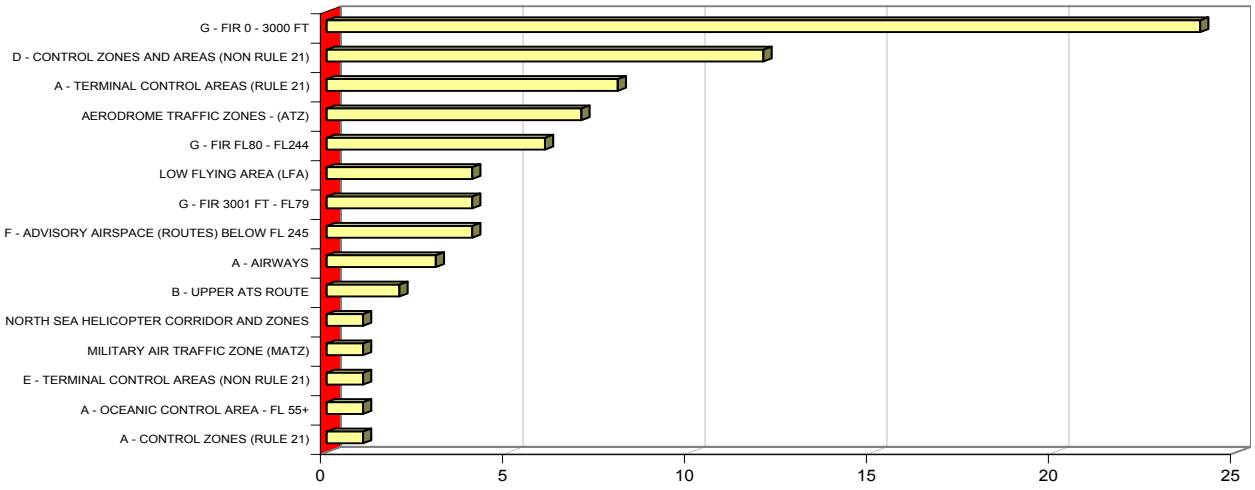


Figure 3

The UKAB Report of a year ago drew attention to a decrease from 17 to seven Airprox events occurring inside Terminal Control Areas (Rule 21). The comparable figure in 2006 was eight which is pleasing. Balanced against this decrease is a steady increase in the number of Airprox occurring in Class D airspace which now ranks as second in the above figure: 12 Airprox in 2006, from nine in Jan~Jun 2005 and four in Jan~Jun 2004. In the absence of 'utilisation' data, it is not possible accurately to ascertain the reasons for this change. Lessons identified from Airprox occurring in Class D airspace are regularly repeated and publicised for the benefit of all.

COMMERCIAL AIR TRANSPORT (CAT) SECTION

Risk results for Airprox involving at least one CAT aircraft are plotted by month in Figures 4 and 5 overleaf using the data in Tables 5 and 6 below. As mentioned above, the CAT Risk profile for Jan~Jun 2006 is substantially the same as for 2005: of the 43 Airprox in 2006 just over 88% were Risk Category C, the same percentage as in 2005. There were no Risk Category A events involving CAT aircraft in Jan~Jun 2006.

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	1	0	0	0	0	0	1
Risk B	1	0	2	0	1	0	4
Risk C	4	5	7	7	8	4	35
Risk D	0	0	0	0	0	0	0
Totals	6	5	9	7	9	4	40

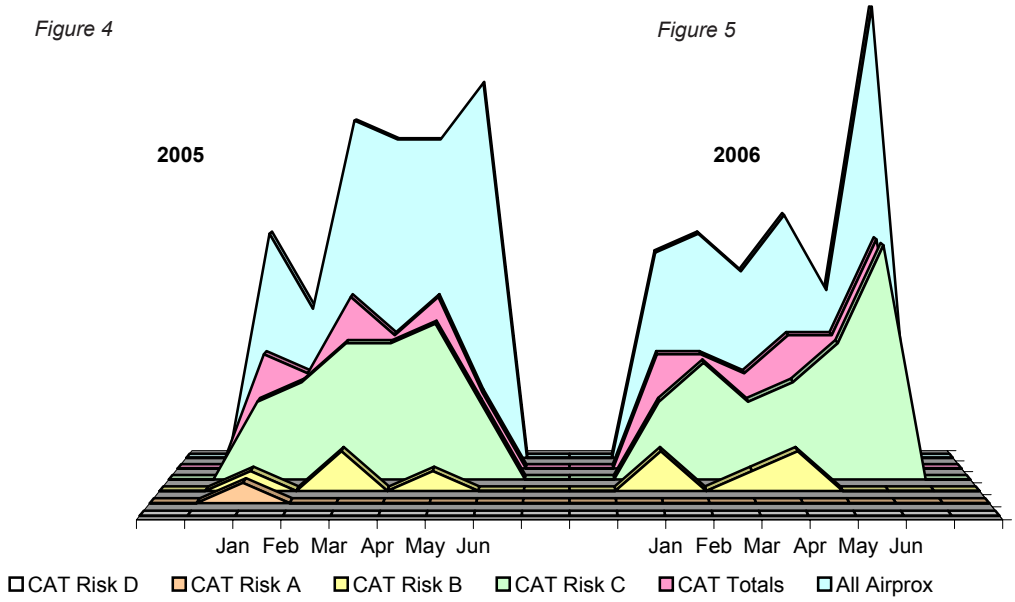
Table 5

2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	2	0	1	2	0	0	5
Risk C	4	6	4	5	7	12	38
Risk D	0	0	0	0	0	0	0
Totals	6	6	5	7	7	12	43

Table 6

CAT Involvement in Airprox: January - June in 2005 and 2006

Figure 4 *Figure 5*



In terms of **causal factors**, 76 were assigned to the 43 'at least one CAT aircraft' Airprox with those that feature most prominently being listed in Table 7 below. It is interesting to note that 'Penetration of CAS/SRZ/ATZ without clearance' features more prominently than hitherto which may link with the increase in Airprox in Class D airspace.

Ser.	Cause	Totals	Attributed to
1	DID NOT SEPARATE/POOR JUDGEMENT	8	CONTROLLER
2	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	7	PILOT
3	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	6	PILOT
4	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	4	PILOT
5	DID NOT ADHERE TO PRESCRIBED PROCEDURES	4	PILOT
6	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	4	PILOT
7	TCAS TRIGGERED BY CAS TRAFFIC	3	AIRBORNE SYSTEMS

Table 7

As mentioned in the Foreword, it is understandable that there is general interest in Airprox involving CAT aircraft. There being no Risk category A events during the first six months of year 2006 in which at least one aircraft was CAT, a brief review of the five Risk category B Airprox is appropriate here. Firstly, there is no geographical link between the five events: one occurred in Scotland; one in the Midlands and three in the Southern part of the UK. Four of the five events occurred in controlled airspace which is, of course, where the major part of CAT flight operations takes place. One event involved three aircraft. Seven of the total of 11 aircraft involved in the five Airprox were CAT, the other four being three GA and one military. In two of the events, the crew of one aircraft did not fully comply with ATC instructions (per Ser.2 in Table 7) and in another two Airprox the (single) pilot in each of two GA aircraft entered controlled airspace without clearance from ATC (per Ser.3 in Table 7), then coming into confliction with a CAT aeroplane. Over and above publication by the UKAB, such events as the latter two are given wide publicity within the GA community so that all might benefit.

GENERAL AVIATION (GA) SECTION

Risk data for GA Airprox are given below: Tables 8 and 9 show the 'raw data' from which the charts in Figures 6 and 7 are constructed. The proportion of risk bearing events is down, by almost 10%, and as noted earlier there has been a significant decrease in the number of Risk category A Airprox involving at least one GA aircraft, from 10 to three.

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	2	0	1	1	3	3	10
Risk B	1	2	3	6	2	6	20
Risk C	2	2	6	5	6	6	27
Risk D	0	0	0	0	0	0	0
Totals	5	4	10	12	11	15	**57**

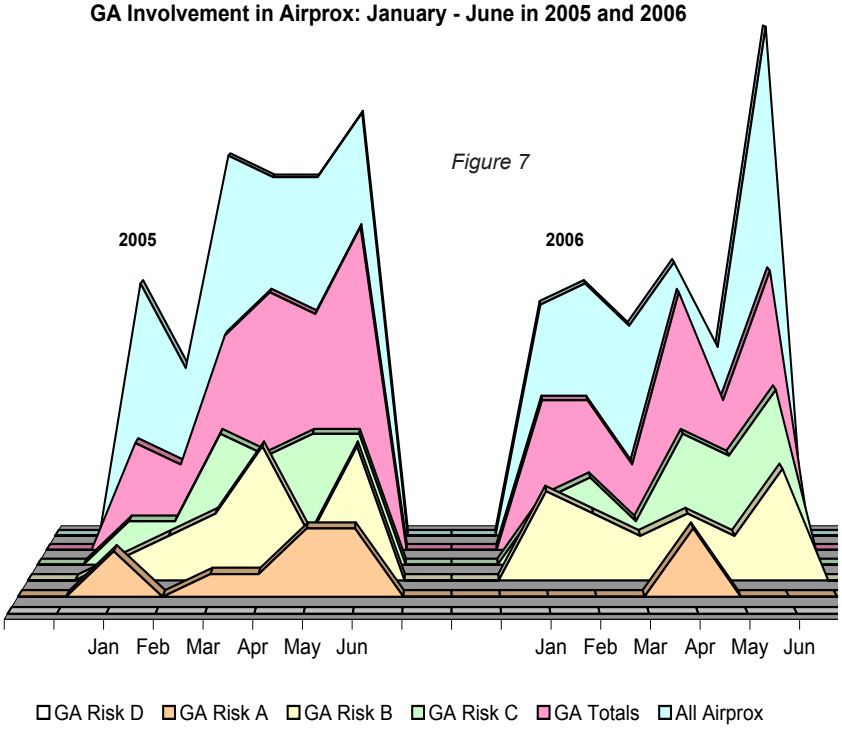
Table 8

2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	3	0	0	3
Risk B	4	3	2	3	2	5	19
Risk C	3	4	2	6	5	8	28
Risk D	0	0	0	0	0	0	0
Totals	7	7	4	12	7	13	**50**

Table 9

Figure 6

Figure 7



The 50 'GA' Airprox events in 2006 gave rise to 84 **causal factors** (any one Airprox event can have more than one causal factor), the most frequently assigned being as in Table 10 below. The total number of times that each of the six Causes, listed in the Table, were assigned accounts for more than half of the total (of 84). Sighting issues usually head the list, given that most GA Airprox occur in 'see and avoid' airspace, so it is no surprise that almost one third of the causal factors assigned to GA Airprox involves the pilot(s) of one aircraft not seeing the other aircraft or seeing it late. The importance of good lookout is routinely taught and emphasised to all who fly in 'see and avoid' airspace and UKAB plays its part in disseminating this message.

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	18
2	LATE SIGHTING OF CONFLICTING TRAFFIC	9
3	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	5
4	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	5
5	FAILURE TO ADHERE TO PRESCRIBED PROCEDURES	5
6	FAILURE TO PASS OR LATE PASSING OF TRAFFIC INFO	5

Table 10

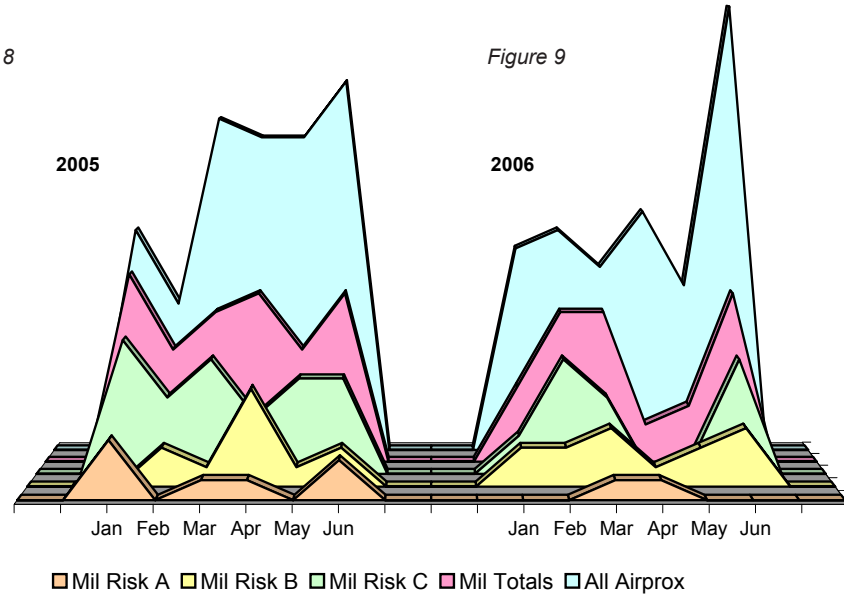
MILITARY SECTION

Risk data for those Airprox involving at least one military aircraft and which occurred in the first six months of 2005 and 2006 respectively are plotted in Figures 8 and 9. The underlying figures are given in Tables 11 and 12.

Military Involvement in Airprox: January - June in 2005 and 2006

Figure 8

Figure 9



As can be seen, the total number of Airprox in this set is down by almost 30% with a commensurate decrease in the number of Risk category C events. It may be that military flying hours within UK airspace are at a lower level than hitherto: this will be best assessed at year-end when appropriate statistics become available. The proportion of **risk bearing** events has increased - 37% (2005) to 44% (2006) but the proportion of Risk A occurrences is significantly lower, 6% vs 14% (2005). This is to be welcomed. As regards the main **causal factors** in 'military' Airprox, shown in Table 13, sighting issues continue to predominate. It is pleasing to note that much attention continues to be given to the fitment of collision warning systems to military aircraft, the Tucano fleet being the latest to benefit.

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	3	0	1	1	0	2	7
Risk B	0	2	1	5	1	2	11
Risk C	7	4	6	3	5	5	30
Risk D	0	0	0	0	0	0	0
Totals	10	6	8	9	6	9	48

Table 11

2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	1	0	0	2
Risk B	2	2	3	1	2	3	13
Risk C	2	6	4	0	1	6	19
Risk D	0	0	0	0	0	0	0
Totals	4	8	8	2	3	9	**34**

Table 12

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	14
2	LATE SIGHTING OF CONFLICTING TRAFFIC	7
3	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	7
4	FAILURE TO PASS OR LATE PASSING OF TRAFFIC INFO	4
5	TCAS TRIGGERED BY CAS TRAFFIC	2

Table 13

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 that follows updates actions being taken in response to those Safety Recommendations published in the last UKAB Report Book. Also listed are Safety Recommendations made more recently together with Responses where available. Updates will continue to be published, on the internet and in these Reports, until action is complete as indicated by 'CLOSED' in the 'STATUS' sections below.

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.

UPDATE AT DEC 2006: The CAA and MOD initial review was completed on schedule. The CAA, NATS and MOD are working towards the implementation of a maximum rate of climb and descent restriction in UK Controlled Airspace (Classes A to E) of 8,000fpm. The conditions and areas where this restriction can be lifted to permit essential military training are being finalised, prior to implementation, at a series of planned meetings between the key stakeholders.

STATUS - ACCEPTED – OPEN

059/04 28 Apr 04 involving an Embraer 145 and a Tornado F3 Risk B

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 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.

The CAA accepts this Recommendation. The CAA, MOD and RAF Strike Command will review jointly the coordination process and terminology used by Military and Air Defence Controllers and Civil Air Traffic Controllers when effecting coordination with other military and/or civilian ATSUs. The CAA will seek to standardise civil procedures and terminology where practicable, and will disseminate any improvements to the coordination process via a MATS Part 1 supplementary instruction and amendments, truce training, and the regular ATSU/ATSSD audit processes throughout 2005.

UPDATE AT JAN 2006: The work planned for 2005 has been progressed. CAA and MOD representatives continue to discuss issues within the Working Group where any new issues are considered; consequently, enhanced civil-military co-ordination procedures will be evaluated within the Scottish Centre later this year.

UPDATE AT MAY 2006: The results of the trial of enhanced civil-military co-ordination procedures at the Scottish Centre have still to be evaluated fully but the initial findings are encouraging. The trial is being extended whilst this work is completed.

UPDATE AT DEC 2006: Following the successful civil/military coordination trial that took place at the Scottish Centre, the process has moved on to aligning the corresponding regulations. The military element of this process needs to be considered as a formal amendment proposal for Joint Service Publication (JSP) 552. Responses to that formal amendment proposal are required by 8 December 2006 to allow sufficient time for a final version to be circulated for inclusion within a planned amendment to Change 4 of JSP552, in March 2007.

The civil element of this process requires the CAA-led ATC Procedures Working Group (CAPWG) to facilitate the incorporation of the agreed enhanced procedures into the Manual of Air Traffic Services Part 1 (MATS Pt 1). The next meeting of the CAPWG is on 17 January 2007 and will be attended by the military staff officer with responsibility for the JSP 552 procedures. The next available date in the MATS Pt 1 amendment cycle is end July 2007; therefore, the CAA intends to promulgate the revised procedures via an ATSIN ahead of the formal amendment. The ATSIN will be released to coincide with the date of Change 4 to the military JSP 552.

Meanwhile, the enhanced civil-military procedures continue to be used at the Scottish Centre and are being adopted for use between RAF Leeming and Durham Tees Valley Airport under a local Letter of Agreement as part of the response to Safety Recommendation 118/05.

STATUS – ACCEPTED – OPEN

118/05 11 JULY 05 involving a PA28-180 and a Harrier T10 Risk C

RECOMMENDATION: The CAA and MoD should ensure that the airspace sharing arrangements specified in the LoA between RAF Leeming & Durham Tees Valley Airport accord fully with the stipulated requirements for the provision of an ATS to flights in Class D CAS.

ACTION: The CAA and MoD accept this Recommendation. A joint CAA SRG/MoD audit of the interface between RAF Leeming and Durham Tees Valley Airport was conducted, in part as a result of this incident, and a report produced in October 2005. The Report identified weaknesses in the arrangements in place at that time that allowed access by traffic under the control of RAF Leeming to Durham Tees Valley Airport Class D airspace. In particular, the Report noted that "…t*he units should detail in the LoA exactly how this airspace sharing will be managed locally and clarify the provision of service in Class D airspace."*

Since the publication of this report, the CAA and MoD have been working with the two units concerned to address the audit findings, and in particular to ensure that agreed procedures satisfy the minimum requirements for the provision of services in Class D airspace. Progress towards satisfactory closure of all the audit findings is ongoing and it remains the intention of both MOD and the CAA that this will be achieved.

UPDATE AT DEC 2006: The LoA has been completed and is passing through the final SRG / MOD approval process prior to implementation. The LoA between RAF Leeming and Durham Tees

Valley Airport fully accords with the stipulated requirements for the provision of an ATS in Class D airspace.

Note: Enhanced civil-military coordination procedures have been introduced at the Scottish Centre in response to Safety Recommendation 059/04. These procedures are being adopted for use between RAF Leeming and Durham Tees Valley Airport under a local Letter of Agreement as part of the response to Safety Recommendation 118/05.

STATUS – ACCEPTED – CLOSED

186/05-01 06 Oct 05 involving a Duo Discus T Glider and a Tornado F3 Risk A

RECOMMENDATION: The MOD and the British Gliding Association should examine the merit of introducing a two-way information flow system that will alert each other of significant planned flying activity.

ACTION: The MoD and BGA accept this Recommendation. The BGA is, through its airspace subcommittee, discussing with MoD how ongoing communications can be achieved between gliding operations and the military when the weather is likely to give the conditions such that both will be flying in the same areas.

UPDATE DEC 2006: The MOD considers that progress made is very positive, this workstream being continued as a matter of priority. The BGA 'roadshow' continues to make presentations to increase the knowledge about where to find gliders and in what conditions. HQ STC have investigated a simple notification system through the Low Flying Booking Cell indicating where gliding conditions have resulted in a concentration of aircraft. An initial successful meeting was held between the parties in the Summer to outline the issues and establish a way forward. It was agreed that the two likely interfaces would be the Low Flying Booking Cell and the AWACs unit at Waddington. It is planned to define a simple process and then run a trial with a limited number of participants (probably two in Scotland and one in Wales). The key areas being considered are a simple way of signalling a potential wave day, probably using the existing scale system of '0' to '5' with zero being nil chance of wave to five being optimum conditions, and how these activities can in practice be signalled. The BGA website; Low Flying Booking Cell and on occasion AWACs are all possibilities for exchanging information and advice.

STATUS – ACCEPTED – OPEN

186/05-02 06 Oct 05 involving a Duo Discus T Glider and a Tornado F3 Risk A

RECOMMENDATION: The CAA should continue to promote and with renewed urgency the production of a 'lightweight' transponder and, when available, consider mandating its carriage and use in gliders.

ACTION: The CAA accepts this Recommendation. The CAA proposes "to amend the Air Navigation Order 2005 for the purpose of improving the technical interoperability of all aircraft in UK airspace" with the aim of introducing new regulatory requirements in March 2008. The Regulatory Impact Assessment, which received Cabinet Office approval for publication on 3 June 2006, will consult on the need to increase the carriage and operation of transponders to improve secondary radar conspicuity and to enhance ACAS and CWS capability. The CAA is promoting the development of a low powered SSR transponder to meet the needs of light-motorised and non-motorised aircraft.

UPDATE DEC 2006: The CAA is continuing to work towards development of a low powered SSR transponder, as covered in the published Regulatory Impact Assessment. A draft requirements document has been circulated to Industry and user groups and there are currently several companies in the UK which are in the process of developing a product.

STATUS – ACCEPTED - OPEN

015/06 08 Feb 06 involving an Embraer 145 and a Tornado F3 Risk C

RECOMMENDATION: The CAA should re-emphasise to pilots who fly in uncontrolled airspace in the UK and to UK-based civil controllers that it is essential for the pilot and controller to agree the type of ATC service that is to be provided. The respective responsibilities of pilots and controllers in such circumstances should be reiterated.

ACTION: The CAA accepts this Recommendation. On 4 September 2006, the CAA issued ATSIN 90, which addresses this Recommendation from the perspective of air traffic controllers. In addition, AIC 119/2006 (Pink 107) "Radar Service Outside Controlled Airspace" was issued on 9 November 2006 which addresses this Recommendation from the perspective of pilots.

STATUS – ACCEPTED - CLOSED

078/06 15 Jun 06 involving a Saab SF340 and a Tornado F3 Risk C

RECOMMENDATION: The CAA and MoD should further develop procedures to ensure that during notified UK air exercises integration of exercise traffic and passenger-carrying aircraft is improved.

STATUS – OPEN

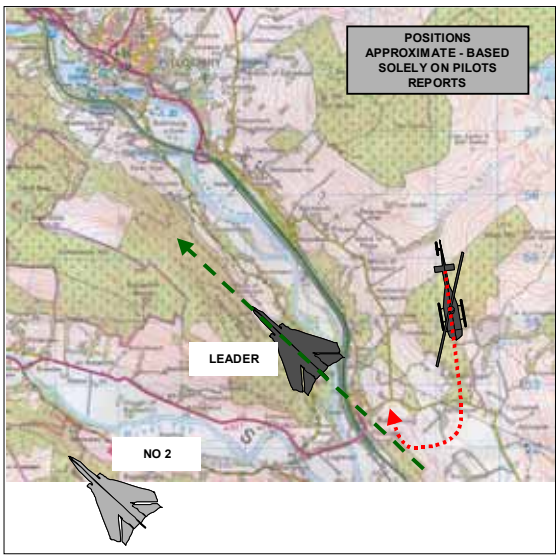
List of Abbreviations

AAI	Angle of Approach Indicator
aal	Above aerodrome level
ac	Aircraft
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACN	Airspace Co-ordination Notice
ACR	Aerodrome Control Radar
A/D	Aerodrome
ADC	Aerodrome Control(ler)
ADF	Automatic Direction Finding Equipment
ADR	Advisory Route
AEF	Air Experience Flight
AEW	Airborne Early Warning
AFIS(O)	Aerodrome Flight Information Service (Officer)
agl	Above Ground Level
AIAA	Area of Intense Aerial Activity
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
alt	Altitude
amsl	Above mean sea level
AOB	Angle of Bank
A/P	Autopilot
APP	Approach Control(ler)
APR	Approach Radar Control(ler)
ARP	Aerodrome Reference Point
ASACS SSU	Air Surveillance and Control System Standards and Safety Unit
ASR	Airfield Surveillance Radar
ATC	Air Traffic Control
ATCC	Air Traffic Control Centre
ATCO	Air Traffic Control Officer
ATCRU	Air Traffic Control Radar Unit
ATIS	Automatic Terminal Information Service
ATM	Aerodrome Traffic Monitor
ATS (U)	Air Traffic Service (Unit)
ATSA	Air Traffic Service Assistant
ATSOCAS	ATSs Outside Controlled Airspace
ATSI	Air Traffic Services Investigations
ATZ	Aerodrome Traffic Zone
AWACS	Airborne Warning and Control System
AWR	Air Weapons Range
BGA	British Gliding Association
BHAB	British Helicopter Advisory Board
BHPA	British Hang Gliding and Paragliding Association
BINA ERS	British Isles/N Atlantic En Route Supplement
BMAA	British Microlight Aircraft Association
c	circa
CAA	Civil Aviation Authority
CALF	Chart Amendment - Low Flying
CANP	Civil Air Notification Procedure
CAS	Controlled Airspace
CAT	Clear Air Turbulence
CAVOK	Visibility, cloud and present weather better than prescribed values or conditions
Cct	Circuit
CFI	Chief Flying Instructor
CinC Fleet	Commander in Chief Fleet, Royal Navy
CLAC	Clear Above Cloud
CLAH	Clear Above Haze
CLBC	Clear Below Cloud
CLBL	Clear Between Layers
CLOC	Clear of Cloud
CMATZ	Combined MATZ
CPA	Closest Point of Approach
C/S	Callsign
CTA	Control Area
CTR/CTZ	Control Zone
CWS	Collision Warning System
DA	Decision Altitude
DAAvn	Director Army Aviation
D & D	Distress & Diversion Cell
DF	Direction Finding (Finder)
DFTI	Distance from Touchdown Indicator
DH	Decision Height
DME	Distance Measuring Equipment
DUA	Dedicated User Area
E	East
EAT	Expected Approach Time
elev	Elevation
ERS	En Route Supplement
est	estimated
FAT	Final Approach Track
FIC	Flight Information Centre
FIR	Flight Information Region
FIS	Flight Information Service
FISO	Flight Information Service Officer
FMS	Flight Management System
FO	First Officer
fpm	Feet Per Minute
fps	Flight Progress Strip
GAT	General Air Traffic
GCA	Ground Controlled Approach
GCI	Ground Controlled Interception
GMC	Ground Movement Controller
GP	Glide Path
GS	Groundspeed
H	Horizontal
HISL	High Intensity Strobe Light
HLS	Helicopter Landing Site
HMR	Helicopter Main Route
HPZ	Helicopter Protected Zone
HTZ	Helicopter Traffic Zone
HUD	Head Up Display
IAS	Indicated Air Speed
iaw	In accordance with
ICF	Initial Contact Frequency
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
JOI	Joint Operating Instruction
JSP	Joint Services Publication
KHz	Kilohertz
kt	Knots
km	Kilometres
L	Left
LACC	London Area Control Centre (Swanwick)
LARS	Lower Airspace Radar Service
LATCC(Mil)	London Air Traffic Control Centre (Military) (West Drayton)
LFA	Low Flying Area
LFC	Low Flying Chart
LH	Left Hand

LLZ	Localizer
LJAO	London Joint Area Organisation (Swanwick (Mil))
LoA	Letter of Agreement
LTMA	London TMA
MACC	Manchester Area Control Centre
MATS	Manual of Air Traffic Services
MATZ	Military Aerodrome Traffic Zone
mb	Millibars
MHz	Megahertz
MoD	Ministry of Defence
MRSA	Mandatory Radar Service Area
MSD	Minimum Separation Distance
MTRA	Military Temporary Reserved Airspace
N	North
NATS	National Air Traffic Services
NDB	Non-Directional Beacon
nm	Nautical Miles
NMC	No Mode C
NK	Not Known
NR	Not Recorded
NVG	Night Vision Goggles
OAC	Oceanic Area Control
OACC	Oceanic Area Control Centre
OAT	Operational Air Traffic
o/h	Overhead
OJTI	On-the-Job Training Instructor
OLDI	On-Line Data Interchange
PAR	Precision Approach Radar
PFL	Practice Forced Landing
PF	Pilot Flying
PI	Practice Interception
PINS	Pipeline Inspection Notification System
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
RH	Right Hand
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)
TAS	True Air Speed
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
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
USAF(E)	United States Air Force (Europe)
UT	Under Training
UTA	Upper Control Area
UTC	Co-ordinated Universal Time
V	Vertical
VCR	Visual Control Room
VDF	Very High Frequency Direction Finder
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	Very High Frequency Omni Range
VRP	Visual Reporting Point
W	West

AIRPROX REPORT NO 001/06

Date/Time:	4 Jan 1358	
Position:	5640N 00340W (4nm SE Pitlochry - elev ~400ft)	
Airspace:	UKDLFS/Scot FIR (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Bell 206 JetRanger
Operator:	HQ STC	Civ Pte
Alt/FL:	605ft (Rad Alt) (RPS 1018 mb)	400ft agl (NR)
Weather	VMC CLOC	VMC CAVOK
Visibility:	25km	unltd
Reported Separation:	100ft V/200ft H	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports leading a pair of ac on a low-level instructional sortie with a student navigator in the rear seat of a grey ac with HISLs and Nav Lights on. They were squawking 7001 with Mode C and operating on a tactical frequency while heading 311° at 440kt in Battle formation, 4km apart about 4nm SE of Pitlochry, with the lead ac on the right side of the formation. At 1358·24, a gold/red and black striped JetRanger-type helicopter was seen by the lead navigator to pass approximately 100ft below and 200ft to the right of the lead ac, travelling in the sam e direction; he climbed his ac immediately to increase separation. Just prior to the sighting, the lead crew had both been looking left towards their No 2 to assess his formation position. He did not assess the degree of risk.

THE JETRANGER PILOT reports flying a green and gold helicopter flying S from Cairngorms at 70kt towards Cumbernauld in contact with ScACC. He had advised Scottish he would set down at a private landing site adjacent to Ballinluig for 2min (to drop a parcel) approaching from N. He identified the site, informed Scottish he was setting down, and flew past the site (on its E side) on his RHS to reconnoitre it. He then turned Westwards to circle around the site and then onto a course of NNW. Just as he was steadying on this course, he heard a noise and almost simultaneously saw a big jet pass to his L (W side), and probably slightly higher. He only saw the plane after it had passed as it came from behind. He continued to land after another turn to the right to approach the site from the N. He was aware that military jet ac operated at low level in that part of Scotland and therefore most of his flight had been at >3000ft until he had to set down. He did not believe that he could have seen the jet any earlier and before his turn N as it would have been too far away. He assumed that the jet crew had seen him as they approached from behind. He felt no turbulence from their passage, but found it hard to judge distance as he only saw it after it had overtaken him but he did not assess the degree of risk.

Note: The incident occurred below recorded radar cover.

HQ STC comments that the geometry of this encounter may well have made it very difficult for anyone in the Tornado formation to spot the Jet Ranger any earlier. As the helicopter flew down the valley, and past the landing site, it was probably behind terrain to the Tornado. Also, a green and gold ac below and against a tree-covered hillside would have been well camouflaged. The lead navigator spotted the helicopter too late to take any effective avoiding action.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar video recording (that did not show the event) and reports from the appropriate ATC and operating authorities.

Members noted that the relative positions of the ac involved were only approximate since the pilots' reports could not be confirmed from the radar recording. Members were unanimous, however, in their view that in the circumstances it would have been very difficult for the respective pilots each to see the other ac. The JetRanger was below the horizon, at least in the final stages of the approach, and was of a very similar colour to the forested background with little relative motion. Members also agreed with the helicopter pilot's view that while he was on a heading which would have allowed him to see the Tornados they would have been too far away. After his turn(s) the Tornados would have been behind him and his attention was then on locating the landing site and manoeuvring for an into-wind landing.

There was some discussion regarding the utility of military ac listening out on an FIS frequency. Military Members pointed out that this would not be possible as most fast jet ac only have one main radio which, on such low level tactical missions, is almost continuously used for operational purposes.

The Board considered whether the cause of this incident had been a sighting issue or was simply a conflict in the FIR, Members concluding that none of the pilots involved could have reasonably expected to see the opposing ac any earlier than they did. That being the case, although the cause of the incident was a conflict in the UKDLFS/FIR, since the ac had passed before any action had taken effect, safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

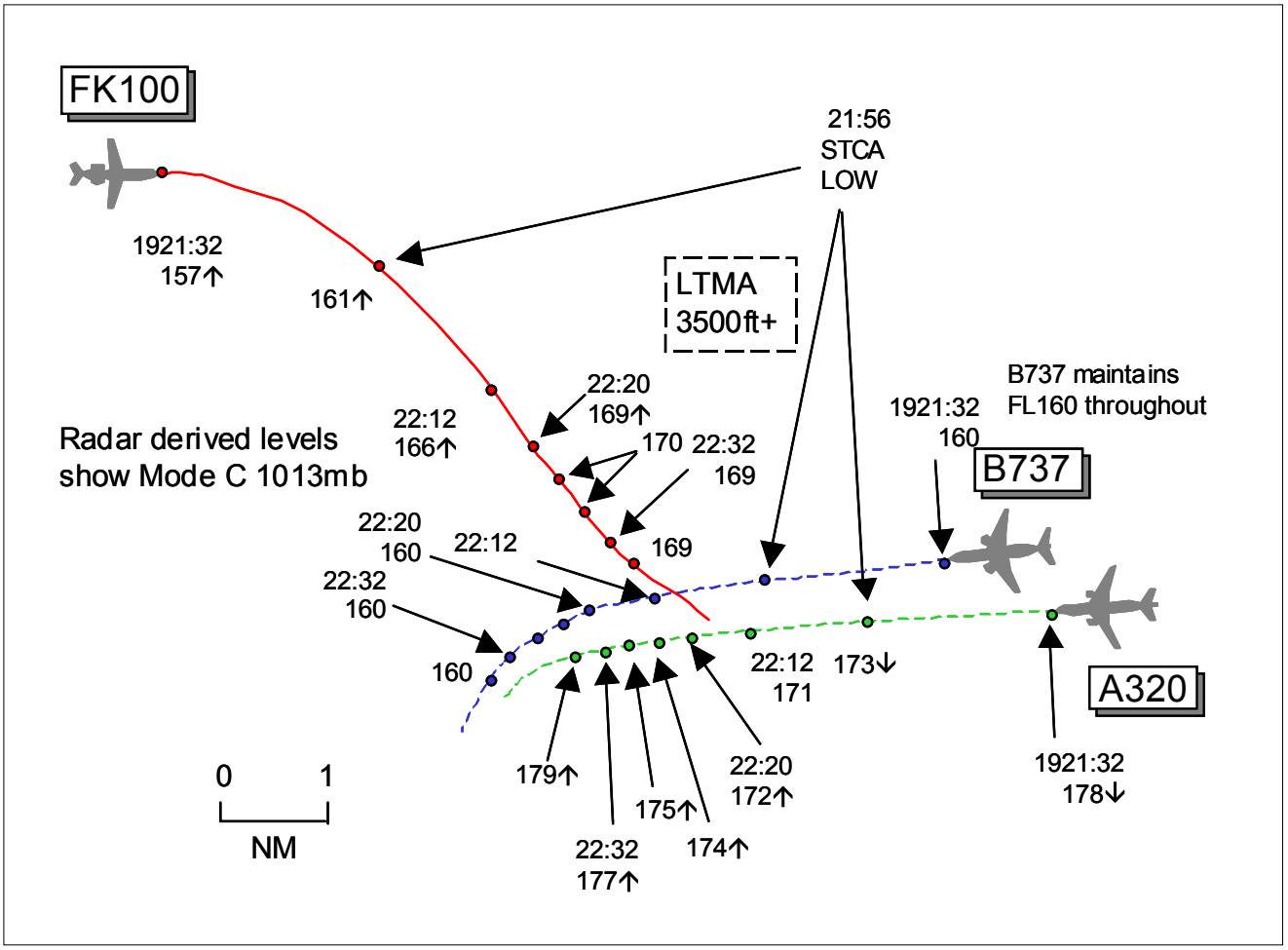
Cause: Conflict in the UKDLFS/FIR.

Degree of Risk: B.

AIRPROX REPORT NO 002/06

Date/Time:	NIGHT 10 Jan 1922		
Position:	5139N 00019E (7nm E LAM)		
Airspace:	LTMA	(Class: A)	
Reporter:	LTCC LAM SC		
	First Ac	*Second Ac*	*Third Ac*
Type:	B737-400	A320	FK100
Operator:	CAT	CAT	CAT
Alt/FL:	NR	FL172↓	FL160↑
Weather Visibility:	VMC CLBL	IMC	IMC
Reported Separation:	NR	NR	700ft V/4nm H

Recorded Separation:
FK100 v B737 1000ft V/1·25nm H; FK100 v A320 800ft V/1nm H



AIRPROX REPORT No 002/06

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LTCC LAM SC reports that the B737 and A320 were inbound to LAM and the Coordinator had arranged for the next LAM inbound to arrive at FL190 as NE Deps were climbing the FK100 to FL180 and avoiding his other LAM traffic. He observed the FK100, as it was climbing through FL160, to turn towards the B737 and A320. He gave avoiding action to the B737 flight that took it followed by avoiding action to the A320 flight that advised him of a TCAS climb.

THE LTCC NE DEPS SC reports climbing the FK100 to FL110 on heading 105° whilst the N Coordinator had coordinated climb to FL240 with LACC DVR Sector. The plan was to vector the FK100 to the N of traffic (the B737 and A320) inbound to LAM and then to turn it S routeing under further Heathrow inbound traffic at FL190; this was agreed with TC E and TC LAM. The FK100 flight was given climb to FL180 with normal ROC. Very shortly after this he noticed the FK100 in a R turn whilst it was climbing through FL160 so he told the crew to turn back as the flight was now in confliction with the B737 and A320. He then gave the FK100 flight an 'avoiding action' hard L turn heading 070°, a climb to FL170 and TI but the ac did not appear to take the turn. Had the FK100 crew done so when first instructed this incident would have been a lot less serious as he had seen the situation develop prior to STCA activating. For some reason he believed the FK100 intercepted the DET R336 as if it was following the SID.

THE B737-400 PILOT reports heading 266° holding at LAM IFR at 220kt and in receipt of an ATS from London squawking 6632 with Mode C. A TCAS TA was received on the inbound leg as an intruder ac was closing from their R, above them, and a little bit behind. ATC gave an instant heading L onto 180° and TI about the other ac which was maintaining an incorrect heading. The L turn was executed promptly which took them away from possible conflict.

THE A320 PILOT reports inbound to Heathrow IFR heading 266° and in communication with London squawking an assigned code with Mode C. Approaching the LAM fix with 200-300ft to go before levelling-off at FL170, a TCAS TA alert followed by an RA warning was received on traffic in their 2 o'clock. The TCAS guidance was followed, resulting in a climb to FL182, whilst ATC gave a turn onto heading 180°. After 'clear of conflict' was received, normal operations were resumed.

THE FK100 PILOT reports outbound from Luton IFR at 250kt and in communication with London squawking 5242 with Mode C. After departure RW26 the ac started to turn L in NAV mode and whilst in the turn ATC instructed them to fly heading 105°. He was sure that HDG 105° was set but he could not tell for sure if HDG mode was really selected. ATC cleared them to climb, in different steps, with a high rate to FL180; the average ROC was 2900fpm. At approximately FL140, the ac turned unexpectedly to the R which he, the Capt and PNF, recognised so he asked the FO, PF, *"Hey, why is the ac turning?, are we not on heading anymore?"* At the same time ATC reminded them to fly heading 105° and, as they turned back a TA alert was received. ATC instructed them to turn further L onto heading 070° at the same time as they received a TCAS RA 'climb' warning. The PF switched off the AP and flew wings level, following the RA guidance with 2 red targets displayed ahead. ATC, who were not aware of their RA at the time, instructed them to level off at FL170, which they could make, and passed TI; the RA terminated clear of conflict. He could not tell exactly why the ac turned, if the HDG mode was not correctly engaged or the NAV mode was unintentionally re-engaged during the flight. He estimated separation at the CPA as 700ft vertically and 4nm horizontally and assessed the risk as low.

ATSI comments that the FK100 departed from Luton following a DVR7B SID. This requires the ac to, after passing 500ft aal, turn L to intercept BNN VOR R035. At BNN d7 turn L onto BPK VOR R286 to BPK VOR. At BPK VOR turn L onto BPK VOR R099 to intercept DET VOR R336 to DET VOR then to DVR VOR. The crew established contact with the TC NE Deps controller at 1914:55, and reported climbing to 4000ft following a DVR 7C (*i.e. the DVR SID from runway 08 and not 26 from which they had actually departed*). They also used the incorrect c/s, which the controller queried, ascertaining that it was '009' and not '008' as the crew had initially used. The flight was identified and the crew advised that there was no ATC speed restriction. At 1916:00, the NE Deps controller instructed the crew to climb to 6000ft '*…radar heading one zero five*' and this was correctly read back by the crew. The controller issued further climb instructions, in stages, to FL180. Meanwhile, the N Coordinator had coordinated the FK100 out of the sector at FL240. The NE Deps controller was aware of traffic inbound to Heathrow via LAM and so the allocated heading of 105° was to keep the FK100 N of the inbound track. The instruction for the FK100 to climb to FL180 was given at 1921:30, when the ac was passing FL157, 9·5nm S of Stansted. The closest Heathrow inbound, the subject B737, was in its 2 o'clock at a range of 8·2nm maintaining

FL160 and the other, the subject A320, was passing FL178 for FL170 in the 2 o'clock position of the FK100 at a range of 9nm. Both ac were on a reciprocal W'ly track S of the FK100. The NE Deps controller was monitoring the FK100's progress carefully as he intended to turn it R, routeing behind the B737 and A320, to cross the track inbound to LAM on course to DVR. However, as the FK100 was passing FL161 (1921:56), it is seen to have commenced a R turn onto a SE'ly track and headed towards the B737 and A320 ac inbound to LAM. The NE Deps controller immediately transmitted *"FK100 c/s continue on the heading turn left avoiding action hard left hard left heading zero seven zero degrees*". STCA activated white (low severity) and the TC LAM controller issued avoiding action turns to both the B737 and the A320, instructing them to turn L onto 180° as well as passing TI. The NE Deps controller then transmitted *"It was a cleared level of flight level one seven zero"* to which the crew replied, *"Climbing flight level seven zero* (sic)*"*. At 1922:14, STCA changed to red (high severity) and the A320 reported a TCAS climb. At this time the B737 was in the FK100's 1 o'clock at a range of 2·5nm at FL160, whilst the A320 was in the 12 o'clock position at a range of 3·5nm at FL171, with the FK100 passing FL166. The avoiding action turns passed to the A320 and B737 took effect but the FK100 did not appear to change track. Later analysis of the radar recording indicated that the point that the FK100 turned off the ATC heading of 105° was close to the point where the SID track turns R to intercept the DET R336.

UKAB Note (1): The FK100 passes 1000ft above and 1·25nm behind the B737 4sec before the CPA against the A320. This occurs at 1922:32 as the A320 is seen climbing through FL177 and passing 1nm to the S of the FK100 which indicates FL169, 800ft below. Separation is restored 4sec later as the A320 climbs through FL179.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of all three 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 FK100 crew's report, it appeared that flightdeck CRM had not detected whether or not HDG mode had been selected correctly on the AFCS. Looking at the track flown and the comments made by the Captain, it appeared to pilot Members that the A/P was probably left in NAV mode, after being given an ATC heading, which should have been detected by the crew when following SOPs. This led to the FK100 deviating from the ATC assigned heading and into conflict with the B737 and A320 which had caused the Airprox.

The NE Deps SC had formulated a sound plan and had quickly detected the FK100 turning towards the B737 and A320. However, the FK100 crew did not take the L turn issued, and acknowledged, to resolve the potential confliction and continued their climb. Unbeknown to the SC, the FK100 crew were responding to a TCAS RA warning. Clearly if the FK100 crew had reported this, the SC would then have been aware that the cockpit workload had increased and that the crew were busy. The NATS Advisor informed Members that the incident data was analysed using the Interactive Collision Avoidance Simulator which revealed that the FK100 crew should have received multiple TCAS RAs during this fluid encounter. Initially an RA 'climb, against the B737, would have generated a mutual 'monitor vertical speed' TCAS warning in the B737 cockpit. After this had ceased an RA 'descend' would have been received as the FK100 climbed towards the A320, the crew of which would, as they reported, have received a coordinated TCAS RA 'climb'. The SC was undoubtedly concerned and seeing that the FK100 was not turning as instructed, the SC gave its crew a stop-off at FL170 which they were able to action. However, although this was complementary (in the right direction) with the TCAS 'descent' command that would have been generated, this levelling-off meant that the A320's TCAS RA would have then strengthened its guidance until the situation was resolved. The LAM SC was alerted to the conflict by STCA and gave avoiding action L turns to both the B737 and A320. The A320 crew had quickly followed their TCAS RA guidance, eventually stopping their climb when over 1000ft above the FK100.

Although the actual risk of collision had been removed by the combination of all the actions taken by the parties involved, Members agreed that the FK100 had passed the B737 and A320 with separation margins reduced. The FK100 crew had not reported receiving nor actioning a TCAS RA 'descend' and had not complied with the ATC instructions prior to stopping their climb which was sufficient to persuade the Board that safety had not been assured during the encounter.

AIRPROX REPORT No 002/06

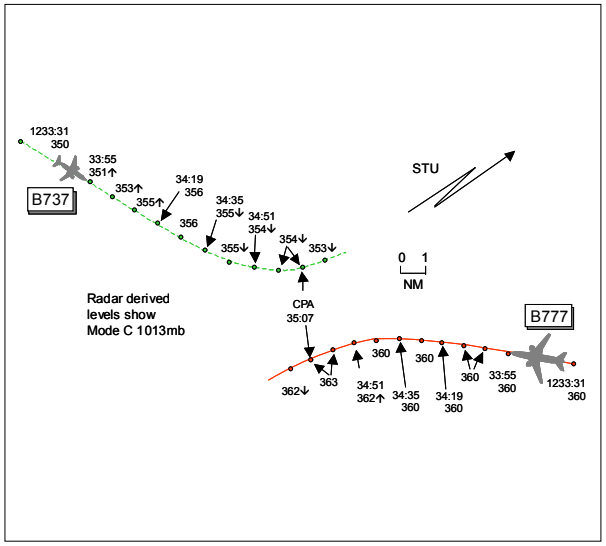
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The FK100 crew allowed their ac to deviate from an ATC assigned heading in Class A airspace such that it flew into conflict with the B737 and A320.

Degree of Risk: B.

AIRPROX REPORT NO 003/06

Date/Time:	16 Jan 1235	
Position:	5146N 00525W (20nm SW STU)	
Airspace:	UAR UL607	(Class: B)
	Reporting Ac	*Reported Ac*
Type:	B737-800	B777
Operator:	CAT	CAT
Alt/FL:	↑FL360	FL360
Weather	VMC CLAC	VMC CLOC
Visibility:	30km	
Reported Separation:		
	800ft V/3-4nm H	400ft V/3nm H
Recorded Separation:		
	900ft V/3·9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 115° at 463kt en route to Germany and in receipt of an ATS from London on 129·37MHz squawking 2001 with Mode C. Shortly after commencing climb, passing through FL350 for FL360, they noticed traffic on TCAS 20nm ahead but slightly R of track, head-on, with a high closure rate and +1000ft. They immediately challenged ATC and were issued descent clearance to FL350 followed swiftly with an avoiding action heading of 360°. During the turn TCAS gave an RA 'descend' so the AP was disengaged and the guidance was followed: ATC were informed of the manoeuvre. The visibility was 30km whilst flying above cloud and the other ac was seen to pass 3-4nm away to their R and 800ft above in level flight but turning L. He assessed the risk as medium as they had seen the potential conflict in advance.

THE B777 PILOT reports en route to the USA and tracking via CRK at FL360 and in communication with London. They heard ATC issue an immediate turn to another flight and shortly after this they received a TCAS TA on a target a few degrees R of the ac's nose showing FL356 climbing. London then issued them with an immediate turn onto heading 180°, about a 90° L turn. The FO, PF, disconnected the AP and commenced a 30° AOB turn; at this point the other ac was not seen visually. During the first 20° of turn an RA 'climb' command was received and the PF initiated the climb following the Flight Director (FD) and the Capt, PNF, informed ATC of the TCAS manoeuvre. The other ac was now seen visually as it passed down their RHS about 800-1000ft below and 3nm away. The RA ceased and London cleared the flight back to FL360 on course to CRK.

THE LACC S8T CONTROLLER reports acting as an OJTI to a student. He noticed that a BA46 at FL270 was on a radar heading which would have taken the flight into D117 Pendine Danger Area; the minimum safe level to transit above the Danger Area was FL290. As the student was at an advanced level of training, he did not step on the RT but told the trainee to turn the BA46 'hard' L to ensure that it missed D117. During this scenario he had not noticed that when the trainee had climbed the subject B737 to FL410 on a heading he had also allowed the B777 at FL360 to route direct to CRK. As soon as the BA46 had completed its turn to miss D117, the B737 pilot questioned his cleared level – by now the B737 and B777 were about 12nm apart. The trainee gave avoiding action immediately to both flights, firstly to the B737 and then the B777 – L turns and TI. He had prior to this attempted to stop the B737's climb but to no avail. The trainee continued to pass TI to both flights until standard separation was attained and estimated the minimum separation as 4nm and 500ft.

THE S8P CONTROLLER reports that he became aware of an incident between the B737 and B777 but could not offer any further information except that the B737 was accepted from Shannon at FL330 and was coordinated out of the sector to S5 at FL410.

ATSI reports that both ac were in communication with the LACC S8T. A mentor and trainee were operating the sector with both the workload and traffic loading being described as 'light'. The trainee had reached an advanced

stage of training and was scheduled to undergo his Certificate of Competency examination the following day. Accordingly, the mentor was permitting the trainee to make virtually all the executive decisions although the mentor was holding the Mentor Box which permitted him to take over control of the sector should it be required.

The B777 flight established communications with the S8 trainee at 1222:40. The ac was some 12nm SE of Brecon, maintaining FL360 and routeing direct to CRK as agreed with the preceding sector. Approximately 40nm ahead of the B777 was another ac (AC1) in the climb to FL360 and following a similar routeing. At 1223:40 a BA46 flight called the sector and reported climbing to FL230 heading 150° and tracking towards STU. This BA46, although not directly involved in the Airprox, would be a significant distraction as events unfolded. Located approximately 30nm SE of STU is Danger Area D117 which was active to 29000ft. Although the subject ac were above this level, the BA46 was not and this fact was something that would occupy both mentor and trainee. The trainee had selected the Danger Area to be highlighted on his video map.

The trainee instructed the crew of the BA46 to climb to FL270, the requested cruising level, and turn L heading 140°, which was correctly acknowledged. At 1227:25, the trainee gave a further heading instruction to the crew of the BA46 which was now 22nm NW of STU. The B737 flight contacted the trainee at 1230:30, reporting level at FL360 and tracking E to STU. The trainee instructed the crew to fly a heading of 115° and asked them what their requested cruising level was. The crew replied that they were requesting FL410. At this time, the B737 was 50nm W of STU whilst the first westbound ac (AC1) at FL360 was 15nm SW of STU and the subject B777, still maintaining FL360, was 36nm behind that ac. At 1231:50, the trainee instructed the crew of the B737 to climb to FL350. When this instruction was given, the BA46 had crossed STU, now level at FL270 and still on the assigned radar heading of 150°. If it was allowed to continue on its present track it would penetrate D117. It was about this time that the mentor pointed out the track and the active Danger Area to the trainee and so he instructed the crew of the BA46 to turn L onto 090°.

At this point the mentor leaned over the shoulder of the trainee to select the vector lines and ascertain whether the BA46's radius of turn would keep it clear of the Danger Area. The trainee then instructed the BA46 crew to turn further L heading 070° and to make a good rate of turn. Whilst the mentor was checking the turn, at 1233:30, the trainee instructed the B737 to climb to FL360. At that time, the B737 had passed the first W'bound ac (AC1) at FL360 but the B777 was in the 12 o'clock position of the B737 at a range of 27nm. Shortly after the B737 commenced its climb the crew transmitted "*London just for information B737 c/s our TCAS shows traffic head-on one thousand above at two zero miles*". The Mode C displayed by the B737 was FL353 and so the trainee instructed the crew to maintain FL350 and the crew replied that they were in the climb but would descend back down to FL350. The trainee then passed avoiding action to both ac, instructing the crew of the B737 to turn L onto 360° and the B777 to turn L heading 180°. TI was passed to both crews as the ac continued to converge. By the time that the avoiding action instruction had been passed to the B777, the two ac were almost head-on at a range of 13nm, with the Mode C of the B737 indicating FL356. At 1234:40, the crew of the B777 reported responding to TCAS and this was followed by the crew of the B737 advising they were in a TCAS descent. As the two ac passed starboard-to-starboard at 1235:07, separation reduced to 3·9nm and 900ft, as recorded on the Clee Hill radar. Thereafter, the ac returned to their assigned levels.

The mentor explained that he had worked with the trainee before and was one of his prime mentors. The Danger Area had been active all morning and so both controllers were fully aware of its status and the minimum safe level to overfly it. Strips were available and displayed on both the subject ac. The mentor had seen immediately the potential problem with the BA46 and the Danger Area. The trainee had placed the BA46 on a heading, which was not really necessary, which meant that the ac would not turn at STU and track on its own navigation E'bound towards Brecon, staying within the airway and N of the Danger Area. The unit investigation revealed that the trainee was practising the procedure of radar vectoring traffic along airway UR14 and turning it to route along UL9, in case he was required to do this during his forthcoming Competency examination.

Agreement had been reached with the previous sector that 2 W'bound ac, the second one being the B777, could route direct to CRK. The trainee believed that the E'bound B737 would be well N of these two ac and so pose no problem. There was further traffic (AC2), maintaining FL370 that was routeing inbound to STU from the NW and this was going to be a problem when climbing the B737 to FL410. The trainee instructed the crew of the B737 to fly a heading of 115°. Although he had used this heading earlier in the session, the resulting track for both this ac and the earlier ones, was S of the required one. Enquiries with the Metrological office determined that the wind at FL350 at STU at that time was 340° at 95kt. Clearly, if a desired track of 100° was necessary a heading of some

15 or 20 degrees less than this would be required. The resulting track took the B737 S of where the trainee had initially planned but almost parallel to the traffic (AC2) at FL370 and so he planned to use this to his advantage.

The initial climb instruction to FL350 passed to the B737 was safe, as the ac would remain underneath both of the W'bound flights at FL360. However, the trainee's attention, as well as being directed to the BA46 approaching the Danger Area, focused on whether a confliction existed between the traffic (AC2) at FL370 and the B737. The mentor was concentrating on the position of the BA46 and, given the trainee's advanced stage of training, had not expected an unsafe clearance to be issued. The mentor had not heard the trainee instruct the crew of the B737 to climb to FL360. He had reached over the R shoulder of the trainee to select the vector lines and so was not looking directly at the radar. As soon as the B737 crew remarked that they could see traffic on their TCAS, i.e. the B777, the mentor looked and saw the problem. The trainee reacted swiftly to the situation and there was no need, in the opinion of the mentor, to take over control of the sector. However, he did prompt the trainee to continue passing updated TI to the 2 subject ac as they approached each other.

The mentor reported that he had worked many times with the trainee and was caught out when such a rudimentary error was made. He added that the trainee had been reluctant to use opposite direction levels and so to climb an E'bound ac to FL360 (a usual W'bound level) was also out of character. In addition to providing a unit report, the unit fed the data into their Interactive Collision Avoidance Simulator, which applies TCAS logic and simulates TCAS activity. The concern was that the pilot of the B737 queried the climb instruction at 1233:55 (start of the transmission) when the Mode C readout indicated FL351. The trainee immediately instructed the ac to maintain FL350 but the crew had commenced a climb and the Mode C indicated FL356 by 1234:19 before showing a descent (FL355) at 1234:35. [UKAB Note (1): As the B737 reaches FL356 (1234:19) the Mode S data block shows the AP selected level change from FL360 to FL353 and then on the next sweep 8sec later to FL350]. When the Mode C indicated a descent through FL355 and the two ac were 9·3nm apart. Separation was lost 24sec later (900ft/4·2nm) but the Mode C from the B737 had only decreased to FL354. The simulator showed that shortly after commencing descent, the crew of the B737 would have received a TCAS RA requiring a descent rate of between 1500-2000fpm. The Mode C radar data indicated that the actual rate of descent employed by the crew of the B737 was in the order of 400–500fpm. Furthermore, the B737 was on an assigned heading of 115° and was passed an avoiding action instruction to turn L onto 360° at 1234:10, when the two ac were 15nm apart. However, the radar recording, utilising the Mode S data, shows that by 1234:45, (i.e. 35sec after the avoiding action had been passed and immediately before the crew reported a TCAS descent) the heading had only changed by 5°.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members could add little to the comprehensive ATSI report. The mentor was understandably allowing the trainee to continue 'controlling' the situation, given his advanced stage of training, without stepping in and taking over too soon which could have 'knocked' the trainee's confidence. The BA46's track made good, whilst following the radar vectors issued by the trainee, had undoubtedly drawn the mentor's attention away from the overall traffic situation. However, the onus was on the mentor to balance this against continuously monitoring the trainee's actions. The mentor became distracted and did not register that the trainee had climbed the B737 into conflict with the B777 which had caused the Airprox.

Pilot Members were surprised that the B737 crew, having seen the B777 ahead and told ATC of the potential confliction as they commenced their climb, had continued to climb to FL356 before descending after being told to maintain FL350. Conscious that it does take time to effect a flight path reversal, Members nonetheless believed that the B737 crew had been slow to respond to the ATC descent instruction, probably because they were fully aware of the situation, although TCAS simulation indicated that a higher ROD would have been requested than selected by the crew. ATCO Members thought that the avoiding action turn had been given in good time but the B737 crew had also been slow to respond to this instruction leading to the subject ac passing closer at the CPA. Both of these elements were thought to have contributed to the Airprox.

Turning to risk, the S8T trainee had passed avoiding action to both flight's crews. The B777 crew had also received a 'coordinated' TCAS RA 'climb' and complied with the guidance, with both crews visually acquiring each

during their manoeuvring. All of these elements when combined were enough to allow the Board to conclude that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

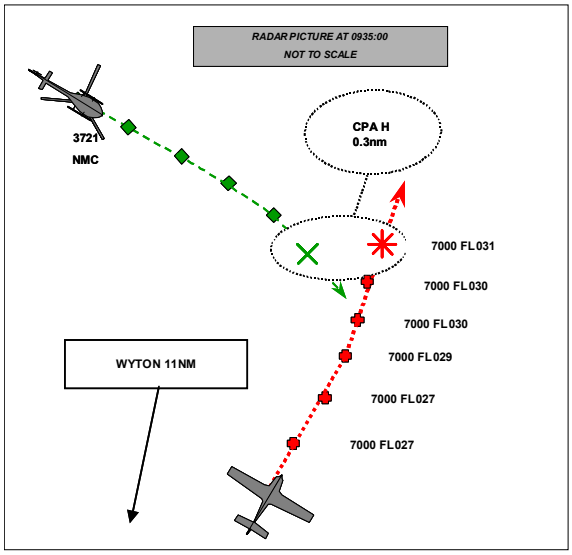
Cause: The LACC S8T mentor became distracted and did not register that the trainee had climbed the B737 into conflict with the B777.

Degree of Risk: C.

Contributory Factors: The B737 crew did not respond in a timely manner to the ATC descent and turn instructions.

AIRPROX REPORT NO 004/06

Date/Time:	17 Jan 0935	
Position:	5231N 00012W (10nm ESE Wittering)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Gazelle x2	Grob Tutor
Operator:	JHC	HQ PTC
Alt/FL:	2500ft (RPS)	3000ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	15km	>10km
Reported Separation:	0ft V/100m H	500ft V/0.3nm H
Recorded Separation:	NR V/0.3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports leading a flight of two camouflaged Gazelles from Wittering to Wattisham straight and level at 2500ft and heading 120° at 90kt. A solo pilot flew the lead ac with a VIP passenger and the No 2 had a commander, a further pilot and a passenger. They were squawking the Wittering allocated code with Mode C and were in receipt of a FIS from Wittering Departures who passed them TI on an ac in their 2 o'clock at 3nm. The No 2 pilot called visual immediately followed by Lead. The other ac appeared to be about 200ft above the formation so the leader made a slight heading change to ensure that they passed behind it. As the other ac reached a position in the 10 o'clock relative to the No 2, it banked hard L towards the formation and descended, heading straight for No2 who took evasive action by descending and breaking R out of the formation. He later rejoined his leader from the 5 o'clock and, having regained position, visual contact with the other ac was regained as it departed away from their 5 o'clock. He assessed the risk as being high.

THE GROB TUTOR PILOT reports flying a local instructional flight from Wyton with a UAS student pilot in a white ac with strobes selected on and squawking 7000 with Mode C. They were heading generally Easterly at 100kt and he was instructing instrument recoveries from unusual positions (UP), with the student using an instrument flying visor. They were operating in good VMC well below a layer of cloud. On climbing away from a practice UP recovery on an Easterly heading, he noted a pair of Gazelles at a similar level about 3nm N of his position and he assessed that they would pass behind him so he instructed the student to continue climbing straight ahead thus ensuring that they would pass well above the Gazelles. He assessed that they had gained about 500ft V separation. He noted no change in track of the Gazelles so he turned L onto a reciprocal track so that he could continue to maintain visual contact with them from the Instructor's seat (LH). He then briefed the student for the next practice UP and, conscious of remaining visual with the Gazelles, he put the ac into a descending left-turning UP and gave control to the student for the recovery. As the student carried out the briefed recovery, the instructor noted that the most Easterly of the 2 Gazelles had turned sharply to the W. He pointed out that the Grob Tutor, with its overall white colour scheme, is notoriously difficult to see against a background of cloud and this factor may have delayed identification of his ac by the Gazelle crews: nevertheless, he estimated that they came no closer than 500ft vertically or horizontally to the Gazelle formation and he had remained visual with both ac throughout the encounter therefore no collision risk had existed.

MIL ATC OPS reports that the Gazelle formation leader contacted WIT Departures (Deps) at 0931:21 and was given a FIS climbing to 2500ft on the Barnsley RPS of 995Mb. At 0934:57 Deps passed TI as *"right 1 o'clock, 2 miles, manoeuvring, indicating 2700ft."* which was acknowledged and he reported passing 2000ft on the Chatham RPS of 996Mb. Deps called the traffic again at 0935:23 *"12 o'clock, 1 mile, crossing right-left, indication 2900ft."* the leader reported visual with the ac and then at 0935:57 reported the Airprox to Deps. Under the terms of a FIS, ATC were not required to pass TI but the controller, recognising that the ac would pass close to each other, passed TI in any case and this enabled the Gazelle pilots to acquire the other ac visually.

HQ JHC comments that despite what appeared to be initial sensible avoiding and positioning manoeuvres by the commanders just prior to the incident, it still resulted in a close encounter in the open FIR. With the benefit of hindsight the commander of the Grob could have given better consideration in remaining in positive visual contact and allowing the formation longer to clear the immediate airspace before executing a give back student UP exercise, where monitoring student, aircraft and having a sound look out would have proved challenging. The No2 Gazelle HP was clearly startled by the Grob's descending dive, unaware of the other pilot's intention to remain in visual contact and broke out to avoid what he perceived as a risk of collision. A salutatory lesson in ensuring sound application of HASELL checks!

HQ PTC comments that the pilot of the Tutor was aware of the Gazelles for some considerable time, and manoeuvred his ac to maintain what he thought was a sensible separation, whilst allowing him to continue with his exercise in an expeditious manner. However, as the Gazelle formation did not know that the Tutor had seen them, the descending left turn, ironically selected to maintain visual contact with the Gazelles, seems to have caused them concern.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered that despite both pilots having seen each other's ac the separation in this incident had reduced below that which they thought desirable. The Gazelle pilots, having selected a heading to take them clear of the Grob which they acquired early due to the good TI, were very concerned when it turned sharply towards them, so much so that the No2 had to take further avoidance and leave the formation.

Specialist Members thought that when conducting manoeuvres which involve rapid changes of flight parameters it is wise to do so in an area well removed from any other ac. While the Grob instructor was most likely in a position to ensure that no actual conflict would take place, the other pilots had no means of knowing this and sensibly opted for a larger level of separation thus ensuring the safety of both the ac involved.

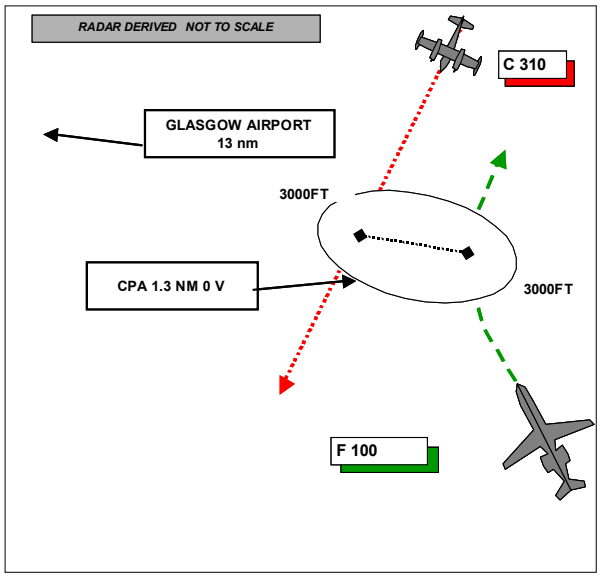
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Grob Tutor instructor flew sufficiently close to the No2 Gazelle to cause its pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 006/06

Date/Time:	20 Jan 14:35	
Position:	5551N 00402W Glasgow Intl)	(13nm E
Airspace:	Scottish TMA	(Class: E) (2500-6000ft)
Reporter:	Glasgow ATC	
	First Ac	*Second Ac*
Type:	Fokker 100	Cessna 310
Operator:	CAT	Civ Pte
Alt/FL:	3000ft (NR)	3000ft (QNH 1003mb)
Weather	IMC	IMC
Visibility:	0	0
Reported Separation:	Not seen	Not seen
Recorded Separation:	0 V /1.3nm H	



UKAB Note (1): No climb is seen from the F100 until just after the ac had passed.

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

GLASGOW APR provided a sketchy report stating that a C310 departed Cumbernauld VFR with no pre-warning or Flightplan and requested an IFR clearance from him to FL55. Meanwhile an inbound Fokker 100 [F100] was being vectored for an ILS to Glasgow RW23. The C310 climbed to 2500ft VFR and the pilot was instructed to maintain VFR, as there was IFR traffic in his vicinity, cleared to descend to 3000ft. The F100 was initially vectored NW to fly round the C310 which subsequently turned further to the S, so the F100 was turned onto 040° to go round it and TI on the C310 was passed. The ac came within 1.5-2nm at the same level but the F100 called a TCAS RA at 3500ft. It appeared that the C310 had climbed to 3000ft VFR, but after the event the pilot stated that he had been IMC momentarily at 2500ft.

THE FOKKER 100 PILOT reports flying a scheduled passenger flight inbound Glasgow in receipt of radar vectors from APR. While heading 340° at altitude 3000ft on the QNH of 1005mb, VFR traffic from Cumbernauld was transiting the zone (sic) at 3000ft. Glasgow APR gave them an avoiding turn to 040° to maintain a 2nm separation. During the turn, a TCAS TA was followed by an RA 'climb'. Once the RA cleared the ac was levelled at 3500ft and then returned to 3000ft. The pilot informed ATC and asked for the level of the VFR traffic as they were in cloud. APR explained he was on a VFR clearance and needed to maintain 2nm separation from them. The Cessna 310 pilot then said he had gone into cloud 'just before the RA'. He did not see the other ac and did not assess the risk.

THE CESSNA 310 PILOT reports that he had departed from Cumbernauld intending to fly VFR out of the Glasgow and Scottish TMA via Baillieston VRP heading 240° at 120kt and then onwards to the TLA VOR. He was initially at 2000' VFR but was given an instruction from Glasgow APR to climb to 3000' and he thought he was also given vectors as he had asked to be kept clear of the masts [1913ft amsl] to the East of Airdrie. He became aware of concerns from the pilot of another ac who had received a TCAS instruction to climb and he informed the controller that he was IMC at the time. At no time did he see the other ac and therefore did not assess the risk.

ATSI reports that the Glasgow APR described his workload as low, with 3 ac on frequency, and that he had been in the position for about 10min. He commented that he had been familiarising himself with a new radar display but did not comment as to whether this had provided enough distraction to affect his operation.

UKAB Note (2): The Glasgow 1430 weather report: was surface wind 240°/17kt; Visibility 6000M; Cloud few at 2000ft, scattered 2800ft; broken at 4500ft.

AIRPROX REPORT No 006/06

The pilot of an F100 established communication with Glasgow APR at 1428, reporting descending to FL80 towards LANAK. The flight was descended in turn to 5000ft and instructed to leave LANAK heading 340° for positioning for an ILS to RW23 as 'number two' in the traffic.

The pilot of a C310 made his initial call on the APR frequency at 1432. At first the APR Controller believed the flight was a helicopter airborne from the Civic Centre heliport, E of the Airport. This was due to a similarity between its registration and that of a helicopter that had been operating from there recently. However, once the pilot reported, *"just airborne out of Cumbernauld routeing back towards TALLA and Full Sutton request Radar Advisory Service please"* the APR Controller realised that it was the C310 that had arrived that morning. The pilot was informed that he would receive a FIS and was allotted the Glasgow squawk 1737. The controller confirmed that he had not received any advance details about his flight, asked the pilot for his requested cruising level and he responded *"we'll go initially to Flight Level five five depending what the what the cloud is doing"*. The controller asked whether the pilot would be happy to continue VFR for about another five minutes and this was agreed and the pilot reported levelling at 2400ft on QNH 1003mb. (The QNH had increased to 1005mb by this time but the pilot was not informed of the new pressure.) The pilot was instructed *"not above two thousand five hundred feet VFR just for the moment I've got IFR traffic descending your vicinity to three thousand feet"* (not the subject F100.) The pilot did not read back the altitude restriction but commented that he was looking for the mast. This referred to the Kirk O'Shotts TV Mast, situated to the east of Airdrie, about 7.5nm SSE of Cumbernauld, the top of which is 1913ft amsl. The controller said to expect a climb in about another couple of minutes i.e. when it was clear of the first IFR inbound.

At 1434, the F100 pilot was instructed to descend to 3000ft and to turn left heading 320°. The C310 was then cleared to *"climb to maintain altitude three thousand feet"* and instructed to *"squawk ident"*. The pilot reported climbing to 3000ft and was informed *"it's still a Flight Information Service I will change that flight service shortly"* (once clear of the F100). The controller commented that he believed that the C310 was still operating VFR, even though it was climbing to 3000ft. The clearance for the C310 to climb to 3000ft resulted in the flight entering the Scottish TMA Class E airspace, where the base is 2500ft. The controller believed that the two flights would be horizontally separated, although there was no necessity to provide standard separation between IFR and VFR flights in Class E airspace. The MATS Part 1, Section 1, Chapter 2, Page 1, states the minimum services to be provided in Class E airspace. These include 'pass traffic information, as far as practicable, to IFR flights on VFR flights; VFR flights in contact are to be given traffic information as far as practicable'. No positive traffic information was issued to either flight at this time. The C310 was allowed to continue its own navigation and was not placed on a radar heading. Approximately 30sec later, realising that the subject ac would be closer than he anticipated because the C310 had turned left, he instructed the F100 to turn right heading 040°, informing the pilot it was vectoring around traffic climbing out of Cumbernauld. He did not use the term 'avoiding action' as he was not attempting to ensure standard lateral separation. Information was then issued on VFR traffic twelve o'clock at a range of 3nm and the pilot reported sighting it on TCAS. Information was passed to the pilot of the C310 about an IFR ac 2.5nm SE at similar altitude. At this time the F100 pilot reported a TCAS climb and subsequently requested the level of the VFR traffic. It was reported at 3000ft with the additional comment that it *"should always have been at least two miles away from you at all time"*. Local recordings report the minimum separation as 1.4nm at the same altitude.

At 1436:10, the pilot of the C310 reported turning towards TALLA heading 135° but was instructed to *"just continue on your track at the moment if you're able to maintain VFR*" and the pilot reported *"we are India Mike at the moment at three thousand feet"*. The APR Controller commented that this was the first time he was aware that the C310 was operating IFR and placed it on a radar heading of 170°. Thirty seconds later the pilot was informed that he was now operating IFR under a Radar Control Service.

The controller commented that he realised, with hindsight, that the clearance for the C310 to climb to 3000ft should not have been issued as a positive clearance as it might have resulted in the pilot believing he had an IFR clearance. He added that normally for VFR traffic he would pass a restriction e.g. to operate not above 3000ft. He felt that his main concern was to address the C310 pilot's concerns about the presence of the mast by allocating a terrain safe level as soon as possible. He said that he believed that the C310 pilot wished to operate IFR although the pilot never mentioned it on the frequency. He explained that this assumption may have resulted from assessment of the weather conditions; the request for a RAS on initial contact; and the level requested enroute or operating the inbound flight IFR but nevertheless he understood that at the time of the Airprox the C310 was operating VFR. Had he realised that this flight had been in IMC he would have taken positive action to ensure separation between the two flights.

The Glasgow MATS Part 2 states that IFR departures from Cumbernauld should be coordinated with Glasgow before departure. There are no procedures for VFR traffic.

The incident occurred within Class E airspace where separation is not required between IFR and VFR flights. The controller assumed that the C310 pilot was operating VFR at the time, as the pilot had not reported going into IMC, although he believed the pilot's idea was to operate IFR enroute. Consequently, his intention was not to provide standard separation but to deconflict the two flights. Although both ac were at the same altitude he believed that the flights would be sufficiently laterally separated. He did not issue traffic information to either flight at the time. However the C310 pilot, operating on his own navigation, turned towards the F100 resulting in an avoiding turn being issued to the latter and only then was TI passed to the subject ac. It is considered that, in the conditions applicable at the time, it was not advisable to clear both ac to the same altitude, especially using a positive climbing clearance to the C310. Additionally, had TI been issued to the C310 pilot about the F100 on its left, it is possible that he would not have turned towards it.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This incident caused considerable debate both amongst pilot and controller Members as the precise circumstances are open to differing interpretations. The main point of contention concerned both the C310 pilot's and the Glasgow APR's understanding of whether the C310 was operating under VFR or IFR. Although the C310 pilot was requested - and had agreed - to remain VFR, that request was superseded by the instruction to 'climb and maintain 3000ft' which was a specific instruction. By adhering to this instruction, the C310 pilot could not guarantee to remain VFR and he was therefore given by implication an IFR clearance. Had a specific instruction such as 'climb not above 3000ft, maintain VFR' been given the situation would have been much clearer. Equally, had the C310 pilot informed the controller that he was 'going IMC' then that would have given the controller a prompt that the flight was now operating under IFR such that separation was required. (The two flights would then be IFR on IFR rather than IFR on VFR, the latter requiring only the passing of TI). This instruction to climb had invited the C310 to operate IFR in the Class E airspace but the controller had not subsequently provided the required separation instructions to the C310. If the controller was aware and content that both ac were operating IFR at 3000ft, it was not clear from his report how he had intended to separate the ac and by what margins. If he thought that the C310 was VFR, he did not pass the required TI on the F100 allowing the pilot to visually acquire and avoid it. The Board thought on balance that the controller had intended the C310, for the time being, to continue to fly VFR in the CAS and believed that its pilot was so doing. Despite the apparently contradictory factors, Members felt that the C310 pilot implemented the instruction to climb to 3000ft on the assumption that it had been given because of his concern regarding the proximity of the masts and possibly neither pilot or controller had fully realised the implications of the climb which put the C310 into IMC in Class E CAS.

One controller Member opined that even before the climb to 3000ft, the clearance to fly 'not above '2500ft', the base alt of the Class E CAS, was itself a clearance to enter and operate therein, albeit VFR. The Member also noted that the phrase 'Radar Control' - which is associated with CAS entry - was not used at any time. Another experienced controller Member suggested that it is always prudent for controllers to keep abreast of the latest weather situation in their area of responsibility so that they can be sure that any clearances or instructions they give are viable.

An experienced GA Member suggested that in such marginal weather conditions, it would have been wiser for the C310 pilot to plan to fly the route under IFR; this would have had the added benefit of avoiding the masts by a considerable margin. He also noted that the C310 pilot's readbacks of mandatory items were not always full and correct.

As events unfolded and despite the confusion over the Flight Rules of the C310, the Glasgow APR did not take the correct actions as required by MATS Part 1 for either 'IFR on IFR' or 'IFR on VFR'. He apparently attempted to give the F100 2nm lateral separation from the C310 as opposed to 3nm or 1000ft required for IFR/IFR (or give both ac TI as required for IFR/VFR). Fortunately however the ac were separated laterally and the F100 had received a TCAS RA; the Board therefore concluded that there had been no risk that the ac would have collided.

AIRPROX REPORT No 006/06

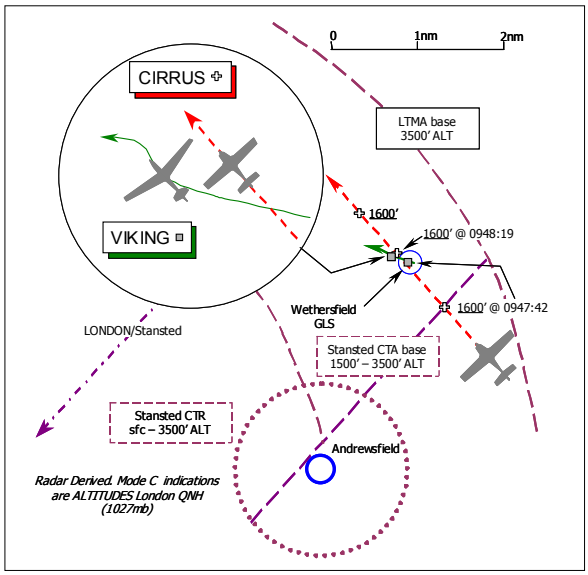
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Glasgow APR instructed the Cessna 310 pilot to climb into conflict with the Fokker 100 without providing the necessary Traffic Information.

Degree of Risk: C.

AIRPROX REPORT NO 007/06

Date/Time:	21 Jan 0948 (Saturday)	
Position:	5158N 00030E (Overhead Wethersfield elev: 321ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Viking Glider	Cirrus SR22
Operator:	HQ PTC	Civ Pte
Alt/FL:	1400ft (QFE 1015mb)	1500ft (amsl)
Weather	VMC CAVOK	NR CAVOK
Visibility:	>10km	>10km
Reported Separation:	200ft V/300m H	500ft V/500m H
Recorded Separation:	0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIKING GLIDER PILOT reports that his glider is white with red wingtips and 'dayglo' stripes. He was operating from Wethersfield whilst in communication with Glider CONTROL on 128·975MHz and had just executed a winch launch to a height of 1400ft QFE (1015mb) [in the order of 1760ft QNH (1027mb)] on a heading of 280°. After releasing from the cable he turned R into wind onto a heading of 320°, which is when the other ac – a low-wing single engine Cirrus monoplane – was first seen 300m away as it overtook his Viking Glider some 300m to starboard on a parallel course and about 200ft below his glider. No avoiding action was taken as the other ac was passing clear when first spotted so a level cruise at a speed of 50kt was maintained. He assessed the risk as "low".

The prevailing weather was CAVOK with a flight visibility of 20km whilst flying out of the sun. The reporting glider pilot was concerned over the potential danger to the other ac from the winch wire. He added that ac flying clear below the Stansted CTA sometimes route far too close to the GLS at Wethersfield.

UKAB Note (1): The UK AIP, at ENR 5-5-1-6, promulgates that Wethersfield Glider launching site is active during daylight hours for aerotow and winch launches, which may attain a height of 2000ft agl, above the site elevation of 321ft amsl.

THE CIRRUS SR22 PILOT reports that he was on a VFR flight from Antwerp bound originally for Duxford with another pilot but their destination was subsequently changed, whilst enroute, to Cambridge. They had just been released by Shoreham [it was actually Southend] but had not yet switched to Cambridge and he was navigating using the electronic map in the Cirrus [although it was subsequently ascertained that a topographical VFR+GPS chart was available to them in the ac]. A squawk of A7000 was selected with Mode C.

Flying in a level cruise at 170kt at an altitude of 1500ft QNH in CAVOK weather, they approached an old airfield that they could see from the crosses painted on the runway was closed: unfortunately the electronic charts did not show it. Neither were they aware that it was used as a glider launch site at certain times. Approaching this unknown airfield they observed some gliders on the ground, so to ensure that they were not flying in the immediate vicinity of any wires etc, they diverted slightly to fly overhead these gliders on the ground. He then spotted an airborne glider about 1000m away above and to the left of his ac. Minimum vertical separation was 500ft as the glider passed above and about 500m to port with a "low" risk of a collision. No avoiding action was taken as the relative courses did not converge so as there was no confliction they continued on to Cambridge. After landing they were asked to telephone the glider site, which he did.

UKAB Note (2): In a subsequent telephone conversation with the other pilot who was flying in the ac, it was determined that the original planned route was to pass to the SW of Stansted inbound to Duxford. Whilst a topographical VFR+GPS chart was available to them they did not refer to it and consequently were unaware that Wethersfield glider launch site lay ahead of them along their revised course. Acknowledging the danger posed by the winch cable, he opined that the Cirrus's electronic map display is usually most reliable.

UKAB Note (3): The Debden radar recording shows the Cirrus squawking A7000 on a steady NW'ly track, maintaining an altitude of 1600ft unverified Mode C (1027mb) as it crosses the lateral SE boundary of the Class D Stansted CTA stub at 0947:42, where the base altitude is 1500ft amsl. Meanwhile a primary contact, believed to be the glider flown by the reporting pilot, is shown departing from the immediate vicinity of Wethersfield on a westerly course before turning onto a WNW'ly track and directly in the Cirrus pilot's 12 o'clock at a range of 1·3nm. The Cirrus overhauls the glider on a track marginally to the W of Wethersfield and subsequently passes 0·2nm [400yd] to the E of the glider at 0948:19 as it starts to overtake the latter to starboard, broadly in accord with the reports of both pilots. The glider pilot's reported height of 1400ft QFE (1015mb) would equate broadly to an altitude of 1760ft QNH (1027mb), suggesting that the glider was in the order of 160ft above the Cirrus's indicated 1600ft QNH unverified Mode C.

UKAB Note (4): The 0950UTC Stansted METAR gives 310/08kt CAVOK 05/04.

HQ PTC comments that this incident highlights the dangers of relying on electronic aids whose database may not be complete. The VGS squadron operates under a permission letter issued by the CAA [8AP/06/02/05 dated 3 Oct 05], which allows the unit to launch to 2000ft agl. An LoA between Stansted and the VGS allows them to operate to 2300ft QNH. The squadron activate this by telephone when they begin gliding operations and close it when they finish, thereby allowing the VGS gliders to operate legitimately in this Class D CAS.

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.

A pilot Member opined that modern electronic aids to navigation can be very useful but are not the complete answer and here the Cirrus pilot reports that the ac's navigational database was apparently less than comprehensive. Usually, when operated correctly such devices will give adequate warning of hazards ahead but in the Board's view it was unwise to rely solely on the electronic database within the Cirrus. It was apparent from the Cirrus pilot's frank report that they were completely unaware of the gliding activity at Wethersfield before they sighted the gliders on the ground. Acknowledging that this was a short-notice change to the Cirrus pilots' planned route, Members opined that reference to VFR charts – that were carried in the ac - would have revealed the danger from winch cables at Wethersfield: the salutary lesson here was to ensure that when faced with a short-notice change of plan you consult all the information available and check carefully for hazards along the new route. With two pilots in the Cirrus there seemed to be little reason for not complying with this basic tenet of good airmanship. Perhaps understandably, the Viking glider pilot had not spotted the Cirrus approaching from abaft the port beam during the winch launch until he turned R into wind, which was when the Cirrus overtook his glider. Whilst it was there to be seen, gliders on winch launches climb at a very high pitch attitude and the Board was briefed that the speed of the Cirrus's approach would have prevented it from being spotted before the launch was initiated. With little further debate the Board concluded that this Airprox had resulted because whilst flying in the vicinity of a notified and active glider launch site of which he was unaware, the Cirrus SR22 pilot flew into conflict with the Viking glider.

In their assessment of the intrinsic risk of collision here, the Board was charged with considering the risk of a collision between the ac involved and not a collision between the Cirrus and the winch wire nor what might have happened if the situation had been slightly different. Nevertheless, the Viking glider pilot reports that he released the winch cable at an altitude of about 1760ft, broadly 160ft above the Cirrus pilots flying at an altitude of 1600ft - as evinced by the radar recording - and thus flying above the base of the Stansted CTA within Class D CAS, apparently without a clearance. Therefore, the Cirrus pilot was extremely fortunate that his ac had not been struck by the cable, after it had been released by the glider pilot and just moments before the Cirrus overflew Wethersfield. The Viking pilot was unaware of the Cirrus until it overtook his ac to starboard and so he had no influence on the eventual outcome. Fortunately the Cirrus pilots had detected the Viking glider at a range of 1000m, which would have enabled them to turn away and afford the glider a wider berth if needs be. As it was,

no avoiding action was considered necessary by either pilot and the Board agreed that there had been no risk of a collision between these two ac in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

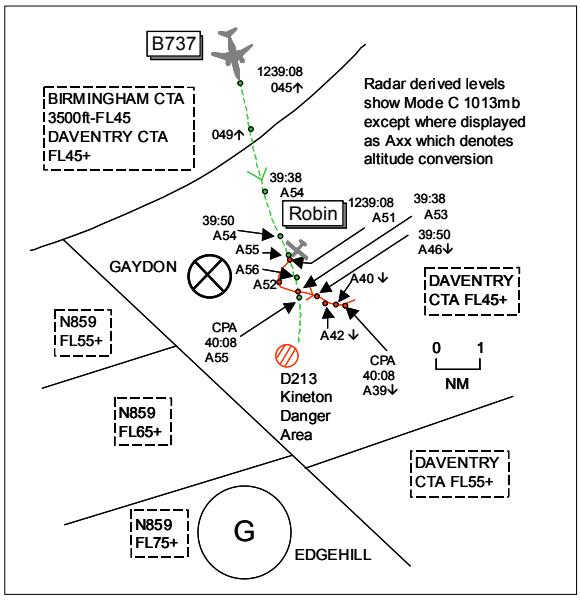
Cause: Whilst flying in the vicinity of a notified and active glider launch site of which he was unaware, the Cirrus SR22 pilot flew into conflict with the Viking glider.

Degree of Risk: C.

AIRPROX REPORT No 008/06

AIRPROX REPORT NO 008/06

Date/Time:	21 Jan 1240 (Saturday)	
Position:	5210N 00126W (12nm W DTY)	
Airspace:	DAV CTA/LFIR	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	B737-500	Robin 2160i
Operator:	CAT	Civ Club
Alt/FL:	FL50	Aeros
		(QNH)
Weather	VMC CLOC	VMC CLOC
Visibility:	10nm	NR
Reported Separation:		
	NR	1500ft V/1·5nm H
Recorded Separation:		
	100ft V/2·3nm H OR	
	1600ft V/1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports outbound from Coventry IFR and in receipt of an ATS from Birmingham on 118·05MHz squawking 0556 with Mode C. A standard departure route was flown and the flight was transferred from Coventry ATC to Birmingham during the period that the ac was levelled at FL50. Heading 180° at 275kt, traffic was noted on TCAS in their 12 o'clock range 3nm closing from the opposite direction at the same level. When communication was established, Birmingham informed them of traffic with which they were now visual. A short while later an RA 'monitor vertical speed' was received followed by an RA 'climb'. ATC gave them a L turn to avoid a conflict but, as the turn was started, he informed ATC that they would be turning R as the conflicting traffic was going in the same direction. He told ATC of his TCAS manoeuvre and visual contact was maintained until they were clear of the traffic, a light ac coloured blue. He did not report the separation distance but assessed the risk as medium.

THE ROBIN 2160i PILOT was contacted and he completed an Airprox report form 3 months post incident. However, a copy of the form was not received at UKAB until one month later. He reports flying solo on a local sortie from Wellesbourne and in communication with Wellesbourne Radio on 124·25MHz squawking 7000 with Mode C. He departed at 1225Z in his blue/white coloured ac and routed to the area that he has always used for aerobatics, between Gaydon and Edgehill/Kineton, cognisant of the FL045 base level of the Daventry CTA. As he entered the area he climbed up to 4500ft, he thought, on the Wellesbourne QNH, carried out his HASELL checks and then set himself up for the first run of the day between Kineton Danger Area and Edgehill. He could not remember the exact sequence but it would normally be a 45° down to gain speed, fly level then a roll followed by a further descent to gain speed ready for a loop, then stall-turn until the altitude was around 3000ft. After this he turned R, he thought, at the end of the sequence into a climbing turn to return to the start position. Climbing through 3500ft, he thought, he saw a large ac (the subject B737) climbing out of Coventry about 5nm away and 2000ft above, off his port wing. Since his direction of travel was between 30-40° from the B737's intended line of flight and he was increasing the separation distance between them, he believed there was no risk. The B737 continued straight on without altering course so he rolled to the R, 90° to the B737's track, to present the underside of his ac to make it more easily visible whilst at the same time he sideslipped down to about 3000ft, he thought. On levelling-out he kept visual contact with the B737 all of the time until it passed abeam before it passed behind by 1·5nm and 1500ft above. Once the B737 was clear of the area he continued with more aerobatics, eventually landing at 1315. He went on to say that he had operated in the area for 14 years, flying various types of ac including Pitts, Yaks and Extras, and had chosen the area as Gaydon was suitable for landing should an emergency arise. Unfortunately, with the regular passenger flights from Coventry, the area was getting unsafe for aerobatic flights so he has since moved his operating area to near Evesham and Long Marston.

UKAB Note (1): During a subsequent telephone conversation with the UKAB Secretariat 4 months post incident, the Robin pilot said that he was unaware of the existence and usage of the aerobatic conspicuity squawk 7004

but is now fully briefed on the transponder code setting procedures to be followed. After explaining the geometry of the encounter, as revealed by the radar recording, he could not remember climbing to 5000ft but that would not be unusual, only it would be dependant on the atmospheric pressure being high relative to the SAS.

THE BIRMINGHAM APR1 CONTROLLER reports that the B737 was transferred to him from Coventry as the ac was reaching FL050. He instructed the flight to squawk 'ident' and although the area was busy with non-airways transponding traffic, he noticed an ac with a 7000 squawk indicating FL048 (unverified) on a W'ly heading. As this was in potential confliction with the B737 he told the flight to turn L and passed TI. The B737 crew reported that the L turn would place their ac into conflict as the unknown ac had now turned onto an E'ly heading. The B737 crew turned R to avoid the other ac and reported a TCAS 'climb' as he was coordinating climb for the flight to FL070 with LTCC. He asked the crew if they had the traffic in sight, which they did, reporting it to be a light ac to their L and slightly below and that they would be filing a report. After the incident, the unknown ac was seen to descend rapidly below CAS and disappeared from radar approx 5min later.

UKAB Note (2): Met Office provided archive data of METARS for Birmingham as EGBB 1220Z 31010KT 9999 SCT018 09/05 Q1028 and 1250Z EGBB 1250Z 32010KT 9999 SCT018 08/04 Q1028

ATSI reports that the B737 departed from Coventry, having been released by Birmingham. The ac climbed to the standard level of FL50 and established contact with the Birmingham APR at 1239:10. At that time the B737 was passing FL45 (altitude 4950ft QNH 1028mb) and the radar recording indicates a 7000 squawk in its 12 o'clock at a range of 4·1nm tracking SSW, with an unverified Mode C readout of altitude 5100ft (cFL46). The APR instructed the crew to squawk 'ident' and then to *"…turn left now heading zero nine zero traffic twelve o'clock at three miles indicating flight level four eight*". The crew replied "*Understood (B737 c/s) it's actually turning in our direction if we turn on that heading"*, to which the APR responded *"Turn right then"* which the B737 crew did. Very shortly afterwards they reported a TCAS climb. The 7000 squawk had reversed its turn from tracking SSW and turned L onto an E'ly track. [UKAB Note (3): The 7000 squawk, later traced to be the subject Robin, indicates unverified Mode C altitude 5300ft (cFL48) on just one radar sweep at 1239:38 when it is just L of the B737's 12 o'clock range 2·3nm as it is level at altitude 5400ft (cFL49).] At 1239:50, as the crew were reporting a TCAS climb, the Robin was in the 11 o'clock position of the B737 at a range of 1·5nm, with the B737 indicating altitude 5400ft (cFL49) and the Robin an unverified altitude of 4600ft (cFL41). The vertical separation continues to increase as the B737 climbs and the Robin descends. [UKAB Note (4): The CPA of 1nm occurs at 1240:08, the B737 showing 5500ft (cFL50), having reached 5600ft (cFL51) on the previous sweep, with the Robin showing 3900ft (cFL34) descending.] At the time of the Airprox the Robin was operating in an area where the base of CAS is FL45. As the Coventry ATSU does not have SSR, there was no way of Coventry knowing that the 7000 squawk was operating inside or outside of CAS at the time the B737 departed. Although the Birmingham APR did not place the B737 under an ATC service, or use the words 'avoiding action', it is considered that this had no effect on the Airprox. Accordingly, it is assessed that there are no civil ATC errors disclosed.

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.

Pilot Members believed that the Robin pilot, in being very familiar with the area, might have allowed this familiarity to influence the thoroughness of his preparation with respect to CAS prior to his flight. Any sortie involving GH or aerobatics needs to be planned carefully to ensure that due attention is paid to both vertical and lateral limits of CAS boundaries. This is particularly crucial when operating below CAS where the base level is defined as a FL as any flight using a QNH that is higher than the SAS requires the pilot to calculate a maximum altitude that can be flown to ensure that the ac remains below the promulgated CAS level. The Robin pilot had reported flying up to 4500ft QNH and during his manoeuvring seeing the B737 to his L 2000ft above. The radar recording shows the Robin's unverified Mode C at 5300ft QNH 1028mb for one radar sweep which equates to 4850ft on SAS (1013mb) with the B737 only 100ft above this level. After seeing the B737, the Robin pilot initially thought their respective flight paths were diverging sufficiently but had then sensed that they were in confliction. He had acted accordingly by manoeuvring to make his ac more conspicuous and then sideslipping down clear of the B737's intended flight path. The Birmingham APR reported seeing the Robin's Mode C at FL048 whilst the B737 crew reported, when levelling at FL050, seeing the Robin at the same level. On the balance of probability, the Board therefore concluded that whilst conducting aerobatics, the Robin pilot apparently entered CAS without clearance, causing the Airprox.

The B737 crew had seen the Robin on TCAS which facilitated them visually acquiring it ahead. The APR gave TI and a L turn to avoid it but the Robin had quickly 'turned-about' so the crew declined the L turn and told ATC that they would be turning R. ATCO Members thought that ideally the APR should have issued 'avoiding action' to the B737, when the Robin's Mode C indicated entry into CAS, but in the circumstances the turn was given by the APR as soon as possible after the Robin's squawk was assimilated and after the B737 crew had already seen the Robin and could 'self manoeuvre' to avoid it. As the B737 crew started to follow their TCAS RA 'climb' guidance, the Robin pilot quickly manoeuvred clear of the B737's intended flight path. Taking all of these elements into account, the Board concluded that the robust actions taken by the Robin pilot, when combined with the visual sighting and actions taken by the B737 crew, had been effective in removing any risk of collision.

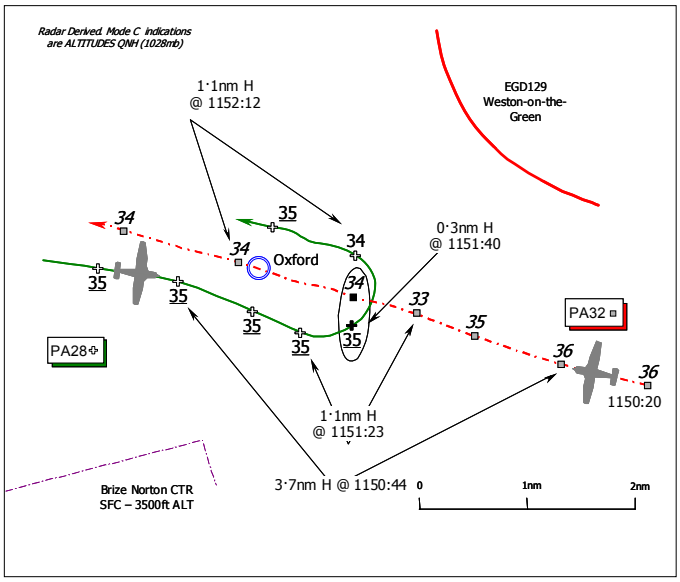
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Whilst conducting aerobatics the Robin pilot apparently entered CAS without clearance.

Degree of Risk: C.

AIRPROX REPORT NO 009/06

Date/Time:	21 Jan 1151 (Saturday)	
Position:	5149N 00119W (Overhead Oxford Kidlington - elev 270ft)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	PA32
Operator:	Civ Trg	Civ Pte
Alt/FL:	3500ft (QNH)	3400ft (QNH)
Weather	VMC CLOC	VMC CLOC
Visibility:	10km	10km
Reported Separation:	50ft	Not seen
Recorded Separation:	100ft V/0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT, a flying instructor, reports his ac has a white/blue livery and all the ac's lighting including the landing light and wing-tip strobes were on whilst holding VFR in the overhead of Oxford/Kidlington aerodrome flying in VMC, clear of cloud with an in-flight visibility of 10km. He was sitting in the RHS acting as safety pilot/ instructor with a student occupying the LHS with IF screens erected. They were in receipt of a FIS from OXFORD TOWER on 133·425MHz, squawking A7000 with Mode C.

Oxford ATC had given a call that other traffic was in the area and he was looking out but could not see the other ac. Flying level at 3500ft Oxford QNH (1028mb), they flew overhead the beacon heading 094° (to track 100°) and then turned L to proceed outbound for the Oxford RW09 NDB procedure. After the L turn outbound [the procedure track is 290°] and within 10sec of steadying on the outbound course at 100kt, he saw the other ac – a low-wing single engine PA32 - low, about 100m away to his L and tracking away from his own ac. He estimated that the PA32 had crossed beneath his ac from their R 1 o'clock to their L 8 o'clock about 50ft beneath his PA28 when they were on the eastbound heading inbound to the beacon.

When the PA32 was approximately 2nm away, its pilot spoke to TOWER to say he was still looking for the holding traffic – his own PA28 – so he reported that he was visual with the PA32. He added that no avoiding action was taken as the other ac had already passed underneath his PA28 when it was first spotted. The risk was not assessed.

THE PA32 PILOT provided a brief account but helpfully provided a copy of his original chart. He was flying with another qualified PPL holder from Stapleford to Gloucestershire/Staverton under VFR, in VMC some 100ft below cloud with an flight visibility of 10km and with the sun on his port side. The ac has a white/blue colour-scheme and the anti-collision lights including the tail mounted HISL were on. He was in receipt of a FIS from Oxford TOWER, he thought on 125·325Mhz but actually on 133·425MHz, and squawking A7000 with Mode C selected on. A heading of 286° was flown from overhead BOVINGDON to overhead Oxford at 29nm BNN DME, flying at 125kt in a level cruise at 3400ft Oxford QNH (1028mb), before turning L to track 275° from the Oxford overhead. The ac flown by the reporting pilot – the PA28 – was not seen; the risk was not assessed.

THE OXFORD COMBINED APPROACH & TOWER CONTROLLER reports that this was an exceptionally busy Saturday. The PA28 was in the "OX" RW09 NDB Hold at 3500ft Oxford QNH (1028mb). He had confirmed that the PA28 crew was operating VFR and had instructed its pilot to report 'Beacon Outbound' VFR. When the PA32 pilot called to transit through the Oxford aerodrome overhead VFR at 3400ft QNH, from Stapleford to Gloucestershire, he passed traffic information to the pilots of both ac and this was acknowledged by both of them. The PA32 pilot then asked if he should climb or descend so he was advised that the PA28 in the hold would shortly

be outbound on the procedure and descending: the PA32 pilot continued maintaining 3400ft QNH. Since both ac were operating VFR and both had acknowledged the traffic information provided on each others' ac he thought that any potential conflict had been resolved.

After the PA28 landed he received a telephone call from the PA28 instructor saying that the transiting PA32 had flown very close to his ac. Subsequent to a 'face to face' discussion there was no indication that the PA28 pilot would be filing an Airprox report until the following Tuesday morning when he visited the Tower.

The 1150UTC Oxford weather was reported as: 310° 10-15kt; 10km nil weather; Cloud: SCT 3500ft; +7/+4; QNH: 1029mb QFE: 1019mb.

ATSI reports with RT transcript that the Oxford APPROACH and TOWER positions were combined due staffing considerations. Consequently, due to the high number of movements, the controller's workload was described as high.

The PA28 was holding over the OX NDB at 3500ft QNH (1028mb) and had been cleared for an NDB approach to RW09. The pilot confirmed he was operating the procedure VFR. The PA32 pilot established communication with the controller at 1150:20, reporting *"..PA32 out of Stapleford…routeing…Bovingdon overhead Oxford to Gloucestershire we're currently 4 miles to the east of you at 3400 feet 1023 just like to transit through your overhead".* The PA32 pilot was informed he was being provided with a FIS; was issued the Oxford QNH 1028mb; instructed to report overhead the aerodrome and, at 1150:40, was passed traffic information about the subject PA28, *"traffic in the Oscar Xray hold overhead the field it's a PA28 at 3500 feet"*. The PA32 pilot responded at 1150:50 *"we copy the traffic would you like us to climb or descend?".* He was informed by APPROACH *"that traffic will shortly be descending outbound you can contin-maintain 3400 feet for the moment that traffic also VFR QNH 1028"*. Although the pilot of the PA32 had not mentioned his flight conditions, the controller assumed he was operating VFR and this was later confirmed in the pilot's written report. The PA32 pilot acknowledged with *"1028* [mb] *and we'll maintain 3400 feet"* QNH. When asked by the controller to report his position in the hold the PA28 pilot reported at 1151:10 *"..just going over beacon beacon* [sic] *outbound for the procedure* [RW0]*9"*. The controller informed the PA28 crew about the PA32 just before 1151:20 *"..roger you probably copied the PA32 southeast of the field 3400 feet VFR to transit report leaving 3500* [ft]", which the pilot answered *"wilco"*. The radar recording reveals that moments later at 1151:40, the subject ac passed each other by 0·3nm minimum horizontal separation, the PA28 in the L turn at 3500ft [unverified] Mode C some 100ft above the PA32 indicating 3400ft [unverified] Mode C. After a new QNH of 1029mb was issued at 1151:50, the PA32 pilot reported at 1152:10 *"through the overhead at 3400 1029"*. The controller requested a transmission from the PA28 pilot for a DF bearing whereupon the pilot responded at 1152:20, *"I've got the traffic* [the PA32] *in sight.."*. The radar recordings reveal that after the ac had passed each other, the PA28 made a L turn, resulting in it tracking about 1·3nm behind the PA32. It was when he was behind the PA32 that the pilot of the PA28 reported the traffic in sight. The PA32 pilot did not sight the PA28: when the controller informed the PA32 pilot that *"the previously mentioned PA28 traffic is in your right 5 o'clock has you in sight"* the PA32 pilot replied *"…copied that we haven't got him at this moment".* The PA28 pilot's written report confirmed the Airprox occurred whilst he was heading E.

Both acs' crews were operating VFR and despite the high workload appropriate traffic information was passed to both pilots. In addition to this Airprox, an ATC overload was reported on this day. As a result of this, local Management have agreed to the introduction of another controller to be rostered on Saturdays, allowing the APPROACH frequency to be operated during the period 0930-1600.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was readily apparent from the ATSI report that both the PA28 and PA32 were operating on the same frequency and had received traffic information about each other's ac before the Airprox occurred. The traffic information provided to the PA28 crew by the Oxford controller was given just 20sec before the closest point of approach between the two ac, but that said the PA28 crew could also have heard the PA32 pilot's initial call which would have given earlier warning of its approach from the E. Clearly, the training task does place a high workload on instructors whilst closely monitoring students conducting instrument flying training and evidently with the latter's

view obscured by IF screens it was up to the instructor to maintain a comprehensive lookout scan and ensure appropriate visual separation under the VFR that pertained. The radar recording evinced that the PA32 was there to be seen, marginally above the PA28, but some Members wondered if the IF screens were an issue here and might have obscured the PA32 'cross-cockpit' from the flying instructor sitting in the PA28's RH seat. Equally, the PA32 pilot should have seen the PA28 beforehand or as it banked into the L turn on his port beam to turn in astern. Evidently, the 'head-on' aspect with both ac at almost exactly the same level and of small cross-sectional area with no relative crossing motion to highlight their presence until the latter stages of the encounter all combined to mask the presence of each other's ac from the pilots. The scattered cloud reported at 3500ft might also have been significant here. Thus with both pilots unaware of the proximity of the other ac until after the event, the Board concluded unanimously that this Airprox had been the result of a non-sighting by both pilots.

Members agreed that the Oxford controller could have done little more to prevent this close quarters situation as both the PA28 instructor pilot and the PA32 pilot, operating under VFR, were equally responsible for safe separation from each other's ac. Fortuitously, the PA28 had not passed exactly over the NDB situated on the aerodrome for if he had the encounter might have been a lot closer. As it was the minimum horizontal separation was 0·3nm as the PA28 turned about around the PA32 a mere 100ft above it to roll out astern of the latter, which is when the PA28 instructor spotted it. Whilst this might have been sufficient to ensure that a collision was narrowly averted the Board concluded that the safety of the ac involved had certainly been compromised.

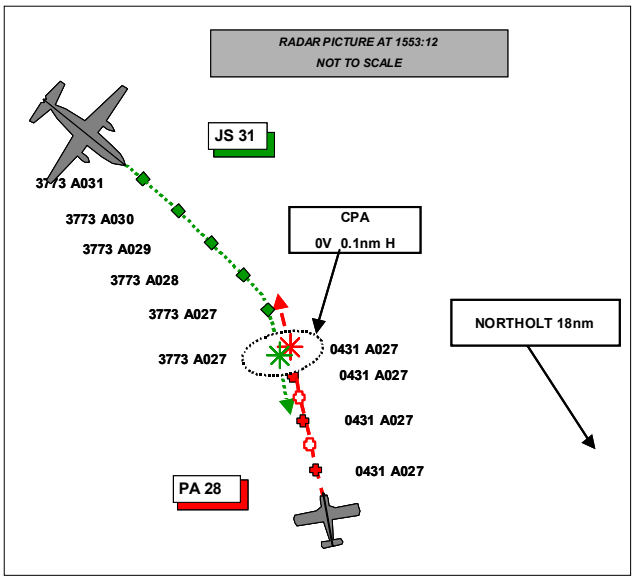
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by both pilots.

Degree of Risk: B

AIRPROX REPORT NO 010/06

Date/Time:	31 Jan 1553	
Position:	5140N 00051W (2nm W of Princes Risborough)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Jetstream	PA28
Operator:	CINC FLEET	Civ Pte
Alt/FL:	2600ft (QNH 1026 mb)	2700ft (QNH 1025 mb)
Weather	VMC CLNC	VMC CLNC
Visibility:	6-7km	10km
Reported Separation:	20ft V/100m H	Not Seen
Recorded Separation:	0 V/0.1nm (185m)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading 140° at 200kt on an IFR flight at FL50 from Plymouth for a "Romeo" arrival at Northolt with VHF handovers from Plymouth Military, Yeovilton, Lyneham and Benson. On handover from Lyneham, heading 065°, Benson gave a limited RIS and held them at 3400ft on the London QNH of 1026 while approaching the Romeo arrival entry point (usually 2400ft at that stage). At about 1551 Benson called traffic 2nm S, 900ft below them but with no relative track and later at 1553, about 2nm before the entry point, Benson called *"On instructions from Northolt turn R and head 170° and descend to 2400ft*"; they complied with the instruction. On passing 2600ft and heading 140° a light ac was observed in the 1130 position about 150yds away, straight and level and flying on a N'ly heading. They increased the bank angle to 40° to increase the separation distance and he informed Benson that he had taken avoiding action on a light ac; shortly after they were handed over to Northolt. He assessed the risk of collision as being high.

THE PA28 PILOT reports heading 353° at 110kt en route from Blackbushe to Humberside under VFR squawking as directed with Mode C and initially in receipt of a FIS from Farnborough. Farnborough terminated the service and requested they *'free call on route'*. They squawked 7000 and were calling Brize at the reported time of the Airprox. They recall Farnborough advising them of a contact on a reciprocal heading with no height details but their lookout did not reveal any ac so they continued en-route.

The details in the report were advised by RAC (Mil) later and at the time the PA28 pilot was unaware of the Airprox. They did not see the reporting ac.

MIL ATC OPS reports that all timings in this report are UTC and the timings of the tape transcripts correlate accurately with the video recording.

Benson Zone (BEN) was manned by a trainee and mentor and they were providing a RIS, limited because of SSR only operations, to a Jetstream that was routing from Yeovilton to Northolt via Princes Risborough. At 1551:54 Northolt Supervisor (NOR SUP) called BEN and asked to take the Jetstream on a heading of 170° for a direct approach to RW07 at Northolt. After checking that the pilot was happy with this heading change, BEN instructed the crew to set the London QNH 1026Mb and to descend and report level at 2400ft. At 1552:39 BEN passed TI to the Jetstream pilot on a PA28 *"[C/S] as you turn traffic south east 2 miles northwest bound indicating 900 feet below."* The pilot acknowledged and then BEN updated the TI at 1553:05 *"[C/S] previously called traffic now right 1 o'clock, half a mile, right left, indicating 200 feet below"*. The pilot transmitted a further acknowledgement and was then instructed to avoid over flying Wycombe Air Park. By this time, Northolt Zone (NOR ZONE) had replaced NOR SUP on the landline and was ready to take the handover when the BA31 pilot transmitted to BEN *"...just be advised we've just*

passed less than a quarter of a mile a light aircraft heading due north at about the same height." BEN confirmed that he believed this was the traffic that had previously been called. The handover then continued normally.

Analysis of the Heathrow radar recording at 1552:29 shows the Jetstream 4nm to the NW of the PA28 tracking NE indicating A035, whilst the PA28 is seen tracking NW indicating A025. At 1552:34 the Jetstream is seen to commence descent when it indicated A034 and 5sec later, at the time the TI was passed, the ac had started to turn right. At this point the ac are 3nm apart indicating vertical separation of 900ft. When the TI was updated at 1553:05 the ac were 0.5nm apart with the Jetstream indicating A028 and the PA28 indicating A027. At 1553:13 the aircraft reached the CPA with 0.1nm with both ac indicating A027.

The portion of airspace within which this Airprox occurred is extremely congested. BEN was providing a limited RIS to the Jetstream crew due to operating SSR only. After an earlier prenote, NOR Sup rang BEN to initiate an early handover to position the Jetstream by means of a turn onto 170° for a visual recovery to RW07 via a more expeditious route rather than the standard Northolt arrival via Princes Risborough. BEN asked the Jetstream crew if they were happy to accept the turn but did not pass concurrent TI on the PA28, which at that stage was 4nm to the SE of the Jetstream and directly on the descending Jetstream's projected track, indicating 900ft below. The passing of TI, before commencement of the turn, may have affected the crew's decision to accept the turn or would have given the crew more opportunity of acquiring the PA28 visually. The Jetstream crew were under a RIS and operating in a "see and be seen" environment, however both BEN and NOR Sup should have taken into consideration the Jetstream's projected track before initiating a turn which would put the ac into direct confliction with another ac, with little opportunity for the crews to acquire the opposing ac visually.

ATSI reports that PA28 pilot contacted Farnborough at 1541 and requested a FIS. The flight was issued with a Farnborough squawk and identified 1nm N of Blackbushe. The pilot was advised he was in receipt of a FIS, which he read back. No TI was passed to them and the flight was transferred en route just before 1553 (shortly before the Airprox occurred).

CINCFLEET comments that this was a very close call that in hindsight may have been prevented had the NOR SUP not acted in good faith and in the interests of expedition. The turn onto 170°, in VMC, was supported by relevant TI with two pilots operating VFR but still resulted in the Airprox. The limited airspace available is routinely busy and has resulted in other similar incidents with pilots following Northolt standard arrival procedures. This was the flying pilot's second Airprox submitted in this airspace on approach to Northolt and has resulted in the unit concerned amending policy so that all approaches to Northolt made by its ac are under RAS or via the airways structure. Both options enhance safety but compromise expedition. TCAS is unlikely to be fitted to this aircraft before 2012.

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 briefed by a controller familiar with operations in the area of this incident that this is a very busy and complex portion of Class G airspace with Northolt, Denham and Wycombe traffic and many VFR transits skirting London's CAS.

Members noted that the non-TCAS-equipped Jetstream was under a RIS in Class G airspace, albeit positioning prior to entering CAS, and the PA28 was also operating legitimately in the same area. That being the case, the prime means of collision avoidance was 'see and avoid' under the Rules of the Air. In this case the PA28 had right of way but the Rules of course depend largely on both pilots seeing the opposing ac and taking appropriate action which is frequently not the case as witnessed by this incident.

It is possible that the Jetstream pilot was unsighted due to the PA28 being below his line of vision and possibly obscured by the ac fuselage until the two ac were at about the same alt of 2700ft. Further, the radar recording showed that the ac were on a constant bearing with almost no relative movement. From the PA28 cockpit the Jetstream would have been in the high 11 o'clock descending; Members were surprised that the pilot had not seen the much larger Jetstream as it approached him.

Notwithstanding that the cause of this incident had been primarily a lookout matter, the Board felt that the Jetstream pilot might not have accepted the early turn onto 170° - which put the ac in conflict - if he had been given TI before or during the turn suggested by Benson Zone. By the time TI was passed around 25 sec later, the Jetstream pilot had already commenced the turn and descent and had limited opportunity to change his course of action.

While the visual arrivals at Northolt are well used and perfectly legitimate, IFR arrivals should ensure that incidents such as this one do not occur. Such arrivals, at least from a controller's perspective, are preferable. The Board welcomed the follow-up action initiated by the unit.

PART C: ASSESSMENT OF CAUSE AND RISK

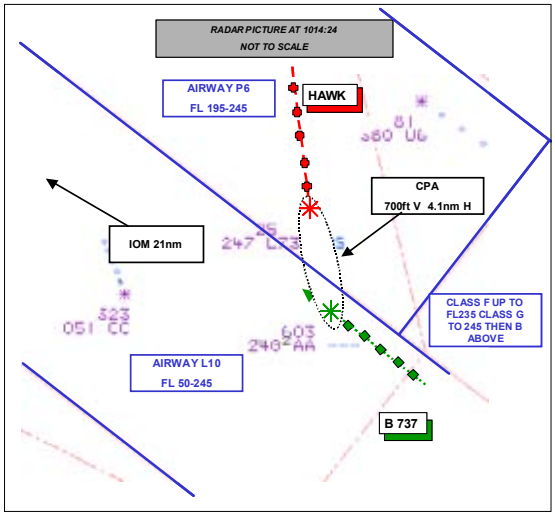
Cause: Non-sighting by the PA28 pilot and a late sighting by the Jetstream crew.

Degree of Risk: B.

Contributory Factors: Benson Zone offered the Jetstream crew a turn without supporting Traffic Information.

AIRPROX REPORT NO 011/06

Date/Time:	2 Feb 1014	
Position:	5359N 00407W (17nm SE Isle of Man)	
Airspace:	L10	(Class: A/B)
Reporter:	ScATCC	
	First Ac	*Second Ac*
Type:	B737	Hawk TMK1
Operator:	CAT	HQ PTC
Alt/FL:	FL240 (NR)	FL250
Weather	NR NR	VMC CAVOK
Visibility:	100nm	Unlimited
Reported Separation:	700ft V/3nm H	700ft V/1.5nm H
Recorded Separation:	700ft V at 4.1nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

ScATCC reports that LJAO co-ordinated the Hawk crossing YL10 southbound at FL250 against the B737 cruising westbound on L10 at FL240. As a courtesy, he passed TI to the B737 pilot on the Hawk about 2min before they were due to cross. When they were about 4nm apart he observed the Mode C on the Hawk indicating FL248 descending so he immediately gave the B737 an avoiding action descent, there being no meaningful lateral avoiding action due to the close proximity of the aircraft. The B737 responded that he was already following a TCAS descent. The Mode C on the Hawk indicated FL247 descending, and then quickly returned to FL250. The B737 pilot advised that he would be filing an Airprox.

THE B737 PILOT provided a report 7 weeks after the incident which stated that he was heading 310° on L10 at 270kt IAS when Scottish ATC warned them about military traffic to the N of them descending to 1000ft above their cruise level, FL240. TCAS contact was established and the other ac appeared to level at FL250. Visual contact was made on a Hawk aircraft which was under military control. The other ac then started to descend which triggered a TCAS RA *"descend, descend now".* The F/O, who was the handling pilot, took correct TCAS drill and at the same time the Scottish controller called them to descend to FL200 as avoiding action. The other aircraft got to about +700ft and 3nm from their position and was closest as it passed through their 6 o'clock.

THE HAWK TMK1 PILOT reports heading 175° at 420kt and cruising at FL250 under the control of Swanwick Mil, who reported traffic in the 11 o'clock, left to right, 1000ft below. The student pilot then allowed the ac to descend whilst looking for this traffic. Once the descent was noted, the rear seat instructor took control and climbed back to FL250. The ac had descended approx 250-300ft during the manoeuvre. An airliner [with a readily identifiable colour scheme] was observed passing left to right about 1000ft below and 1.5nm in front. There was no collision risk as the airliner was in sight throughout.

MIL ATC OPS reports that all timings in this report are UTC but that the timings on the RT transcript are not adequate to check correlation of the radar and RT; it is however, highly likely that they correlate.

LJAO NW (NW) was working a Hawk callsign routeing from IOM to Valley while Antrim were working a B737 at FL240. NW had co-ordinated with Antrim that the Hawk would be not below FL250 against the B737 at FL240. Although the timings on the transcript are missing it is apparent that NW cleared the Hawk pilot to fly at FL250 and the pilot agreed as follows: NW broadcast *"[C/S]...maintain FL250, I may be unable to descend you north of Valley, you may have to maintain at 250 until the Welsh MTA"* and the pilot replied *"[C/S] roger happy to maintain 250..."* and later, just before passing traffic information (TI) on the B737, NW says again *"[C/S] roger maintain FL250."* At 1013:55 NW transmits the TI to the Hawk *"[C/S] traffic left 11 o'clock 8 miles crossing left right co-ordinated a thousand beneath"* and the pilot replies *"[C/S] visual."*

Analysis of the Great Dunn Fell radar recording at 1014:00 shows the Hawk indicating level at FL250, on a S track, 9nm NW of the B737. At the same time the B737 is tracking NW, indicating FL240. At 1014:16 the ac are 5.8nm apart and the Hawk indicated FL248 at the start of its descent; on the next sweep the Hawk's Mode C indicates FL247, the B737 indicates FL240 and the returns are 4.1nm apart. At 1014:32 the next radar sweep shows the ac 2.5nm apart and the B737 is indicating FL238 as it responds to the TCAS RA and the Hawk indicates FL249 as the ac returns to its assigned level. On the next sweep the Hawk's Mode C is not displayed but the next sweep shows the ac 1.6nm apart and diverging with the Hawk indicating FL250 whilst the B737 indicates FL233. Thereafter the ac continue to diverge. It is clear that NW carried out acceptable co-ordination to maintain separation between the Hawk and the B737 and it is also clear that both the controller and the Hawk pilot understood that his ac was cleared to fly at FL250. In addition the Hawk pilot was visual with the B737 before he descended below his assigned level. The controller did not notice the level deviation straight away and has very honestly reported that this was due to a mistake in his label management which left the Hawk's Mode C obscured for a short period.

ATSI reports that LJAO contacted the Scottish Antrim sector and requested coordination across the airways system to the south of the Isle of Man with a Hawk. It was agreed that the Hawk would cross southbound not below FL250. A few minutes later LJAO called again and requested confirmation that the B737 would be not above FL240. This was confirmed and agreement was reached that the Hawk would be not below FL250 with the B737 climbing to not above FL240.

When the B737 called on the Antrim frequency, the controller passed TI on the crossing Hawk. At the time, the Hawk was maintaining FL250 in the 2 o'clock position of the B737 at a range of 30nm. As the Hawk neared the edge of the airway the Mode C started to decrease, and at 1014:16, when the Hawk was still in the B737's 2 o'clock but now at a range of 5.8nm, it was indicating FL248. It further reduced to FL247 when at a range of 4.1nm and the Antrim controller gave avoiding action and TI to the B737 pilot who replied that they were in a TCAS descent. As the ac continued to converge the Mode C of the Hawk quickly returned to FL250 and it passed approximately 1.6nm behind the B737.

UKAB Note (1): MATS Part 1 Sect 1 Chap 5 12.1.4 states:

'Although aircraft operating in controlled airspace are deemed to be separated from unknown aircraft flying in adjoining uncontrolled airspace, the radar controller should aim to keep the aircraft under his control at least two miles within the boundary where possible. Unpredictable manoeuvres by unknown aircraft can easily erode separation'.

HQ PTC comments that this incident was caused by a straightforward altitude infringement. Crews have been rebriefed as to the importance of maintaining cleared levels in 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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board was satisfied that this was a straightforward level deviation by a student pilot that was not corrected by the instructor before it caused a TCAS alert in the B737. The Board noted that the Antrim SC had picked up the deviation very quickly, giving accurate TI and avoiding action to the B737 crew who reacted correctly to this TI; to the TCAS TA and to the subsequent TCAS RA. Due to the correct and timely action and the incident geometry, the Board considered that there had been no risk of collision in this case.Without suggesting that such might have been a factor in this incident, Members pointed out that instructors should be aware of the possibility of altitude deviations and be prepared to take control as soon as any deviation becomes apparent rather than letting the situation develop.

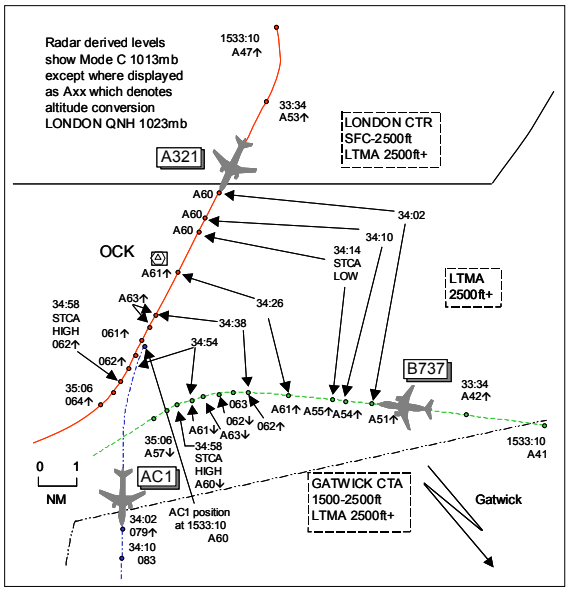
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hawk crew descended below their assigned level.

Degree of Risk: C.

AIRPROX REPORT NO 012/06

Date/Time:	27 Jan 1535	
Position:	5114N 00028W (12nm NW Gatwick)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-800	A321
Operator:	CAT	CAT
Alt/FL:	6500ft↑ (QNH 1023mb)	NR
Weather	VMC CLAC	VMC CLBL
Visibility:	10km	10km
Reported Separation:	NR	NR
Recorded Separation:	300ft V/2·8nm H OR 1000ft V/1·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports outbound from Gatwick IFR heading 270° at 250kt and in receipt of a RCS from London on 126·82MHz squawking 4422 with Mode C. Whilst climbing through 6500ft for 7000ft, he thought, ATC told them to descend to 5000ft and to turn onto heading 250°. They then realised that they had a TCAS TA alert on the EHSI on S'bound traffic 300-400ft above them 4nm away to their R. As they started the turn and descent another TA alert was received on traffic to their L so they asked the controller to confirm the required heading, informing him of the other traffic. ATC told them they were clear of that traffic so they continued the L turn onto 250°. They visually acquired the first traffic when given TI by ATC (2 o'clock 2 miles), a B757 or A321, passing clear to their R and above. ATC apologised.

THE A321 PILOT reports, 1·5 months post incident, outbound from Heathrow IFR following a MID SID from RW09R and in receipt of an ATS from London. After transfer to London, instead of continuing S they were given a R turn onto a N'ly heading, he thought (but was not sure), back towards Heathrow. They assumed there must have been conflicting traffic but they did not see traffic, he thought, nor receive any TCAS TA or RA alerts/ warnings. After a short time they were given a S'ly heading to route to their destination.

THE LTCC SW DEPS/OCK SC reports that the B737 was climbed to 4000ft by the Gatwick Director. He made 'face to face' coordination with the WILLO SC but was not precise. He asked if he could climb (the B737) after crossing tracks with "*the 'company prefix' on the Midhurst*". [UKAB Note (1): the ac to which this refers is shown in the diagram above as AC1]. This was approved and after crossing tracks with this ac he told the B737 flight to climb to FL130. As the flight approached 5000ft he noticed the subject A321 (same company as the previous crossing ac) at 6000ft, 5nm to the NW of the B737. He told the B737 crew to turn L and descend to 5000ft but no reply was received so he instigated avoiding action by issuing a turn and descent but still there was no reply. After repeating the instruction the B737 crew acknowledged and he then gave TI but the crew seemed reluctant to turn L as they reported that they had traffic there. By now the A321 was in the B737's 1-2 o'clock. Eventually the B737 descended, but not before reaching 6000ft, and it also turned L onto a heading but not the final one that he had issued which he believed was 160°.

THE LTCC WILLO SC reports the A321 was climbing on a MID departure behind another ac of the same company also on a MID departure. The OCK SC asked to climb a KENET departure under 'the 'company prefix' on MID'. The OCK SC climbed the KENET departure, the B737, to FL130 after passing behind the first MID departure [AC1] at 6000ft but before it had passed the A321. The OCK SC spotted the conflict at range 5nm and told the B737 to descend immediately to 5000ft as it was climbing through 5300ft. He, the WILLO SC, told the A321 flight to climb immediately to FL120 and then turn R from heading 205° onto 090° before passing TI. He saw the B737 reach

altitude 6200ft before descending and heard the OCK SC turn the B737 onto 160° from 285°. The A321 crew reported visual with the B737 whilst turning.

ATSI reports that the controller had been operating as the SC for the bandboxed SW Deps/OCK Sectors for about 10min. He described his workload as medium/light at the time of the Airprox and, consequently, it had not been considered necessary to split the sector.

The B737 flight established communication with the SW Deps/OCK SC at 1531, after departure from Gatwick's RW08R on a KENET 3P SID. The routeing for this SID is *'Straight ahead until I-GG d3, then left turn to intercept DET VOR R262. Follow DET VOR R262 to intercept SAM VOR R070. At SAM d20 turn right to intercept GWC VOR to KENET (LON VOR R276/d37)'*. The pilot reported maintaining 4000ft and was instructed that there was no speed restriction and to establish on heading 285°.

The controller said that he decided to request further climb for the B737. Accordingly, he turned to his colleague on the WILLO Sector (situated at the next control position) to coordinate the climb. Although he could not recollect completely the development of the coordination process, he believed, having observed the radar recordings of the event, that he must have seen AC1 (same company as the subject A321), a Heathrow departure from RW09R on a Midhurst 3J SID, on his radar display. The routeing of this SID is *'Straight ahead to LON d2, then turn right onto LON VOR R127 until LON d3.5, then turn right onto MID VOR R029 to MID VOR'*. With certain minimum cross over points, the SID altitude is to cross MID VOR at 6000ft. He had asked the WILLO SC if he could climb the B737 after crossing tracks with this ac. He could not recollect whether he had referred to this flight as "*the company prefix*" or "*the Midhurst*" or possibly a combination of both sets of words during the face-to-face coordination. By his own admission he confirmed that he did not refer to the full c/s (NB See last paragraph). He had not noticed the A321, which was also routeing on a Heathrow Midhurst 3J SID behind AC1, on the radar display at the time. The climb clearance was agreed but neither he nor apparently the WILLO SC could remember the exact words used in the acceptance. The WILLO SC believed that the climb coordination referred to the A321. At 1533:10, assessing the B737 to be separated from AC1, the SC instructed the former flight to climb to FL130. However, this clearance did not take into account the A321 which at the time was 13nm NW of the B737 on a conflicting routeing. The SC commented that, for an inexplicable reason given that it was clearly showing on the radar recordings, he did not observe this ac until the B737 was approaching 5000ft, approximately 7nm from the A321 (at 6000ft), just before STCA activated. To resolve the confliction, he instructed the B737 crew (1534:00) to *"turn left immediately heading two five zero and descend again altitude five thousand"*. Receiving no response from the pilot, the message was repeated. Again the pilot did not reply, so the following transmission was issued to the B737 flight *"descend altitude five thousand avoiding action turn left heading two zero zero degrees"*. The subject ac were still on conflicting tracks, 4·4nm apart, both at altitude 6100ft. The pilot reported (1534:30) descending but read back the heading as 250°. This response was approximately 30sec after the first turn/ descent instruction had been passed. The SC explained that he did not use the term 'avoiding action' initially because he believed that the subject ac were far enough apart to ensure separation would be maintained as the ac turned. It is possible, however, that the use of this term may have alerted the pilot to the instructions straight away. The controller commented that he overheard the WILLO SC instruct the A321 to turn onto a heading of 090°. He erroneously believed that this would result in this ac turning L towards the B737. In fact the A321 had been instructed to turn R. Acting on the assumption that the A321 would be turning L, the SC decided to turn the B737 further L and transmitted *"Avoiding action turn left now immediately heading one six zero degrees"*. The pilot read back descending, with a heading of 220°. Information was then passed (1534:50) *"Traffic is now your two o'clock range two miles"*. The pilot responded *"Okay we got in sight we got the other traffic here on the left"*. The SC responded that the traffic on the L was clear. The SC thought, at first, that the pilot had transposed the position of the A321, relative to his ac. However, there is an ac showing on the radar replay to the L of the B737. This is squawking a Farnborough squawk, with no Mode C. The SC said that, although this ac would have probably been on his radar display, because he usually displays Farnborough traffic, he did not consider it when the B737 made his comments.

Meanwhile, at 1534:10, the WILLO SC, instructed the A321 flight to *"climb immediately flight level one two zero continue on the heading"*. This transmission was made after hearing the SW Deps/OCK SC's first (unacknowledged) turn and descent instruction to the B737 (L 250°, descend to 5000ft). No messages were passed between the two SCs so the WILLO SC was unaware that the B737 had not responded to these instructions. Information was then issued to the pilot of the A321 about *"traffic left to right stopping below you it's descending again"*. (Radar recordings reveal that the B737 was still climbing at the time, with the Mode S selected level showing FL130.) Shortly afterwards (1534:40), the A321 was instructed to turn R heading 090° whereupon

the pilot reported visual with the other traffic. The radar recording reveals that by 1534:54, the B737 has commenced descent from its highest level (FL063 attained at 1534:42) and is passing altitude 6100ft (FL058). The A321 is still on a conflicting track, climbing through FL062, 1·9nm away.

[UKAB Note (2): Four seconds later the vertical separation has increased to 500ft, the A321 climbing through FL062 with the B737 descending through altitude 6000ft (FL057) whilst horizontal has reduced to 1·6nm. The CPA of 1·4nm occurs at 1535:06 when standard separation is restored as the B737 descends through altitude 5700ft (FL054) and the A321 climbs through FL064, with both flights having commenced their respective turns as instructed by ATC.]

A Temporary Operating Instruction (TOI 153/05), entitled 'Readback of Coordination Messages', with an effective date of 1 November 2005, was published by LTCC Operations. This was followed up by a Supplementary Instruction (SI 07/06), effective 1 February 2006. Both instructions stated that 'Individual coordination messages (including 'tactical' coordinations) must always include a full ac callsign'. It also confirmed that this must occur during either telephone or 'face to face' coordination. The controller commented that he was aware of this instruction and agreed he should have complied with it.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear to the Board that had both SCs complied with the TOI and SI during the 'face to face' exchange, any ambiguity in the agreed coordination could have been removed. The SW Deps/OCK SC had led the coordination process without using a full ac c/s which had led to a poor response from the WILLO SC. Either SC could have 'broken the chain', the SW Deps/OCK by using the full c/s of AC1 - the ac he was looking at - or the WILLO could have pointed out the A321 which was following AC1 on the same SID. In this case, however, following an ambiguous coordination agreement with the WILLO SC, the SW Deps/OCK SC climbed the B737 into conflict with the A321 which had caused the Airprox.

The SW Deps/OCK SC had climbed the B737 when it was clear of AC1 but then noticed the subject A321 in potential confliction. He twice told the B737 crew to turn L and descend but the crew did not respond so on the third occasion he gave the flight avoiding action instructions which were acknowledged, albeit the heading readback was incorrect. Following a further avoiding action L turn and TI, the B737 crew visually acquired the subject A321 although they had earlier received a TA alert on it some 4nm away. From the outset, the B737 crew did appear to be slow to turn but unbeknown to the SC they had believed that another ac to their L was also in potential confliction and had eventually queried this with the SC. This ac, working Farnborough, would probably have generated another TA alert to the B737 crew. The WILLO SC had seen the deteriorating situation and climbed the A321. Following TI and a R turn the A321 crew reported visual with the B737. Although the WILLO SC did not coordinate further with the SW Deps/OCK SC during the incident – he was unaware that the B737 were not responding to the SW Deps/OCK SC's instructions – the actions taken by all parties, when combined, allowed the Board to conclude that safety had been assured during the encounter.

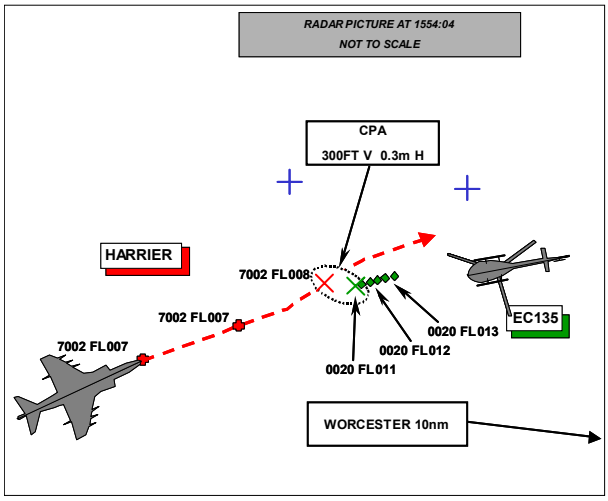
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following an ambiguous coordination agreement with the LTCC WILLO SC, the SW Deps/OCK SC vectored the B737 into conflict with the A321.

Degree of Risk: C.

AIRPROX REPORT NO 013/06

Date/Time:	9 Feb 15:52	
Position:	5214N 00234W (5nm NW Bromyard)	
Airspace:	Lon FIR/DLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	EC135	Harrier T10
Operator:	Civ Comm	HQ STC
Alt/FL:	600ft	270ft
	(Rad Alt)	(Rad Alt)
Weather	VMC CLOC	VMC CAVOK
Visibility:	>30km	>25km
Reported Separation:		
	200ft V/100m H	1000ft V/1nm H
Recorded Separation:		



300ft V/0.3nm (550M) H (verified by HUD assessment)

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC135 PILOT reports that his red and yellow ac is operated on behalf of the County Air Ambulance charity and he was operating solo with 2 paramedics. At 15:29 they were tasked to locate and assist an injured horse-rider so departed Strensham at 15:31 towards the position – a farm - passed to them by ambulance control. He was squawking 0020 with Mode C and was in receipt of an FIS from Gloucestershire ATC until just West of Great Malvern whereupon he made blind calls on the Shobdon radio frequency.

They conducted a search around their target position with a 1nm radius without locating the casualty. RT communications with ambulance control were proving difficult so they elected to land and rendezvous with a land ambulance which had arrived at the farm to try to obtain further information. They made an approach on a Northerly heading towards a field alongside the land ambulance. At 15:52, as they were descending through 600ft

Rad Alt, all crew members noticed a Harrier in their 2 o'clock on an Easterly heading, slightly ahead and beneath them. He estimated the separation was 100nm horizontally and 200ft vertically so he initiated a go-around and a careful lookout to the W in case the ac was part of a formation. He assessed the risk of collision as being high.

He could not report the Airprox to ATC since they were not in contact with anyone at the time so continued with their task, transported a patient to hospital and returned to Strensham at 17:27.

At the time the visibility was in excess of 30km, although difficult to the west due to the low sun, and the sky was clear.

THE HARRIER T10 PILOT reports flying a dual, singleton instructional sortie in a grey ac with HISLs switched on squawking 7001[he thought] with Mode C but not in contact with any unit. They were heading 061° at 450kt towards the end of a routine low level mission when they saw a helicopter about 1.5nm away, high and slightly to the right of their nose. An avoiding action turn of 30° to the left was made keeping the helicopter visual and both crewmembers assessed that there was no risk of collision.

UKAB Note (1): The Harrier pilot provided a HUD video with a voice recording of the incident. The recording confirms his description of events. The helicopter can be first seen at a distance of about 2nm, about 300ft above the Harrier and passes out of the HUD well to their right. At the time the Harrier was at 270ft Rad Alt.

HQ STC comments that it would appear that the Harrier crew saw the helicopter in sufficient time to turn to avoid it. The helicopter crew probably first saw the Harrier after it had turned away.

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 Harrier operating authorities.

The Board was shown excerpts of the Harrier HUD recording that showed the incident clearly. Members also noted that this incident had occurred in an area of high density military low level traffic and this would have been known to the air ambulance pilot who routinely operated there.

Although the helicopter specialist Member was not able to attend he asked the Chairman to pass his comment which is included below.

The Board was satisfied that both ac had been operating legitimately in the FIR and UKDLFS respectively and therefore the 'see and avoid' principle applied. Both pilots had seen the opposing ac in time to act and prevent any collision risk; as witnessed by the HUD recording. However, the Harrier pilot had seen the helicopter and turned left to avoid it some time before the helicopter pilot saw the Harrier. The Board considered this quite understandable due to the high workload of the helicopter pilot at the time. One Member (not a specialist helicopter pilot) noted that this was another incident that had occurred between either a police or air ambulance ac operated by a single pilot while he was in a high workload situation dictated by the task upon which he was engaged. The Harrier pilot had seen the helicopter early enough and kept it visual thus ensuring that he avoided it by a margin sufficient to ensure that there was no risk of collision. Whilst a wider margin would have reduced the Helicopter pilot's concern, this was in the Board's view a conflict in the FIR/UKDLFS resolved by the Harrier pilot. Had the helicopter been TCAS equipped the pilot would have had considerably more warning of the approaching Harrier.

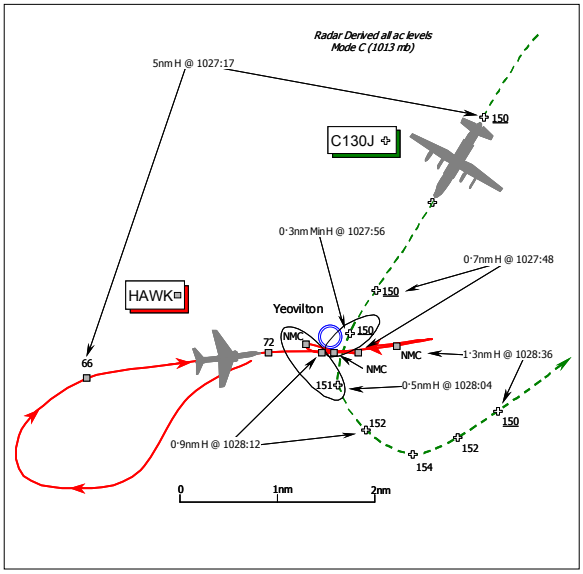
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR/UKDLFS resolved by the Harrier pilot.

Degree of Risk: C.

AIRPROX REPORT NO 014/06

Date/Time:	9 Feb 1028	
Position:	5101N 00238W (o/h Yeovilton)	
Airspace:	Boscombe ARA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C130J	Hawk
Operator:	MOD DPA	CinC FLEET
Alt/FL:	FL150	FL50 - 240
	SAS	SAS
Weather	VMC No Cloud	VMC CAVOK
Visibility:	50km+	>10km
Reported Separation:		
	Nil V/¼nm H	Not seen
Recorded Separation:		
	0·3nm H (~600yd)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C130J PILOT reports that his ac has a grey camouflage scheme but the HISLs were on; the flight deck complement included two pilots and the air load master (ALM). The RHS pilot and ALM were looking out while the LHS pilot was practising the use of the ac's radar and digital map - the ALM having been pre-briefed to take extra care with lookout as is SOP. They were conducting a training flight under VFR and his ac was established in a 10nm racetrack hold, based on the VLN TACAN, turning right [sic] at the VLN and in receipt of a RIS from Boscombe RADAR on 371·82MHz. Flying in a level cruise at FL150 in VMC with nil cloud and an in-flight visibility of 50km+, the weather conditions were *"ideal for see & avoid"*. The assigned squawk of A2601 was selected with altitude reporting, with Mode S and TCAS on. They had competed one 'racetrack' and were inbound to the VLN for the second time, whilst heading 240° at 230kt, with the autopilot engaged. Boscombe RADAR had provided traffic information under the RIS, but they had not previously seen the other ac until the ALM called the Hawk as the RHS pilot saw it appear in the windscreen from below their C130J, "sideways on" just past the vertical about ¼nm away in what appeared to be a loop. To avoid the black Hawk ac, the RHS PF turned the ac rapidly to port, away from the perceived manoeuvre, they then verified with RADAR that the Hawk jet was moving away from them and observed the Hawk complete a further aerobatic manoeuvre before levelling out. Once the Hawk was level they saw the Hawk displayed on the TCAS indicating '-1400ft', but neither pilot saw any TCAS contacts displayed on the large (6" x 8") navigation display, nor was a TA/RA enunciated at all although the ALM believed he might have seen a yellow traffic symbol briefly. He assessed the risk as "low".

THE HAWK PILOT reports his ac has a black colour-scheme but the nose light and HISLs were on whilst engaged in a training sortie and operating VFR in "beautiful" BLUE/BLUE (military A/d state colour code) CAVOK conditions. He was in receipt of a RIS from Yeovil APPROACH [(VLN APP) - situated at RNAS Yeovilton] on 234·3MHz and squawking the assigned code of A0211 with Mode C. Neither Mode S, TCAS nor any other form of CWS is fitted.

During the sortie he called VLN APP and informed the controller that he was going to operate in the Yeovilton overhead in a block from FL50 to FL240 for aerobatics practice. Shortly after commencing his aerobatics he saw a C130J some 12nm to the E heading W at FL150 that was also reported to him by APP. After this traffic information call, neither he nor the other Hawk occupant recalls any further traffic updates or actually seeing the C130J in close proximity. His aerobatics were flown to a base of FL70, topping out at FL130-FL135 and he stressed that he was maintaining an "active" lookout. The Yeovilton ATC SUPERVISOR subsequently informed him that an Airprox had been filed.

THE BOSCOMBE DOWN RADAR CONTROLLER (BDN RAD) reports that the C130J was operating at FL150 in the 'Boscombe triangle' when the crew was passed traffic information on an ac squawking A0211 whose location was described as being 5-6nm S, tracking W indicating FL110. After a short period, the C130J crew called "Tally"

with the traffic. The conflicting ac then appeared to descend to FL65 in the vicinity of the C130J. The Mode 3A and C of the conflicting ac – the Hawk - dropped off and following a brief period the C130J pilot advised he was taking avoiding action against a Hawk in his vicinity. The conflicting ac's Mode A (0211) and Mode C then re-appeared in the vicinity of the C130J and indicating FL135.

THE YEOVILTON APPROACH CONTROLLER (VLN APP) reports that he was the Mentor to a trainee controller operating VLN APP, providing a RIS to the Hawk pilot conducting general handling in a block from FL50-240. As the Hawk was operating in the Yeovilton radar overheard the pilot was informed that the service was 'limited'. An ac displaying a Boscombe Down assigned squawk and flying level at FL150 Mode C was manoeuvring in the vicinity of the Hawk. Both ac were operating in a similar area within the Yeovilton overhead for about 10min. Traffic information regarding the Boscombe Down ac was passed to the Hawk pilot on numerous occasions including information that the other ac was believed to be a C130J . He added that he was operating with both the Hartland Point and local Yeovilton radar sources selected.

UKAB Note (1): The Airprox occurred within the notified Boscombe Down Advisory Radio Area. The extant UK MIL AIP at Vol I ENR 5 - 2 – 5, promulgated to military pilots the co-ordinates of the notified Class G ARA from FL50 to FL245, active in Winter 0930 – 1730 and that:

Considerable test flight activity takes place within the area, which often requires pilots to fly profiles, which limit their ability to manoeuvre their aircraft in compliance with the Rules of the Air. Such flights will receive a radar service from Boscombe Down or the Swanwick (Mil) Special Task Cell.

Only Boscombe Down holds information on the test flying that is planned for the Advisory Radio Area.

Pilots entering the area are advised to call Boscombe Down on 126·7 to obtain information on test flight activity.

UKAB Note (2): The Burrington radar recording does not illustrate this Airprox clearly as only the C130J's Mode C is displayed throughout the encounter with no more than occasional data displayed by the manoeuvring Hawk. The C130J is shown approaching the Yeovilton overhead at 1027:17, level at FL150 as the Hawk teardrops SW'ly and reverses back towards the o/h indicating FL66 Mode C. The Hawk climbs through FL72, which is the last Mode C indication from the ac during the encounter as it commences robust manoeuvres back and forth across the C130J's nose and indicative if the Hawk pilots reported aerobatics. Both ac close to a minimum horizontal range of 0·3nm directly ahead of the C130J , which might be when the Airprox occurred, but NMC is displayed by the Hawk so the level and thus the vertical separation cannot be determined. Thereafter the C130J turns L in conformity with the reported avoiding action L turn, climbing slightly and leaving the Hawk to starboard initially until the latter draws astern. Horizontal separation increases to 1·3nm due S of the Hawk as the C130J ascends to a maximum of FL154 in the L turn, but then separation reduces marginally to 1·1nm against the manoeuvring Hawk for one sweep, before the C130J steadies outbound and descends once more to FL150 as the range then increases.

MIL ATC OPS reports that the C130J ac was operating in the Boscombe Triangle under a RIS from Boscombe RADAR (BDN RAD) in the block FL100-FL150. Simultaneously, a Hawk was operating in a similar area to the C130J in the block FL50-240 under a RIS from Yeovilton APPROACH (VLN APP). Traffic information was passed to the Hawk crew by VLN APP upon the conflicting C130J at 1010:58, as "…*traffic north north east 12 miles tracking south west indicating FL90 climbing fast moving".* The Hawk crew advised they were turning right onto west. The traffic information was updated at 1013:15 as "*previously called traffic now north north west 10 miles, tracking south west indicating FL150"* and again at 1013:51 when additional information was added that the traffic was "*believed to be C130 in the block FL100-150".* Further traffic information was passed at 1022:53 "*Traffic north north west, 10 miles manoeuvring, indicating FL150, believed to be a C130*", whereupon the Hawk crew responded they were "*proceeding to the overhead for aerobatics practice".* VLN APP limited the Hawk's RIS at 1023:10 due to its proximity to the radar overhead. At 1025:24, BDN RAD passed traffic information to the C130J crew "*…traffic south 6 miles tracking west fast moving last indicating FL110".* At 1026:00, VLN APP reiterated to the Hawk crew "*For information, there is traffic* [the C130J] *operating in the overhead at the moment indicating FL150".* Subsequently, the C130J crew reported "*tally*" with the Hawk at 1026:26, then reported taking evading action at 1027:55 and reported an Airprox would be filed.

Although, traffic information was passed to both crews by the relevant controller as per the application of RIS, the traffic information on the Hawk was not updated by BDN RAD to the C130J crew. Although the C130J crew had

reported visual with the Hawk 1½min before the Airprox, the Hawk was carrying out high-energy manoeuvres and an update of traffic information might have proved beneficial to the C130J crew to assist in maintaining visual contact.

THE C130J PILOT'S UNIT comments that whilst the C-130J crew saw and took avoiding action on this potential confliction, it is interesting to note that no clear TCAS alert was provided and this aspect of the incident merits further investigation. It is also relevant to note that military activity to the W of Boscombe Down is becoming increasingly geographically constrained as a result of extensions to controlled airspace; lowering the UAS/MAS boundary to FL195 will further exacerbate this situation. Whilst crews will continue to maintain a good lookout at all times, we are exploring initiatives which may facilitate coordination of traffic in this congested airspace.

MOD DPA TESD ASG ATC comments that whilst fully endorsing the Unit's comments there are some other points of note: Firstly, both pilots agreed that the conditions were good for 'see and avoid'. Secondly, both ac were in receipt of an appropriate radar service and had been given traffic information on each other (albeit the updates could be considered tardy). Despite this, the fact remains that two ac came sufficiently close to cause the pilot of one concern for the safety of the ac.

CinC FLEET comments that notwithstanding the airspace change politics surrounding RNAS Yeovilton and BDN this Airprox occurred in Class G in "beautiful" weather conditions that were "ideal for see and avoid". Both crews were supported by Air Traffic Services compatible with the weather conditions. The fact that the Hawk crew did not 'recall any further traffic updates' after the first TI call is concerning as a further 4 updates were given by VLN APP. This may indicate that the lookout was not as 'active' as described whilst concentrating on the aerobatics and resulted in the non sighting when in close proximity of the larger C130J. The lack of TCAS data and the limited provision of TI reduced the C130J crew's situational awareness. The airspace concerned is routinely busy with military and civil operations and aircraft operating in a military airfield overhead can expect to encounter military aircraft. This Airprox not only highlights the importance of a good lookout when conducting high energy manoeuvres but the importance of TI updates.

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.

Unfortunately, the radar recording had not tracked the Hawk's Mode C sufficiently to be able to establish the latter's level at the CPA where, from his account, the C130J pilot reported that the nimble fast-jet had been sighted "sideways on", just past the vertical about ¼nm away in what appeared to be a loop. On the other hand, the Hawk pilot said that he was topping out at FL130-FL135 – some 1500-2000ft below the C130J indicated level. Nevertheless, whilst not doubting the veracity of the Hawk pilot's account, Members thought it feasible the Hawk could have exceeded this level if it had been sighted through the forward windscreen of the C130J. But then again it could feasibly have been slightly below, given a look-down aspect from the C130J flight deck. It was not possible to resolve this anomaly but it certainly seemed plain to the Board that the Hawk pilot had climbed to a level close to that of the large transport ac without the Hawk pilot being aware of the C130 - a point that did not seem to be in dispute. The Member from FLEET commented that the Hawk pilot had received a significant amount of traffic information over the period leading up to this Airprox – more than might normally be the case – but in the Member's view the Hawk pilot had appeared to take little heed of it. Fast-jet pilot Members agreed and in the STC Member's opinion the Hawk pilot had not paid sufficient attention to the traffic information provided, the last transmission of which was about 2min before the Airprox occurred and painted an accurate picture of the C130J's progress. Controller Members supported this view and believed that the controllers involved here had provided a sound level of service under the RIS that pertained to both crews. Controller Members refuted the suggestion by Mil ATC Ops/ DPA TESD that the traffic information update to the C130 crew was tardy. Indeed, once traffic information has been passed there is normally no compunction to pass further information unless the pilot requests an update, the salutary lesson for pilots being if you definitely want a further update of traffic information once given then ask for it. An experienced CAT pilot and fast-jet test pilot commented that, in general, there seems to be an expectation by pilots receiving a RIS that ATC "will sort it out" which is not always the case. It was worth repeating here that under a RIS the controller will inform the pilot of the bearing, distance, and, if known, the level of the conflicting traffic but no avoiding action will usually be offered, the pilot being wholly responsible for maintaining separation from other ac whether or not the controller has passed traffic information. Therefore, here both acs' crews were

solely responsible for affording appropriate separation against other observed traffic in the FIR. Although the C130J crew reported a "*tally*" [visual contact] with the Hawk at 1026:26, this was about 1½min before the Airprox occurred. At that point the Hawk was below the C130J and was probably 'not a factor'. So when the C130J crew reported taking evading action at 1027:55 – away from the Hawk's perceived manoeuvre just at the CPA - that was, in all probability, after they had visually re-acquired the nimble jet ahead, through the forward windscreen as it climbed toward their level during the pilot's aerobatic manoeuvre. Given the excellent prevailing weather it was unfortunate that the Hawk pilot had not thought to double check the airspace before he executed his climbing manoeuvre. If he had this would have revealed the presence of the C130J, which was after all there to be seen during his aerobatics. The Board concluded, therefore, that this Airprox resulted because, despite comprehensive traffic information, whilst he was conducting aerobatics the Hawk pilot did not see the C130J.

With regard to risk, a rapid climb in excess of 10000ft/min will not potentially be tracked by TCAS and this normally infallible safety barrier can be breached in this manner by such high rates of climb and descent. Without the associated Mode C indications it was not clear what the Hawk's actual rate of climb was: this might be why the C130 pilot reports no RAs were enunciated because TCAS was effectively rendered blind to the presence of the Hawk. Some Members were of the opinion that with the Hawk pilot unsighted on the C130 as he executed his aerobatics, the safety of the ac involved was not assured. Nevertheless, this was a minority view. Other Members contended that having been primed to look out for the Hawk this was a 'good spot' by the alert ALM. But it was also clear that the small black jet had been spotted in time so that the PF was able to turn the larger C130J away from the Hawk's flight path. Although the vertical separation could not be judged at the same point to give an accurate CPA, in the order of 0·3nm horizontal separation obtained at the closest point. This, coupled with the C130J pilot's own assessment of the risk as "low", convinced the overwhelming majority of the Members that no risk of a collision had existed here.

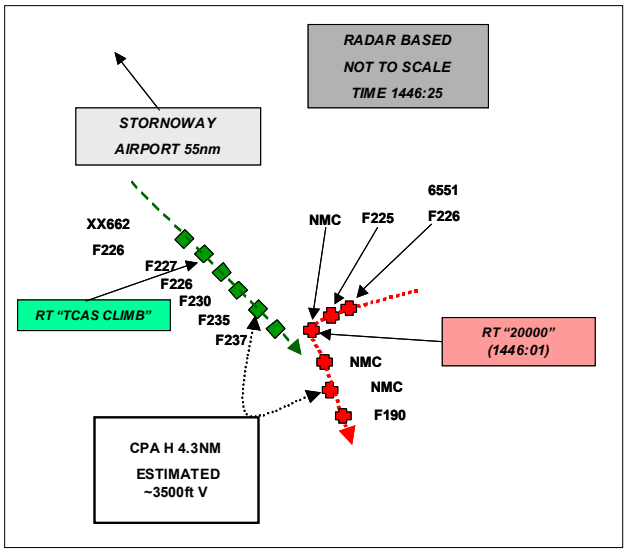
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Despite comprehensive traffic information, whilst conducting aerobatics the Hawk pilot did not see the C130J.

Degree of Risk: C.

AIRPROX REPORT NO 015/06

Date/Time:	8 Feb 1446	
Position:	5717N 00515W (65nm NNW Glasgow)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Embraer 145	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL210	~FL220 (QNH)
Weather	VMC CLBL	VMC
Visibility:	30km	99km
Reported Separation:	1000ft V/2m H	<2nm
Recorded Separation:	(at CPA est ~3500ft) V/4.3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER 145 PILOT reports flying a scheduled passenger flight from Stornoway to Edinburgh heading 155° at 280kt under a RIS and on a direct routing that was accepted after Scottish confirmed that military ATC knew of their routing and intentions. He reported that he believed that the incident had occurred bearing 155° range 65nm from SYY (Stornoway Airport). This placed the ac just outside the lateral limit of the ADR [See UKAB Note 1], in Class G airspace. Scottish then advised them of the position of a contact and they then received a TCAS TA alert. After 10sec they received a TCAS 'monitor vertical speed' followed by a TCAS 'descend'; after following the instruction they then got a TCAS 'climb'. As he initiated the climb he became visual with what appeared to be a Tornado. He informed ATC of their TCAS alerts and they then gave them a heading of 090°. He assessed the risk as being high.

THE TORNADO F3 PILOT reports that whilst conducting a routine training sortie they were given TI on civil traffic approaching from the NW at 25nm and tracking SE at around FL220 initially. At this point they turned S to intercept their wingman who was 50nm to the SSW of them. They lost radar contact with their wingman at about 10nm and had to turn N to open the range before recommitting [to the intercept]. At this point their mental picture had the civil traffic still a long way to the N so they remained heading N and gained sufficient range to recommit on their wingman. They became visual with the civil traffic at a considerable distance before turning to the S and just as they were entering the turn a knock-it-off call was heard from their controlling agency. At that point they were visual with the civil traffic still at a range he estimated to be in excess of 5nm.

Upon reviewing the ac tapes as part of the debrief they became aware that a call was put out from their controlling agency to turn S prior to the knock-it-off. Although this call was recorded on their wingman's tape, it was not received by their ac's radio [as recorded]. On reviewing their tape in the debrief they did not consider that they got within range of the civil traffic to warrant the reporting of an Airprox so the tape was subsequently reused and no further action was taken.

As an aside he was not contacted with regard to the Airprox until two weeks after the incident which was too late to retain any recordings and many sortie details had faded from his memory.

THE ScACC CONTROLLER reports that he asked the E145 pilot for his intentions with regard to his routeing and was told that the pilot intended to route direct to STIRA [GOW 057/26] then Edinburgh under a RIS. He had previously spoken to CRC Scampton regarding 2 of their ac in the vicinity of ADR A1D and notified them of the E145 and they said they would avoid it. A few minutes later he observed one of the Scampton squawks on a W track towards the E145 so he passed TI and then later updated it. The E145 pilot reported a TCAS RA which he acknowledged. While continuing to observe the situation, he deemed it necessary to also give an avoiding action turn onto 090° as he did not have time to call Scampton again. At around the same time, the military traffic was

seen to descend rapidly and the E145 reported that he had completed the TCAS climb so he routed the E145 back towards STIRA. Shortly afterwards Scampton called the Supervisor to report they had lost comms with their traffic at the time of the incident.

At the time he thought the E145 pilot was not reporting the incident except as a TCAS event.

MIL ATC OPS reports that a formation of 2xF3s (F3 A & B) was operating from surface to FL350 receiving a RIS up to FL245 and RC above from CRC Scampton Weapons Controller 5 (WC5). At 1442:16, the WC passed TI to the F3 crews on a conflicting E145 as "*stranger bullseye 030/39 indicating climbing through FL165 tracks 0 correction 150*". Scottish West Coast Controller (WEST) contacted WC5 Asst to ascertain the intentions of the 2 F3s with regard to his E145. The Assistant stated, "*We're planning to work this run in front, then after this run go behind your track".* WEST replies "*If it would help at all he wants to route direct to Edinburgh which will take him about 20-30 degrees to the left*". At this stage WC5 takes control of the landline and states, "*OK, controller's on, if you turn 20-30 degrees to the left I will split behind you and then do my next run to the west*". WEST responds *"[unintelligible] my traffic also, it'll be levelling off at 235".* Further TI is passed to the F3 crews by WC5 at 1444:15,"*F3 formation C/S, if you commit, recommit right, you have a stranger bullseye 045/31 taking a left turn to head directly to Edinburgh*". The F3A crew acknowledged this TI and updated information was passed at 1445:05 "*F3A C/S, previous stranger BRA 290/12 tracks 150 at FL215"* and adds "*if your are not able to come left 190 I'll have to knock off this run"*. Twenty-one secs later WC5 stated "*F3A C/S, you are now co-level with previous stranger Knock-it-off, knock-it-off"* and instructs F3A to turn left onto 180°. F3A acknowledged the knock-it-off instruction and in the turn. WC5 passed TI "*F3A C/S, previous stranger BRA 330/05, co-level at FL 225 climbing FL235*" and suggested a descent. F3A, reported "*F3A C/S, 20 000, F3A C/S heading south*". F3A crew reported, "*visual traffic 6 o'clock high*" and "*is coming back right hand on to [unintelligible] and avoiding traffic visually".* WC5 advised the F3A crew to "*maintain this heading initially*". WEST rang WC5 to advise that the EMB145 had taken

Analysis of the Tiree radar shows the E145 routing between RONAR and ORSUM, although not technically on A1D, indicating FL205 climbing. F3A is 18nm SE of it northbound indicating FL188 climbing. At 1444:34, F3A loses Mode C indication but is seen to initiate a right turn away from the E145 and 10sec later disappears on both primary and secondary radar. F3A reappears at 1444:50 in the E145's left 10 o'clock at 16nm indicating FL193 descending and tracking S. The E145 is then seen to initiate a left turn onto a SE heading. The 2 ac continue to converge and at 1445:42 they indicate at a similar level with F3A being in the E145's left 10 o'clock at 7nm. At 1446:00, the point which the EMB145 crew get a TCAS RA, the F3 is in its 12 o'clock at 5nm crossing from left to right indicating 200ft below the E145. F3A is seen to initiate a hard left turn with 100ft vertical separation evident between the 2 ac. The next sweep shows F3A with NMC diverging laterally from the E145 which is indicating FL130 climbing.

Although the E145 may have technically left the Class F ADR and was on a direct routing this is of little significance. WC5 was providing a RIS to the F3 formation in middle airspace and passed accurate and timely TI to F3A crew on the E145. While the F3A was northbound at 1444:15, WC5 advised that if the F3 crew were considering a turn then they should turn right, as this would take F3A away from the E145: this was actioned. However, the crew then continued the turn onto a Westerly heading which brought them back into conflict with the E145. WC5 continued to pass TI and advised a course of action that resulted in the F3A crew turning away from the E145 with 4nm lateral separation evident. It is arguable that the landline conversations between WEST, WC5 and WC5 Assistant may have been construed as co-ordination. However, RT and landline transmissions between the agencies involved following the Airprox do not indicate that any party considered that co-ordination was agreed.

This Airprox occurred prior to Scampton becoming involved in the co-ordination trial that is currently underway to standardise phraseology used during co-ordination and the passing of TI between civil and military agencies.

ATSI reports the E145 was en route from Stornoway to Edinburgh and established communications with the ScACC Westcoast sector at 1437:00. The workload was reported as 'light' and so was manned by a single controller providing both the Tactical and Planning roles. The E145 pilot reported passing FL61 in the climb to FL235. The controller instructed the pilot to squawk Ident and then enquired whether the crew wished to route via the GOW or direct to STIRA. The pilot replied that direct to STIRA was preferred subject to military traffic. Although the controller had identified the ac, the crew were not informed of this fact nor told their position nor advised of the radar service being provided as is required in MATS Part 1 (Section 1, Chapter 5, Page 2 para 1.2.1 & Page 9 para 8.2). Furthermore, the flight progress strip was not marked with the service being provided. As the

ac was within Class F airspace, following A1D, the appropriate service would have been a RAS and discussions with the controller afterwards confirmed that this was the service he was providing. At 1442 the controller contacted the military (CRC Scampton) and requested information on the military traffic in the area. A discussion followed and the Westcoast controller was advised that after the first run the traffic, a Tornado F3, would be passing behind the E145. The controller informed the military that the E145 would be levelling at FL235 and turning left some 30º direct to STIRA and the dialogue closed with the military saying "*OK thanks very much*". At the time the telephone conversation started the F3 was some 40nm from the E145. The Westcoast controller then advised the E145 crew, at 1443:20, that they may route direct to STIRA and, shortly afterwards, passed traffic information on the F3. He added that he had spoken to the military who were aware of the E145's presence and that they would avoid. The crew replied that they could see the traffic on their TCAS. At 1445:45, the F3 was in the 11 o'clock position of the E145 at a range of 7nm, crossing from left to right climbing through FL226 whilst the E145 was passing FL225. The Westcoast controller updated the traffic information to the crew and suggested that they stop their climb at FL225. The E145 crew responded by saying "*TCAS RA*". At 1445:55, the F3 was in the 12 o'clock position of the E145 at a range of 5.5nm with both ac indicating FL227. The controller then transmitted "*And (E145 callsign) suggest avoiding action turn hard left onto heading zero nine zero degrees*". The radar recording shows that the F3 turned left from a SW track onto a S one and the E145 commenced a left turn from a track of approximately 165º onto east. The Mode C of the F3 disappears for a short period. Unit investigations advised that the minimum separation was 4.0nm and 200 feet.

The Airprox took place within the confines of the ADR and, although not specifically stated at the time, the Westcoast controller was providing a RAS to the E145. He complied with the terms of this service, as specified in MATS Part 1, although despite his best efforts he was unable to maintain 5nm / 3000 feet against the F3. Although the crew reported responding to a TCAS RA the controller issued an avoiding action turn which is contrary to the instructions given in MATS Part 1 SI 3/2005. Subsequently he cited the caveat at the beginning of MATS Part 1 which states: 'Nothing in this Manual prevents controllers from using their own discretion and initiative in any particular circumstance'.

UKAB Note (1): The recording of the Tiree Radar shows the incident as taking place at 1446:05 about 4½ nm to the E of the centreline of ADR A1D. At the CPA the F3 is in the E145's 12 o'clock at a distance of 4.3nm and its Mode C has dropped out. The Mode C is displayed on the next sweep (8 sec later) as FL190, and the E145 as FL237. By calculation assuming a constant rate of descent the F3 would have been at F19875 at the CPA.

UKAB Note (2): Commencing at 14:43:20 the RT transcript shows

"E145 C/S you can route direct to STIRA now".

No change of service is notified then or at any time later. TI continues to be given to the E145 pilot until 14:45:50 when avoiding action was suggested as follows:

"E145 C/S traffic now eight miles in your left half past eleven er same level in the climb suggest you stop off at flight level two two five"

"TCAS RA"

(1446)

"And E146C/S suggest avoiding action turn hard left onto a heading of zero nine zero degrees"

UKAB Note (3): The UKAIP at ENR 1-1-1-1 Para 1.2 states: "…Upper ATS Routes and Advisory routes have no declared width but for the purposes of ATS provision are deemed to be 5nm either side of a straight line joining each two consecutive points.

UKAB Note (4): The ScACC West Coast Controller stated in his report that the E145 was operating in the 'FIR' in 'Class G airspace' and that the E145 was in receipt of a RIS. The E145 captain stated in his report that he was on a 'direct routing from SYY (Stornoway Airport rather than the VOR which is 5nm to the E of the Airport and on the ADR) to EDI and under a RIS. This being the case although he may not technically have been on ADR A1D, since he was within 5nm of its centreline under the provisions of the UKAIP at Note (3) above, a RAS was the appropriate level of ATC service. The ATSI report was based on the unit investigation/report, conducted/

completed 3 months after the event, stated that the Controller was providing a RAS. Despite extensive inquiries these anomalies could not be resolved.

HQ STC comments that although the two controllers had discussed a 'plan' its execution was hampered by the short loss of comms between F3A and the Scampton controller.

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.

Although Members determined that this had been a fairly straightforward incident, the Board was concerned by several associated factors which were discussed in depth.

This Airprox demonstrated in several areas the absolute importance of sticking to standard procedures. Members pointed out that procedures were sound, had evolved over a period of time and were designed to avoid confusion and differing understandings of any situation. One example was the imprecise way that deconfliction was attempted by the respective controllers. There are specified procedures and phraseology for agreeing co-ordination which were not adhered to in this incident. Controller Members believed that the Westcoast Controller had led the Embraer pilot to believe that co-ordination with the military ac had been agreed when it had not. Similarly there was confusion regarding the level of ATC service being provided, resulting from shortcuts in published RT procedures. Furthermore, even with the extensive enquiries conducted by the Secretariat, there were differing perceptions among Members as to whether or not the Embraer had been on the ADR. Members agreed however that although the pilot thought that he was on a direct routing - i.e. not on the ADR - in Class G and in receipt of a RIS, whilst he was still within 5nm of the ADR centreline the appropriate level of service for the Embraer should have been a RAS. It was also noted that whilst it is for the pilot to request the desired level of ATC service, in circumstances where this does not happen it is incumbent on the controller to offer and agree the level of service, thereby removing any confusion. At least in his initial report, the controller believed he was providing a RIS and all his actions were consistent with this level of service. Subsequently, the controller did give avoiding action notwithstanding his belief that the military controller would avoid his ac.

On another point, at the stage where the Embraer pilot had declared a TCAS RA (without any climbing or descending amplification, as is the recommended phraseology), MATS Part 1 at the reference in the ATSI report (above) states that avoiding action should not be given after an RA has been notified. After extensive discussion, controller Members unanimously agreed that this guidance takes precedence over the 'catch all' caveat regarding discretion and initiative. Following discussions within ATSD, it was agreed that this sentence in MATS Part 1 is not designed for this purpose. It is intended for situations where controllers find themselves with a situation which is not covered by the extant procedures. It is not acceptable for controllers to disregard clearly laid down procedures citing this sentence as their justification. Airline pilot Members also added that such turns can, in some circumstances, degrade the climb performance of an ac thereby reducing the safety margin rather than increasing it.

Members were concerned that in many Airprox assessed by the Board no level of ATC service had been agreed between controller and pilot. Further, Members observed that, without implying that this had been the case in this incident, there appears to be a lack of understanding among pilots of the types of ATS and which is appropriate in the various classes of airspace. The NATS Advisor stated that they are aware of the problem and that they continue to make recommendations to units and publicise the issue widely. A controller Member emphasised that it is for a pilot to request the type of service required and for the controller to prompt where such a request is not made. It was felt that a general reminder to pilots who fly in uncontrolled airspace in the UK and to UK-based civil controllers would be timely. The Board therefore made a Safety Recommendation to address this matter.

The Board was informed that although there is a minor issue with Tornado F3 radios there were a number of possible reasons why the first 'knock it off' transmission had been missed. Members agreed that the controller had correctly and quickly followed matters up when it became apparent that the F3 pilot had not actioned the instruction.

Notwithstanding all the discussion above, both ac had been legitimately operating in uncontrolled airspace; both had opted for a radar service and avoiding action by both had resolved the conflict and ensured no erosion of safe separation.

PART C: ASSESSMENT OF CAUSE AND RISK

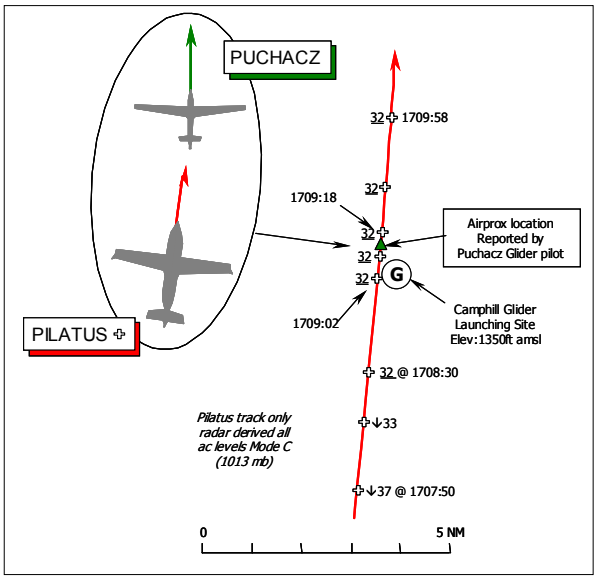
Cause: Conflict in Class G airspace resolved by both pilots.

Degree of Risk: C.

Safety Recommendation: The CAA should re-emphasise to pilots who fly in uncontrolled airspace in the UK and to UK-based civil controllers that it is essential for the pilot and controller to agree the type of ATC service that is to be provided. The respective responsibilities of pilots and controllers in such circumstances should be reiterated.

AIRPROX REPORT NO 016/06

Date/Time:	9 Feb 1709	
Position:	5318N 00144W (0·7nm NNW of Camphill Glider Site - elev 1350ft)	
Airspace:	London FIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	Puchacz Glider	Pilatus PC12
Operator:	Civ Club	Civ Exec
Alt/FL:	1200ft (QFE)	FL40 (SAS)
Weather	VMC	VMC
Visibility:	15km	10km
Reported Separation:	4-500ft V/nil H	Not seen
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PUCHACZ GLIDER PILOT, a gliding instructor, reports that his glider is coloured white with red wingtips/tail. He was in communication with Camphill Glider Site on 129·975MHz whilst winch launching with a student to 1400ft. After the launch they continued to the N of the site with the intention of then joining the Camphill circuit at about 800ft agl. They were flying at 48kt, some 800ft below cloud with an in-flight visibility of 15km. At a position 53° 18' 54"N 001° 44' 27"W - about 0·7nm NNW of the glider site and shown on the diagram by a green triangle - heading 360° (T) in a straight descent through 1200ft QFE above Camphill's elevation of 1350ft amsl [an altitude of about 2550ft amsl], he spotted overhead what he thought was a low-wing business jet, [but actually the PC12] overflying his glider no more than 4-500ft directly above him as it overtook from astern. The other ac disappeared in the direction of Leeds Bradford. Although he did not quantify the risk he added that the other ac was flying within the normal winch launch altitude band of up to 3350ft amsl

THE PILATUS PC12 PILOT reports that he was inbound to Leeds Bradford from Tatenhill and in receipt of a RIS from Leeds Bradford on 123·75MHz. The ac which has a blue livery was crewed with two pilots. The SSR was selected on with Mode C; TCAS is fitted. An extract of the flight log for this sector was helpfully included along with a copy of the IFR flight plan files and IFPS acknowledgment to assist with the investigation. In the vicinity of Camphill his ac would have been heading 015°, at 235kt in a level cruise at FL40, flying in VMC some 500ft clear above cloud in between layers with a flight visibility of 10km, but no other ac was seen at the reported Airprox location.

UKAB Note (1): The US Naval Observatory table of Ephemeral data gives the time of Sunset in the vicinity of Camphill as 1706UTC on 9 Feb: hence night would have prevailed from 1736, after the Airprox had occurred.

THE PILATUS PC12 OPERATOR comments that this Airprox occurred within the 'Open FIR'. At the time of the occurrence the Pilatus crew was under a radar service from Leeds Bradford ATC - previously a FIS from Nottingham/East Midlands ATC - but no reports of any conflicting primary or secondary traffic was received. The Met conditions experienced by the reported crew at the time were 'VMC on top' of broken cloud [5-7 Oktas] at 2700ft; visibility 12km. The operator opined, [erroneously] that any gliding activity conducted above cloud is prohibited.

The reported ac was flying an IFR flight planned route and crews have now been briefed to fly airways routes only in this area to prevent "infractions" with other ac in the lower airspace.

UKAB Note (2): The Pilatus pilot's report was not received by the UKAB until 10 April and when queried with ATSI it was ascertained from Leeds/Bradford ATC that the RT recordings for the day of the Airprox had already been returned to service. Consequently, ATSI could add nothing further.

UKAB Note (3): The UK AIP at ENR 5-5-1-1 promulgates that Camphill glider launching site is active during daylight hours for winch launches which may attain a height of 2000ft above the site elevation of 1350ft amsl – some 3350ft amsl.

UKAB Note (4): From Meteorological Office archives, the Manchester 1650 UTC METAR was: 33006KT 300V040 9999 FEW041 03/M05 Q1021 NOSIG. The Leeds Bradford 1650 UTC METAR was: 31007KT 270V350 9999 FEW040 01/M05 Q1020. The East Midlands 1650 UTC METAR was: 34010KT 9999 BKN046 04/M05 Q1019.

UKAB Note (5): This Airprox is not illustrated clearly on the radar recording because the Puchacz glider flown by the reporting pilot is not shown at all. The Pilatus PC12 is shown on the Clee Hill Radar recording approaching the reported Airprox location directly at a GS of 210kt, squawking A7000, descending through 3700ft Mode C (1013mb) at 1707:50. The Pilatus levels at 3200ft (1013mb) at 1708:30 and is shown passing 0·4nm W abeam Camphill Glider Site a little over 32 sec later at 1709:02. The Pilatus maintains a constant 3200ft (1013mb) as the turbo-prop passes directly over the reported Airprox location - as plotted accurately on the NATS Radar Replay System (NRRS) - just before 1709:18, 0·7nm NNW of Camphill Glider launching Site level at 3200ft (1013mb) and maintaining a steady course. A level of 3200ft (1013mb) related to the Manchester QNH of 1021mb (some 19nm W of the Airprox location) would equate to an altitude of about 3440ft amsl. This suggests that the PC12 was about 890ft above the Puchacz glider pilot's reported altitude of about 2550ft and broadly 90ft above the maximum winch launch altitude of 3350ft as the ac passed abeam Camphill.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was immediately apparent to the Members that the glider site at Camphill was, unusually, at a relatively high elevation and indeed is one of only 4 glider sites notified in the UK AIP as being sited above an elevation of 1000ft amsl. The gliding Member explained that in his view there are several reasons why it is unwise to overfly in the immediate vicinity of Camphill. Firstly, he stressed that as the site is perched on top of a hill, the winch launch could attain a height of 2000ft above the site elevation of 1350ft amsl – an altitude of some 3350ft – such that winch wires could be encountered at relatively high altitudes. Thus depending on the RPS/QNH in use, ac crossing at altitudes similar to that chosen here by the PC12 crew could potentially suffer a wire strike. Additionally, Camphill is an active 'wave' site which experiences wave in any wind direction: therefore, large concentrations of gliders may be found up to the limit of CAS [base level FL65]. There is also an agreement with Manchester ACC for a 'wave box' which permits flights to higher levels under specific rules. Pilots planning low and medium level routes in this area should be aware that the wave, whilst generating good lift, also generates severe sink and Camphill can experience up to 10kt - about 1000ft/min - of sink at times. But another feature of good 'wave' is that outside the areas of lift and sink, there may well be areas of extreme turbulence. Armed with the advice of the gliding Member and noting that the Board only considers what actually happened and not what might have occurred in other situations, Members turned to the assessment of the circumstances surrounding this specific Airprox.

Fortunately, here the PC12 spotted by the Puchacz instructor was somewhat higher than he had estimated. According to the radar recording, the PC12 was of the order of 90ft above the maximum cable altitude that could normally be expected at Camphill. Moreover, the turboprop had passed over the winch launch site after the glider had reached its maximum height and released from the cable. Fortunately therefore, no harm was done in that respect (but a Member added there could quite easily have been another glider in the process of launching) . It was evident that the glider pilot could not have seen the PC12 beforehand, approaching fast from astern, neither could the glider launch ground crew have detected it before the launch. It was unfortunate that the Board did not have the benefit of a transcript of the RT and a report from the Leeds Bradford controller to complete the picture so here the ATC aspects remained unclear. Whilst it was evident that the encounter occurred in Class G airspace and the Board recognised that PC12 crew was perfectly entitled to be flying this route quite legitimately, Members agreed it was unwise to fly so close to the glider launch site at these altitudes and it would be preferable to afford such sites a wider berth. Here the PC12 pilot was unaware of the glider below him but the Board was encouraged by the positive stance taken by the PC12 operator in the interests of flight safety and, in general, choosing a routeing in CAS where available was a sensible option. Clearly the glider pilot was entitled to be operating where

he was - in this instance it was not above cloud – and the BGA Member stressed that the PC12 operator was mistaken if he believed that glider pilots were not entitled to operate VFR above cloud, which in the UK, they are permitted so to do. Nevertheless, the radar recording had also revealed that the PC12 was at a somewhat higher relative altitude above the glider than the Puchacz instructor had estimated and given the glider pilot's reported altitude of about 2550ft, the vertical separation evinced by the recording was in the order of 890ft. Therefore, the Board concluded, that this Airprox was a sighting report of traffic in the vicinity of a notified and active glider launching site with no risk of a collision between the ac involved.

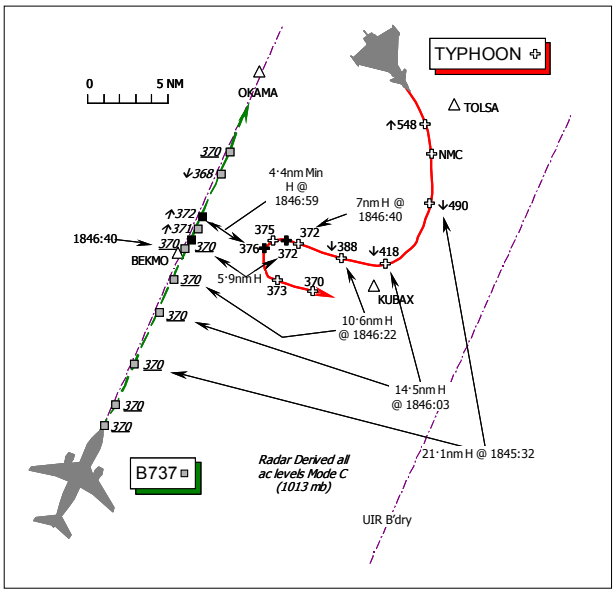
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report in the vicinity of a notified and active glider launching site.

Degree of Risk: C.

AIRPROX REPORT NO 017/06

Date/Time:	14 Feb 1846 Night	
Position:	5317N 00252E (10nm S of OKAMA)	
Airspace:	UAR/MRSA	(Class: B)
	Reporting Ac	*Reported Ac*
Type:	B737-500	Typhoon
Operator:	CAT	HQ STC
Alt/FL:	FL370 (SAS)	FL375 (SAS)
Weather	VMC SKC	VMC NR
Visibility:	>10km	NR
Reported Separation:	3-400ft V/1-2nm H	500ft V/5nm H
Recorded Separation:	200ft V @ 5·9nm H 4·4nm H @ 400ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-500 PILOT reports that he was in transit under IFR from Gatwick to Bergen, cruising level at FL370 in VMC on UAR UM604 under a RCS from London CONTROL on 126·775MHz. Heading 027° at 430kt about 10nm SW of GIVPO intersection, without any prior traffic information from ATC, TCAS enunciated a TA from an ac levelling at their level. The pilot-in-command as the PF instructed his 1st Officer (PNF) to look outside for the traffic which was displayed on TCAS in their 2-3 o'clock so the 1st Officer scanned for the traffic (that subsequently "came out of the moonshine" as the moon was shining behind the other ac, making it difficult to see). The PF scanned the TCAS information and was ready to make an "escape manoeuvre" when shortly afterwards TCAS commanded a CLIMB RA whereupon the autopilot was disconnected and a smooth climb initiated. At the same time the 1st Officer got visual contact with an ac believed to be a military jet which was in a bank so the 1st Officer advised ATC "C/S executing TCAS climb". After climbing 3-400ft they never got a TCAS verbal message of "CLEAR OF CONFLICT" so returned to FL370 and advised ATC that they were clear of the confliction. ATC then advised them that this must be military traffic that they were not aware of. He assessed that there was a risk of a collision.

THE TYPHOON PILOT reports he was flying a training 'Night Famil.' sortie with a student pilot as the PF in their twin-seat ac. The red strobes and navigation lights were on whilst flying VFR, in VMC, whilst in receipt of a RCS from London MILITARY on UHF; the assigned squawk was selected with Mode C.

They climbed to FL550 during the sortie, some 115nm from base and over the N Sea, but then fuel transfer from the ac's external tank stopped thereby preventing any fuel transferring. This left only 'collector tank' fuel available, which is approximately half of the indicated total fuel. He explained that fuel transfer problems can be caused by being too high for the external tank to feed so a descent was initiated in an attempt to restart the fuel transfer and London MILITARY turned them R onto 290° for airspace reasons. In the turn a civil airliner – the B737 - was detected on the ac's AI radar at a range of 15nm flying at FL370. A L turn onto SE was initiated at a range of 10nm to avoid the B737 and the ac's radar shows the airliner passed no closer that 4·5nm away and 500ft below their Typhoon. As the turn was initiated ATC also issued a L turn instruction. Situational awareness was maintained on the civil traffic while they worked out their fuel system malfunction but he added that ATC had not authorised the descent. He opined frankly that they were distracted by the urgency to get the fuel to transfer and descended from FL550 without clearance. He assessed the risk as "low".

LACC SECTOR 10/11 TACTICAL CONTROLLER reports that he was working as the Sector 10/11 TACTICAL controller with a light traffic loading. Both himself and his planner had mentioned the Typhoons that were operating at very high levels of FL500-550. Suddenly he noticed one of them squawking A6121 making a turn towards the B737 and descending. He had no time to give any traffic information or avoiding action as the B737 pilot

transmitted that he was responding to a TCAS RA. He acknowledged the B737 pilot's transmission; watching the event, the B737 pilot took a TCAS RA CLIMB followed by a TCAS RA DESCENT down to FL368.

LATCC (MIL) SECTOR 12 CONTROLLER reports that she was controlling the Typhoon, supersonic, in the climb to FL550. Although N of Y70, when the Typhoon reached 20nm+ from Dutch airspace she instructed the crew to turn first of all onto a heading of 190° and then further onto 290° to maintain the necessary distance from the coastline. By that time the Typhoon was level at FL550, which the crew reported, but in the turn the Typhoon 'dropped-off' the displayed Debden Radar (she had the Great Dun Fell/Debden composite selected at 125nm displayed range) and upon selecting the Cromer Watchman the Typhoon's Mode C was not visible. On the next sweep they were displayed at FL384 heading W with civil traffic in their 11 o'clock at a range of 4nm level at FL370, at which point she confirmed their level and gave them an avoiding action turn against the B737. Prescribed separation was eroded to 4nm horizontally, 1400ft vertically.

ATSI comments that the B737 was northbound on UN604 and contacted the S10/11 TACTICAL controller at 1839:10 when the pilot reported climbing to FL370 inbound to LEDBO. At that time, the Typhoon was passing FL455 on an easterly track 64nm N of the B737. Soon afterwards the B737 levelled at its assigned cruising level of FL370 as the Typhoon climbed to FL520 still heading eastbound. The Debden Radar recording shows that the Typhoon had commenced a gentle R turn and continued its climb to a maximum indicated level of FL548 Mode C at 1845:00, [decelerating through 624kt GS] before turning further R onto a southerly track. At 1845:32, the Typhoon is shown tracking S at FL490 in the B737's 2 o'clock at a range of 21nm. The Typhoon is then seen to commence a further R turn onto a westerly track but the Mode C is no longer displayed. Although the Debden Radar shows a Mode C readout of FL418 at 1846:03, when the Typhoon is in the B737's 2 o'clock at 14·5nm, the picture displayed to the TACTICAL controller, being a Multi Radar Tracking system displayed picture showed no Mode C readouts between 1845:26 and 1846:20, when it indicated FL395 and STCA activated against the B737, 12nm to the WSW. At this stage the ac were on converging headings 10·7nm apart with vertical separation of 2500ft. [UKAB Note (1): The Typhoon steadied onto a track of 290° and its Mode C returns indicated passing FL404 on the Cromer recording at 1846:12, flying at a GS of 556kt]. At 1846:40, the Typhoon was in the B737's 2 o'clock a range of 7nm with the B737 at FL370 and the Typhoon at FL372, when the TACTICAL controller called the B737 crew and they immediately replied that they were in a TCAS 'CLIMB'. The Typhoon then made a very sharp L turn and horizontal separation reduced to a minimum at 1846:59, when the Typhoon was in the B737's 3 o'clock at a range of 4·4nm, with the B737 at FL372 and the Typhoon 400ft above it at FL376. [UKAB Note (2): The LACC Radar Data Processing team analysed the data and determined [from a TCAS simulation] that the Typhoon had descended at a rate which was beyond the LACC Multi Radar Tracking system equipment's threshold [see UKAB Note (3)]. The radars had detected the Typhoon's descent and recorded a level but at the same time marked the Mode C as invalid. This meant that the Mode C values from the various radar heads could not be used by the Multi Radar Tracking system and thus no Mode C data was shown to the TACTICAL controller.

UKAB Note (3): The Debden Radar recording suggests that from top of descent @ FL548 at 1845:00 to FL490 at 1845:32 (5800ft over 32sec) the average RoD equates to <11600ft/min. From FL490 at 1845:32 to FL418 at 1846:03 (7200ft over 31 sec) equates to an average RoD of <14400ft/min, suggesting about an average RoD of <13000ft/min during the period 1845:00 to 1846:03.

Further analysis of the plot listing from the Debden and Cromer radar sources revealed that the Typhoon's Mode C levels had in fact been tracked by at least two of the respective interrogators. In the case of the Cromer this tracked the Typhoon's descent throughout, without interruption, but the Debden listing shows that two returns were primary data only. With the exception of these two primary returns, during the period from 'top of climb' at FL548 at 1845:00 throughout its descent through FL396 at 1846:15, Mode C data was received by both these sources continuously, but not apparently displayed to either controller. NATS Ltd report that over this period the maximum instantaneous RoD detected for the Typhoon derived from the Debden data was 12560ft/min and that from Cromer 13108ft/min, with the individual thresholds being 10000ft/min and 10800 ft/min respectively (GDF 7500ft/min; Pease Pottage 9000ft/min; TCAS 10000ft/min). The single radar source graphs showed that the Typhoons RoD was below these threshold values for some periods of the descent but were not displayed on the LATCC (Mil) recording of the Debden or the Cromer sources. Thus it would appear that the Typhoon's Mode C data was received by both the Cromer and Debden Radars, but not displayed to either LATCC (Mil) CON12 or LACC 10/11 TAC because the software parameters had deemed the received Mode C as 'invalid'.

MIL ATC OPS comments that the Typhoon ac was operating over the N Sea under a RCS from LATCC (Mil) Controller 12 (CON 12) in the climb to FL550 as the crew had requested to carry out supersonic runs at that level.

CON 12 positioned the Typhoon for the supersonic run and the crew reported 'supersonic' at 1839:36. As the Typhoon was operating close to the London/Dutch UIR boundary, CON 12 turned the Typhoon onto a heading of 190° to remain within UK airspace; the Typhoon crew reported level at FL550 at 1844:47. [CON 12 further instructed the crew at 1845:32, to *"..continue right turn heading 290"*, which the crew read-back.] At 1846:33, CON 12 asked the Typhoon crew to confirm they were in the descent, which they did, and at 1846:40 reported *"affirm subsonic, requesting diversion 2*" [but the transmission ended]. CON 12 transmitted at 1847:02, *"..avoiding action turn hard left 50 degrees traffic left 11 o'clock 10 miles crossing left to right FL370".* No reply was received from the crew however the turn was observed on radar from the Typhoon. [UKAB Note (3): CON12 also immediately contacted the LACC N SEA PLANNER to advise of the descent after avoiding action was passed.]

CON 12 was a reasonably experienced controller who was operating under a low workload. She had been operating with the Cromer Radar, initially, but had alternated between the Debden/Cromer Radars in an attempt to regain Mode C information on the Typhoon. It is believed that she missed one iteration of the Typhoon's Mode C on the Debden of FL490 and another single reading on the Cromer at FL404 due to having the other radar selected at the time. On realising that the Typhoon crew had descended without authorisation, CON 12 immediately confirmed with the crew that they had descended and passed effective avoiding action. There is little more CON 12 could have done to prevent this Airprox. Upon realising that the Typhoon crew had descended she acted in a safe and timely manner.

HQ STC comments that despite the fuel problems experienced by the crew, they should not have descended without informing ATC.

UKAB Note (4): The UKAB's assessment of Airprox 156/03, which occurred on 29 Aug 03 involving an A320 and a SHAR (Risk B) resulted in a 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.

The CAA and the MOD accepted 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.

The following update was provided:

The CAA and MOD initial review was completed on schedule. At present, the CAA and MOD continue to work towards a mutually acceptable solution while retaining compatibility with operational training requirements.

The Recommendation remains OPEN.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

From the reporting B737 pilot's account it was evident that he had no prior warning of the fighter's approach from the NE before TCAS enunciated a TA when the Typhoon closed and descended towards them. There followed the TCAS-commanded RA CLIMB that the radar recording evinced through FL371 just moments before the CPA of 4·4nm was achieved. From his perspective, the B737 pilot could quite reasonably have expected earlier warning of the Typhoon's approach towards his ac and clearly, within Class B airspace, prescribed separation must be maintained. However, the concise ATSI report had shown that the LACC 10/11 TACTICAL controller was unable to proffer any warning as the radar picture displayed to the controller by the LACC Multi Radar Tracking system showed no Mode C readouts to alert him to the Typhoon's descent until it indicated FL395. This rapid

descent by the fighter, over some 15000ft, went undetected by the controller before STCA was activated and highlighted the presence of the fighter when about 12nm from the B737 at 1846:20. None of this had been apparent to the LACC 10/11 TACTICAL controller before the B737 pilot reported complying with the RA. Controller Members stressed that once the B737 pilot had communicated that he was following a TCAS RA there was little else that the controller was permitted to do apart from possibly providing further traffic information. Therefore, it seemed that the LACC 10/11 TACTICAL controller had been unable to play a significant part in the outcome of this Airprox.

The NATS Advisor helpfully explained to the Members that the LACC system was operating within its designed parameters. In broad terms the SSR interrogators had sensed the Typhoon's descent but when the radar systems software compared the various returns, it 'deemed' them to be anomalous and erroneous data [invalid] and thus did not display this information to the LACC 10/11 TACTICAL controller. The Board was briefed that the NATS single source radar parameters were optimised for civil traffic and the different threshold values were radar-source-specific due to the different range and rotation rates etc. Thus the LACC controller had no reason to suppose that the Typhoon was not operating well above his traffic until this point. A CAT pilot Member observed astutely that the technology was probably protecting itself from potentially anomalous data from older, perhaps less reliable, airborne equipments to the detriment of displaying accurate and therefore essential information. Controller Members more familiar with the more complex processed radar display systems were keen to learn why the parameters of the NATS single source radars were set in this manner. This was a technical issue outwith the area of expertise of the Board's Advisors in attendance but one which, whilst warranting further investigation, did not prevent the Board from concluding its assessment as to the cause and risk of this Airprox.

A controller Member commended the Typhoon pilot for his frank account and from whose concise reports it was readily apparent that the crew had experienced some significant difficulties during this night famil. Clearly, whilst operating in the MRSA – even when VFR in Class B airspace [Class C from 16 Mar 2006] – at night and under a RCS, clearance to descend was a prerequisite before the descent was initiated. However, it was perfectly clear that this was not a normal situation and Members recognised that the apparent inability to draw on half of the jet's useable fuel load whilst operating so far from base over the sea would have focused the crew's attention somewhat. The HQ STC Member stressed that at the time no attempt was made by the crew to inform CON12 of their difficulties when they unilaterally initiated their descent. Whilst some thought it might have been appropriate to make a PAN call, in the Member's view this was not at that stage an emergency situation. Whilst in no way inferring that the crew should not have descended if that was what they believed they needed to do to resolve their immediate fuel difficulties, a short RT message at the outset would have alerted the LATCC (Mil) controller to their situation. It was therefore worth repeating here, for the benefit of others, the importance of PAN calls and, in general, pilots should not be under any misunderstanding that if the situation warrants, PAN calls (or MAYDAY where appropriate) will focus a controller's attention immediately on their predicament. This should enable the controller to render whatever immediate assistance the crew requires and give them priority over all other flights. No matter if events subsequently make it appropriate to downgrade the emergency/urgency call or even cancel it altogether: Members stressed the key here is to alert the controller as soon as practicable. Furthermore, squawking A7700 or selecting the military emergency facility on the IFF (SSR) (which enables the individual flight identity to be retained whilst triggering an alert) should ensure that the crew's situation is broadcast by the SSR not only to their controller but also to other ATSUs. This permits rapid identification of the emergency ac itself, facilitates assistance from Distress & Diversion Cell at LATCC (Mil) including direct routeings to diversion airfields if appropriate, and will usually attract priority for the emergency ac over all other en-route GAT/OAT if necessary.

As it was these measures did not appear to be necessary here and no emergency was declared by the Typhoon crew. Nonetheless, they did not advise CON12 before initiating their descent and it was not until 1846:30 when the Typhoon was less than 1000ft above the B737's cruising level [the Debden plot-extracted data gives FL377 as the Typhoon's level at this time] that CON12 enquired of the crew who then confirmed they were descending *"…subsonic requesting diversion.."*. But the crew abruptly ended their message whereupon CON 12 transmitted the avoiding action L turn at 1847:02, also adding essential traffic information about the B737. By that stage, the Typhoon pilot reported in his written account, they had already detected the B737 on their ac's AI radar from a range of 15nm as they turned onto 290°; had spotted it at a range of 10nm and had already elected to turn away to the SE before CON12 transmitted the avoiding action instruction. The radar recording certainly evinced the commencement of the turn at a range of 7nm from the airliner, which was before the avoiding action was transmitted. However, the very late recognition of the ac's descent by the LATCC (Mil) controller stemmed from the same reason that applied to his colleague at Swanwick. CON12 - who could only select a maximum of two displayed radar sources simultaneously - was unable to see the Typhoon's descent from the ac's Mode C. The

Mil ATC Ops report had shown that CON 12 missed one iteration of the Typhoon's Mode C on the Debden of FL490 and another when the Typhoon's Mode C was once more displayed on the Cromer at FL404: this was because she had the other radar selected at the time. The Board was briefed that there was only one other indication from the Debden during this time that CON12 could have seen, when the ac passed FL490 [the diagram being a reflection of the very few Mode C returns displayed to the controller during this stage of the encounter]. Controller Members were concerned that the radar data processing parameters were such that it effectively rendered the Typhoon's descent invisible even though apparently sound Mode C data had been received. It was explained that with the exception of two primary-only radar contacts from the Debden, the recorded plot data from this source and the Cromer showed that they received the Typhoon's Mode C throughout, without interruption. Thus the controller was unable to detect the Typhoon's descent before she turned it R onto 290°. However, whilst this seemed to some Members to be a contributory factor to the Airprox, a controller Member emphasised that the fundamental cause of this Airprox was that the Typhoon crew did not report their descent at all. If the Typhoon crew had advised the controller earlier about their descent - or the controller had been able to see from her radar display that the Typhoon had descended - then CON 12 might have been able to intervene earlier and this Airprox could have been prevented. Therefore, the Board concluded unanimously that this Airprox had resulted because the Typhoon crew initiated a rapid descent without clearance and flew into conflict with the B737.

Turning to the risk inherent in this encounter: fortunately the clear weather conditions enabled the B737 1st Officer to spot the nimble fighter as it was already turning away. But as the Typhoon opened SE'ly, it was surprising that TCAS had not enunciated a 'clear of conflict' message to the B737 crew and it was not clear why this was so. It appeared that in the midst of the Typhoon crew's unauthorised and uncommunicated descent, the LATCC (Mil) controller's avoiding action L turn instruction might not have been as significant as might have been thought in ensuring that the Typhoon was turned away from the B737. As the transcript timings revealed, this instruction was transmitted at 1847:02, about 15sec after the radar showed that the Typhoon's turn was commenced and after the CPA. The radar recording revealed that the Typhoon crew started their L turn away at a range of between 6 – 7nm when they were also 200ft above the B737. The fighter pilots were, however, fully cognisant of the presence of the airliner from their onboard AI radar data and had earlier acquired the B737 visually. Their sharp L turn away ensured that horizontal separation did not reduce below 4·4nm. Some 400ft of vertical separation was also evident at this point as the B737 crew complied with the RA and ascended to a maximum of 200ft above their assigned level, but with the nimble fighter turning away off their starboard beam it had also out climbed them. Taking all these factors into account, the Board agreed unanimously that no risk of a collision had existed in these circumstances.

The Board as a whole was concerned that once again an Airprox report had revealed a situation in which an ac had descended in CAS at such a rate that the ac's Mode C level was not displayed by ground-based ATC equipment to warn the controllers of the true geometry of the situation. The Board's assessment of Airprox 156/03 supposed this might be an operational issue that had prevented the interrogator from detecting the Mode C: the associated Safety Recommendation was made on that basis. The Board debated the veracity of this Recommendation in the light of the information presented here. A controller Member thought that the original Recommendation might be unsound but this was a solitary view. However, three years later it would appear from the facts presented by the ATS provider and contained herein that there was indeed a technical limiting aspect, which might have been overlooked previously, to the display of correct Mode C data that had actually been detected by the SSR interrogators. During the investigation into the current Airprox it appeared that the Mode C data had apparently been suppressed by the radar data processing system because it was perceived to be incorrect or "invalid", whereas at face value the data appeared accurate. Notwithstanding this might have been within the design parameters of the 'system' as a whole, it seemed to the Members that the lack of this data had prevented the controller from intervening at an earlier stage to forestall the encounter. This at first sight did not seem to be a satisfactory state of affairs and it seemed that a more detailed analysis of this aspect was warranted in-line with the outstanding Recommendation. Controller Members noted the recent update by the MOD and the CAA on the status of their study but from this scant information it was difficult to establish if any practical headway had been made. The DAP Advisor to the Board briefed the Members that discussions between MOD and DAP continue in an effort to identify measures that might resolve this difficult and complex issue. Whilst accepting fully that the outstanding Recommendation was made concerning a complex topic, Members sought a more detailed explanation of the status of the review team's study to date. Moreover, the Board believed that it might be helpful if the technical aspects revealed here were brought to the attention of the joint MOD/CAA review team to inform their work. Thus the Board charged the Chairman with writing to the MOD and CAA to obtain a more comprehensive understanding of the Review Team's work and to ensure that they were aware of the circumstances revealed by the Board's assessment of this Airprox.

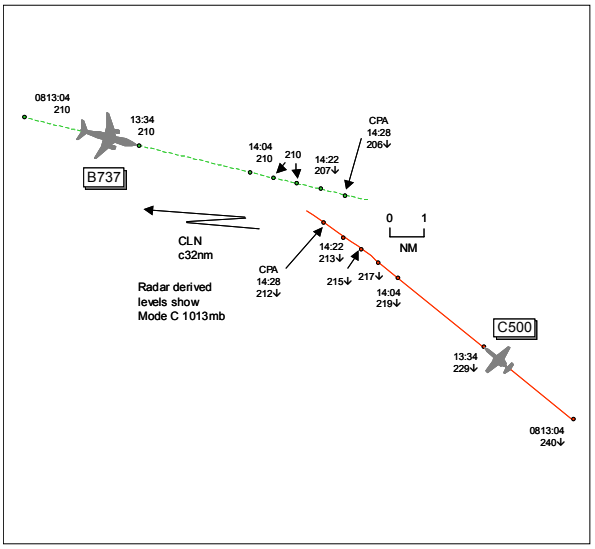
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Typhoon crew initiated a rapid descent without clearance and flew into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT NO 018/06

Date/Time:	31 Jan 0814	
Position:	5149N 00200E (32nm E CLN)	
Airspace:	AWY L608	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-700	C500
Operator:	CAT	Civ Comm
Alt/FL:	FL210	FL220↓
Weather	VMC CLOC	VMC CLAC
Visibility:	>10km	15km
Reported Separation:		
	100ft V/<0·5nm H	Not seen
Recorded Separation:		
	600ft V/0·9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports in the cruise at FL210 and 300kt and in receipt of a RCS from London on 135·42MHz squawking an assigned code with Mode C. They noticed on TCAS traffic approaching head-on from about 20nm ahead, slightly R of the ac's nose, and this was followed by a TCAS TA alert; the other ac was not sighted visually. An RA 'descend descend' warning was then received and TCAS actions were commenced whilst the other ac continued to descend and come closer. After the 'TCAS descent' call was made to London, ATC gave them heading 090°(L turn) to avoid. Flying into sun, the other ac was then sighted, a white C500, as it appeared in their 1-2 o'clock position in a descending, banked L turn, about 300-400ft above and <0·5nm away. It quickly passed <0·5nm abeam still descending, vertical separation was estimated to be 100ft as they started to bank L for heading 090°. He assessed the risk as high.

THE C500 PILOT reports inbound to Cranfield IFR at 360kt and in communication with London Radar squawking an assigned code with Mode C; TCAS is not fitted. After changing frequency they received a new radar vector which appeared normal: they had been receiving radar vectors for the previous 10min during their descent. At the time they were descending through FL220 and had not received any comments from ATC that they were flying/ descending to an inappropriate level. They had not seen any ac in confliction and did not assess the risk.

THE LTCC SABER SC reports that the C500 had been coordinated with the LACC CLN Sector inbound at FL220 whilst the B737 was climbing to FL210 on radar heading 110°. The C500 flight called on frequency on heading 310° descending to FL220, he thought, and he gave the flight a speed. No further descent was given owing to the B737 crossing underneath. He then observed the C500 descending through FL220 so he told the flight to maintain FL220 but this was not done. He then gave avoiding action to both the C500 and B737 flights.

ATSI reports that at the time of the Airprox, both ac were in communication with the TC SABER Sector controller. The SC described the workload as moderate but complex and the traffic loading as 'low to medium'. The SC was operating in a bandboxed configuration and without the assistance of a Coordinator. This aspect is discussed below.

The B737 flight made contact with the SABER SC at 0805:35, when the ac was 11nm E of Stansted, and reported climbing to FL110. The SC instructed the crew to climb to FL140 which was correctly acknowledged. Soon afterwards the SC instructed the crew to fly a heading of 075° and climb to FL170 and, at 0808:00, to climb to FL210. At 0809:35, when the B737 was just to the N of CLN, the SC instructed the crew to turn R heading 110°.

At 0812:30, the crew of the C500 called the SC stating "*…passing two five zero descending two one zero on the radar heading of three one zero*". At this time the C500 was in the 1 o'clock position of the B737 at a range of 26·5nm, with the B737 maintaining FL210. The SC asked the crew of the C500 to report their speed, to which

they replied "*Two six zero knots*" and so the SC instructed them to maintain that speed. At 0814:04, the Mode C of the C500 indicated FL219 (lateral separation 5·4nm) and some 10sec later the SC transmitted *"C500 c/s maintain flight level two two zero"*. By now the C500 was passing FL217 and in the 2 o'clock position of the B737, which was still maintaining FL210, at a range of 4nm. The SC's call crossed with a transmission from another ac and, seeing the Mode C readout from the C500 continue to decrease he transmitted *"C500 c/s main– C500 c/s avoiding action turn left heading zero nine correction turn left heading two seven zero degrees".* The crew read this back and the SC immediately instructed the crew of the B737 to make an avoiding action turn L onto a heading of 090°. STCA activated at 0814:24, and immediately went to red (high severity) as the 2 ac converged. The B737's height readout decreases, presumably in response to the reported TCAS RA descent although the RT transcript/recording does not reveal a TCAS RA transmission from the crew. STCA changed to white (low severity) at 0814:30, almost immediately after minimum separation occurred (0814:28) when the C500 was in the 3 o'clock position of the B737 at a range of 0·9nm and 600ft above it.

The SC reported that he had returned from a break some 10min before the Airprox. He assessed the traffic and was content to take the sector in its bandboxed configuration. A colleague who was with him asked whether he wanted him to occupy the Coordinator's position. The SC replied that he did not but requested his colleague remain 'within shouting distance'. The SC advised that there were a total of 5 positions that could be opened on the sector. One 'pair' of positions would handle outbounds whilst the other dealt with inbounds, the Coordinator's position making up the fifth. The SC added that, at the time of the Airprox, this configuration was not uncommon; however, nowadays the norm is to have at least 2 positions opened.

Although the SC was a recently validated controller, he was confident that he could handle the combined sectors. He stated that during his training only some 15% of training time was devoted to the Coordinator position and the rest on the radar. He further explained that, as the radar controller, it was incumbent upon him to be aware of the coordination required and so the presence of a Coordinator simply reduced the radar controller's workload.

The C500 was inbound to Cranfield and, as such, there is no 'standard procedure' for these flights. They were not very common at all and he could not recall seeing a similar flight since the Airprox. The SC had decided to treat it as an inbound flight to Stansted and route it via ABBOT, which he advised was normal practice on his watch. When the LACC S13 (Clacton) Planner called, it was agreed that the C500 would be accepted into the SABER airspace descending to FL220. Further coordination took place between the Planner and the SC and it was agreed that the C500 would be heading 310° in order to provide separation against other traffic. Analysis of the S13 RT clearly shows that at 0807:30, the S13T transmitted *"C500 c/s fly radar heading three one zero degrees and descend now please to flight level two two zero and be level one five miles before IDESI*". This was fully and accurately read back by the crew of the C500.

It was around this time that the SABER SC's workload started to increase. He had received a call from S13 regarding an RJ85 that was inbound to London City and was some 18nm SE of the C500. It was higher than normal and so required further coordination. It transpired that this ac was the one that reported on frequency just as the SC was passing avoiding action to the C500. The SC had formulated a plan to hold the B737 at FL210 and wait until it had passed the C500, which he expected to be descending to FL220. He was applying speed control to the C500 in order to stream the ac with other inbound traffic. Although his workload increased he did not call for assistance as calls were coming quickly and he did not have an opportunity to request help or support. When the C500 called on frequency the crew clearly reported descending to FL210 but this was not detected by the controller. He opined that he was looking at the overall traffic situation and was expecting the ac to be descending to FL220. At that time he did not cross check the level with his flight progress strip or tick the reported level: however, he has subsequently amended his standard method of checking ac's initial calls.

The SC openly admitted that he hesitated when passing avoiding information due, primarily, to 'the heat of the moment'. He had received a little training during his college training and some more as part of his TRUCE exercises, however, he felt that being in a simulator when you expect a situation to occur was very different to handling traffic on an operational sector when the situation arose unexpectedly.

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 initially discussed the bandboxing aspect of the incident. One ATCO Member thought the Group Supervisor (GS) had a responsibility for ensuring that the sector was appropriately manned as the GS had information available on expected sector traffic levels through the Traffic Load Prediction Device. However, at the time of the handover, the onus was on the oncoming SABER SC to assess, from the information presented to him, that the sector workload was within his capabilities - which he did - whilst the off-going controller 'stood by', his offer to split-off the Coordinator position having been declined. Operating the position 'solo' had later left the SABER SC with diminished TRM: an extra pair of eyes, ears and indeed hands to monitor the situation and help reduce the workload would have been beneficial. In the end, the controller's workload increased to such an extent that he did not have time to request help or support. The workload had risen owing to an increase in required coordination which may not have been evident from the traffic displays to a Supervisor even if he had been looking over the SC's shoulder. The NATS Advisor confirmed that at least 2 positions are now manned during the morning and afternoon periods.

Looking at the incident per se, the LACC S13P had coordinated the C500 into the LTCC SABER Sector descending to FL220. The S13T cleared the flight to descend and this was clearly read back by the crew. However, the flight then descended below this cleared and coordinated level and into conflict with the B737 which caused the Airprox. Pilot Members agreed that the C500 flightdeck CRM should have ensured through compliance with their SOPs that the flight adhered to the ATC cleared level. However, the SABER SC did not detect the C500 crew's erroneous cleared level (FL210) on their initial call on his frequency and this omission had undoubtedly contributed to the incident.

Turning to risk, the SABRE SC had seen the C500's height readout descending through FL219 but unfortunately his transmission to the crew to maintain FL220 crossed with that from another flight. This had delayed resolution of the deteriorating situation but the SC had then issued avoiding action L turns to the C500 then B737 crews respectively. Fortunately, the B737 crew had had an early 'heads-up' from TCAS which showed the C500 20nm ahead in potential confliction. Following a TA alert, an RA 'descend' command was received and actioned and, during this avoidance manoeuvre, the ATC L turn was issued. The crew visually acquired the C500 in a banked L turn 0·5nm away 300-400ft above descending before it passed quickly to their R an estimated 100ft above and <0·5nm away as they commenced their L turn. The radar recording reveals at the CPA the separation was 600ft and 0·6nm with the C500's L turn just evident. Although the robust actions taken by the B737 crew, whilst following TCAS commands, had been sufficient to remove the actual risk of collision, the Board believed that the ac had passed in such close proximity, unsighted by the C500 crew, such that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

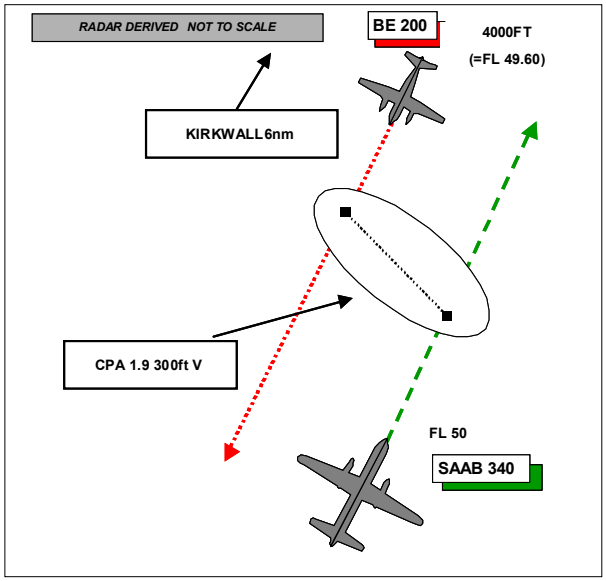
Cause: The C500 crew descended below their cleared and coordinated level into conflict with the B737.

Degree of Risk: B.

Contributory Factors: The LTCC SABER SC did not detect the C500 crew's erroneous cleared level in their initial call.

AIRPROX REPORT NO 020/06

Date/Time:	17 Feb 13:00	
Position:	5850N 00300W (6nm South of Kirkwall)	
Airspace:	W3D	(Class: F)
	Reporting Ac	*Reported Ac*
Type:	Saab 340B	Beech 200
Operator:	CAT	Civ Comm
Alt/FL:	FL50	4000ft
	SPS	(QNH)
Weather	IMC IN CLOUD	NR
Visibility:	0	NR
Reported Separation:		
	0ft V/1nm H	NR
Recorded Separation:		
	0 V/2.4nm H (becoming 300ft/1.9 nm)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340B PILOT reports flying a scheduled passenger flight under IFR inbound Kirkwall. While heading about 015° at 220kt and FL50, they were cleared by Kirkwall APP to overhead KWL to maintain FL50. A TCAS contact was seen on a reciprocal track climbing towards their level and a TCAS TA was received. The radio was busy and as soon as it was radio quiet they advised Kirkwall of the TCAS contact which was then about 2nm in their 11 o'clock and at the same level. While the APP Controller and an outbound aircraft were confirming actual versus cleared levels, they received a TCAS climb RA which they complied with, levelling at about FL60. After the TCAS RA cleared they requested descent and were cleared to do so as they cleared the traffic. He assessed the risk as being high.

THE BEECH 200 PILOT provided a brief report that stated that he was heading 190° after take-off from Kirkwall. Their IFR clearance had included a local climb restriction of FL40 and was passed as they lined up for departure. At the same time they were then given a company message and they [the ac had 2 pilots] miss-heard the restriction as '4000ft'. On levelling at 4000ft, an inbound Saab reported a TCAS warning and ATC asked them to confirm their level. Having passed it they were instructed to descend to FL40 which they did immediately.

KIRKWALL APP reports that he was working a Beech 200 outbound. He passed a company message to the crew and in a separate transmission a local climb restriction of FL40 which the pilot read back. At the time a Saab 340 was inbound, maintaining FL50. Two min after the Beech departed, he passed him a further company message. Immediately following this the Saab reported a TCAS warning of traffic 11 o'clock range 3 miles, same level. He checked the level of the Beech and the pilot reported: "*level altitude 4000 feet*" so he instructed him to descend to FL40. He then instructed the Saab pilot to "*climb as required* " and he immediately replied that he had just completed a TCAS RA climb and was level at FL60.

ATSI reports that the incident took place at 1258, about 8nm S of Kirkwall on ADR W3D which is Class F airspace. At 1247 the Beech pilot called the Kirkwall ADC/APP, reporting that he had copied ATIS Information 'Hotel' and requesting start-up for an IFR flight to Aberdeen via W3D; this was approved. The Saab, also IFR, was inbound from Inverness and, at 1250, established communications with Kirkwall, reporting descending to FL50, with Information 'Golf'. The flight was instructed to maintain FL50, advised that the current information was 'Hotel' and the QNH was 981mb. The Saab was tracking to the KWL VOR in preparation for an ILS/DME/VOR approach to RW 27. A report when the flight reached DME 15 miles from Kirkwall was then requested by the controller, as Kirkwall is not radar equipped.

At 1251, the Beech was issued with a taxi clearance *"…taxi via runway 33 backtrack line-up runway two seven".* At no point, prior to or after this, did the controller obtain a readback of the QNH setting as required by MATS Part

1, Section 3, Chapter 1, Page 9, para 11 ATIS**,** which states in sub para 11.5: *"In the case of a departure ATIS, controllers must obtain a readback of all relevant altimeter settings contained in the broadcast, unless the setting will also be passed in association with start-up or taxi clearance".* While taxiing, the flight was issued a departure clearance-*"…*(callsign)…*clear to Aberdeen via Whiskey three and four Delta climb maintain Flight Level one one five and squawk five one five five there will be a local restriction to follow"* and this was readback. In the next transmission the controller announced that he had a message to pass from the flight's company, which the pilot agreed to accept. MATS Part1, Appendix E, Page 10, para 7.1 advises, *"When requested by a company representative, controllers may transmit specific operational messages to aircraft subject to normal air traffic service requirements and shall prefix the transmission 'Company advise/request…' ".* The message was a request that the crew contact the company on arrival at Aberdeen regarding an additional 4-sector trip that was planned. The pilot responded with *"Okay no problem thanks* (callsign)*".* Immediately following this reply the Kirkwall controller transmitted *"And* (callsign) *local restriction after departure climb maintain flight level four zero until advised"*, to which the pilot responded *"Er after departure climb er flight level four zero…".* (Note: The Transition altitude at Kirkwall is 3000ft). The Beech was cleared for take-off on RW27 with a left turn out at 1254:25. One minute later the inbound Saab reported inside 15 DME. The flight was instructed to *"…maintain flight level five zero to the Kilo Whiskey Lima er on reaching …… you're cleared for the VOR to the ILS runway two seven no descent until established outbound".*

About 2min after becoming airborne, the Beech pilot was relayed a second company message. This time it involved a question about the crew's availability for the proposed flights. Clearly such a question would require some consideration so, not unexpectedly, the pilot responded *"I think we'll er we'll have to look at it once we get back to Aberdeen 'cos erm trying to think about that when we're doing this job at the moment is er bit of a waste of time*". Acknowledging this the controller then requested the flight to report at 15 miles DME. The pilot replied *"Wilco and er if you hear anything else from our Ops just say we'll contact them once we've looked at it in Aberdeen".* Three seconds later the pilot of the Saab reported *"… TCAS contact three miles er our level and er in our eleven o'clock".* This was acknowledged and in the same transmission the controller requested a level check from the Beech, to which the pilot reported *"…four thousand feet".* Once he had confirmed with the pilot that the aircraft was at altitude 4000ft rather than FL40, the controller reacted immediately and instructed the flight to descent to FL40, though he did not use the term 'Avoiding Action'. The instruction was readback correctly. The controller explained the situation to the Saab, whose pilot then reported that a TCAS climb to FL60 had been undertaken and that he was now seeking descent again to FL50. This was subsequently approved, the flight later completing an uneventful approach and landing. The Beech meanwhile, was cleared to FL115, as planned. However, before transfer to 'Scottish' its pilot transmitted *"…apologies about our error about the altitude rather than flight level er I think that came er from getting all the information of the er other jobs er at the same time as the restriction".*

By flying at 4000ft (Kirkwall QNH of 981mb) rather than his cleared altitude of FL40 (SAS) the Beech was by calculation 960ft above his cleared level (1013mb-981mb = 32mb difference; 32mbx30ft = 960ft). Therefore when in level flight, there would have been only 40ft of vertical separation between the outbound Beech (at FL 49.6) and the inbound Saab (at FL 50)

The radar recording shows that at, 1257:14, the Beech is climbing through FL44, Mode C, in the Saab's 11o'clock position at a range of 6.4nm, the latter indicating at FL50, Mode C. The Beech continues to climb and, at 1257:51, the two flights are indicating at the same level, FL50, when in each other's 10:30 position at a range of 2.4nm. When at 10 o'clock they are 1.9nm apart, the Beech still indicating at FL50 while the Saab is now showing a climb, passing FL53. They pass abeam, 1.9nm apart, at 1258:11, the Saab having now reached FL61 and the Beech at FL49, just commencing a descent.

From the ATC perspective, the Kirkwall ADC/APP had no reason to believe that separation between the outbound Beech and the inbound Saab would not be achieved. He had issued the Beech with an instruction to maintain FL40 after departure and obtained a correct readback from the pilot. The Saab pilot had meanwhile reported maintaining FL50. The controller could not have intervened earlier in the developing conflict because, in the absence of radar information, the Beech's climb above its cleared level was not revealed until the TCAS report by the Saab pilot.

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.

Following an in-depth discussion regarding Minimum Safe Flight Levels, it was clear to the Board that the Beech 200 crew had climbed above their cleared level. It was also clear that despite the correct readback of the cleared FL the Beech 200 crew became seriously distracted by the company messages and did not set the SAS. This, the Board unanimously considered, had been a contributory factor in this incident. Although always a distraction, one Member pointed out that in some situations - such as in the air ambulance role - company messages can be essential to the mission. In high-workload situations however, crews should - as the Beech 200 crew belatedly did - ask that such messages be held over, if necessary until they land.

The controller in this incident was not in a good position to prevent it as he had no information other than the pilots' reports regarding the alt/level of the two ac. When he was made aware of the proximity of another ac by the Saab pilot's report of the TCAS alert, the controller acted promptly and correctly.

Since the Saab's crew reacted correctly to the TCAS TA and then the RA and the lateral separation was never less than 1.9nm, the Board considered that there was no risk that the ac would have collided.

PART C: ASSESSMENT OF CAUSE AND RISK

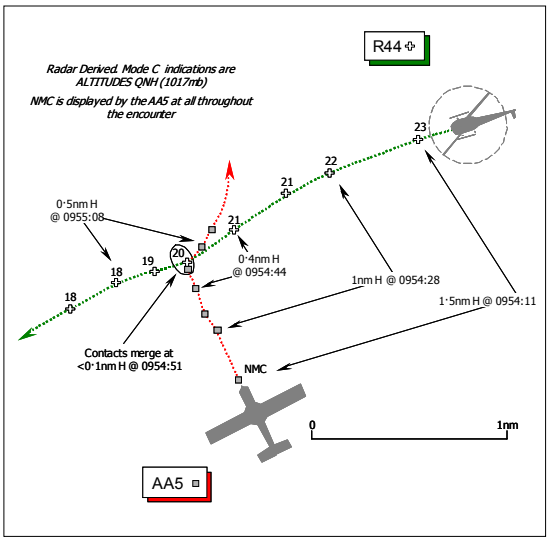
Cause: The Beech 200 crew did not comply with their ATC clearance and climbed into conflict with the Saab 340.

Degree of Risk: C.

Contributory Factor: Distraction of the Beech 200 crew by company messages such that they did not set the SAS.

AIRPROX REPORT NO 021/06

Date/Time:	9 Feb 0954	
Position:	5159N 00057W (2nm E of Buckingham)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	R44	AA5A Grumman
Operator:	Civ Comm	Civ Trg
Alt/FL:	2000ft	1900ft
	(RPS 1014mb)	(QNH 1017mb)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	40nm	>10km
Reported Separation:		
	75ft H	50ft V/600m H
Recorded Separation:		
	<200yd H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ROBINSON R44 HELICOPTER PILOT reports he had departed from Cranfield for a pipeline patrol and was in transit to the start position under a cloudless sky, in CAVOK: however, the Sun was fairly low to the horizon in their 9-10 o'clock. They were in receipt of a FIS from Brize Norton on 124·27MHz and a squawk of A0036 was selected with Mode C [albeit that the pipeline patrol had not commenced and that no PINS had been filed with LF Ops]. An ACAS is not fitted.

When 2-way RT was established with Brize Norton, the controller advised them of traffic crossing R to L but with no height information. Heading 250°(M) at 100kt in a gentle descent from 2500ft to 1000ft Cotswold RPS [1014mb] some 2nm SE of Buckingham, both he and his observer, who was sitting in the LHS, were scanning the sky from their 12 o'clock to 3 o'clock looking for the reported traffic, when he turned his head to speak to his observer. As he turned his head and his field of view swept through their 11 o'clock, he observed the other ac – a white single engine low-wing monoplane – some 75ft away in a steeply banked R turn, which he believed was just going to pass behind his helicopter. Hence, as the other ac was already turning to avoid his R44 he elected to bank only slightly to the R to increase the horizontal separation. The other ac passed 75ft away at the closest point with a *"high"* risk of a collision. He stressed it was a cloudless sky with 40nm visibility: however their normal scan was probably distracted by the traffic information from Brize and that the other aircraft was positioned almost directly into the Sun. His helicopter has a red/yellow colour-scheme.

THE GRUMMAN AA5A PILOT, a flying instructor and pilot-in-command, reports he had departed from Cranfield in his white-coloured ac for a Flying Instructors Course (FIC) instructional sortie and was occupying the left hand seat as the PNF, whilst the student instructor was in the PAX/instructor's right hand seat and was the PF. The rear seat was occupied by a second FIC student. They were in communication with Cranfield ATC but were not under an ATS as this had neither been requested nor specified. A squawk of A7000 was selected with Mode C. An ACAS is not fitted.

Climbing through 1900ft Cranfield QNH (1017mb), some 15nm SW of Cranfield heading 300° at 80kt, he sighted a "reddish orange" R44 helicopter in their 12:30 - 1 o'clock position about 1/3rd of a mile away just slightly above his ac. There was insufficient time to warn the student instructor PF so he took control of the aeroplane himself and immediately turned R using 90° AoB to avoid a collision. The helicopter passed about 600m away to port at the closest point and some 50ft above his aeroplane, but he did not assess the risk.

He added that the student in the rear seat had spotted the conflict slightly before he had, but had no microphone facility and was about to warn the PF by tapping him on the shoulder at the same time as he took control and executed the avoidance manoeuvre. The R44 helicopter appeared to maintain its flight path without deviation but it seemed to him that the helicopter pilot did not sight his aeroplane until he turned R, when he presented his ac's

underside to him. Otherwise, he would have perceived that the R44 pilot would have taken some kind of action to avoid his aeroplane.

UKAB Note (1): The AA5 was identified as the reported ac and the company contact by LATCC (Mil) RAC on 7 Mar. Unfortunately the AA5 pilot did not render his account until 28 Mar, whereupon it was established that the Cranfield RT recording was no longer available. The Controller had filed his report on the basis of an incident.

THE COMBINED CRANFIELD AERODROME/APPROACH CONTROLLER reports that at 0957, the R44 helicopter pilot called on RT and reported a "near miss" near Buckingham. He contacted all flights on his frequency to establish if it was the reported ac. After numerous attempts to contact the AA5 crew, operating VFR under a FIS, he still received no reply and after the ac duration notified by the AA5 operator, overdue action was commenced. He was concerned, so when the AA5 crew called on recovery the pilot was questioned, who stated that he had turned his radio down. The controller opined that this is not helpful as the flight was on a FIS and the crew should be monitoring the frequency; he believed that the pilot had "broken his side of the agreement under the FIS".

MIL ATC OPS reports that the R44 crew contacted Brize Norton LARS at 0954:02, in the descent to an altitude of 1500ft requesting a FIS and information pertaining to the activity of Weston-on-the-Green (W-o-t-G) [EGD 129] free-fall parachute drop-zone. LARS applied a FIS as requested and passed the relevant information on W-o-t-G. LARS also passed traffic information to the R44 crew on the conflicting traffic - the AA5 - at 0954:37, "[R44 C/S]*….there is traffic in your immediate vicinity, crossing right left, keep a good look out no height information*". The R44 crew reported visual with the conflicting traffic at 0954:57 and commented that the other traffic had "*come at us from the left hand side, quite close"* and went on to confirm they would be filing an Airprox.

[UKAB Note (2): Analysis of the Clee Hill Radar recording shows the R44 as an SSR contact only, transiting westbound squawking A0036 descending through an altitude of 2400ft (1017mb). Just after the R44 crew contacted LARS, descending through 2300ft, the AA5 can be seen as an SSR contact only in the R44's left 10 o'clock 1½nm, crossing L - R, squawking A7000 but with NMC. The 2 ac continue to close on conflicting tracks until the CPA at 0954:51 when the AA5's track merges with that of the R44 indicating 2000ft amsl at a recorded horizontal separation of <0·1nm (200yd). After the merge, contact is lost on the AA5 for 1 sweep but the AA5 pilot's reported avoiding action hard R turn is evident thereafter as the AA5 steadies NE'ly. The R44 pilot's reported course deviation to the R is just discernable as the helicopter descends to an indicated altitude of 1800ft.]

Given the R44's altitude and the area in which the crew contacted LARS, the R44 and the conflicting AA5 would have been very close to the vertical limits of LARS's radar coverage. LARS immediately passed traffic information to the R44 crew about the displayed AA5 contact. However, due to the poor quality of the radar return on the AA5, the controller mistakenly perceived the AA5 was tracking from R – L relative to the helicopter, when in fact the opposite was the case and the AA5 was crossing L - R.

ATSI had nothing further to add.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, reports from the ATSU involved and from the appropriate ATC authority.

It was evident to the Board that this Airprox in the 'see and avoid' environment of the 'Open FIR' was fundamentally a lookout issue but there was an underlying lesson here both for pilots and controllers. Unbeknown to the controller, the traffic information - dutifully given by LARS under the FIS provided to the R44 pilot with the aim of assisting his visual acquisition of the other ac - had the unintentional effect of focusing the pilot's and observer's scan in the opposite direction. Controller Members recognised that the relatively close proximity of the ac when the R44 pilot first called the controller – less than 1½nm away and viewed potentially at a large displayed range on the controller's radar based on poor contacts - might have caused difficulty resolving the exact geometry of the situation. One pilot Member opined that this traffic information was misleading and thus intrinsic to the cause. Although this was a singular opinion and not a widely held view amongst the other Members, the lesson for pilots is to maintain an all-round scan and that for controllers is to endeavour to make the traffic information as accurate as possible and to 'paint the full picture'. As it was, the R44 pilot - who was ultimately responsible for 'seeing and avoiding' other ac - did not spot the predominantly white-coloured AA5 approaching from the port side, out of the

Sun, at a constant relative bearing with virtually no relative motion to draw attention to itself until it had closed to about 75ft. This defeated visual detection by the R44 pilot until the last moment when the AA5 was spotted already turning away from the helicopter. Hence, in the Board's opinion, this was effectively a non-sighting beforehand by the R44 pilot.

Clearly, the Cranfield APPROACH controller believed he was providing a FIS to the AA5 pilot, whereas this was not the pilot's perception at all, and unlike Brize Norton, Cranfield is not equipped with a radar so the controller would have been unable to provide any form of warning. The AA5 instructor reports candidly that he did not spot the R44 until it had closed to his 1 o'clock about 1/3rd of a mile away and just slightly above his ac. Clearly the AA5 crew had a responsibility to give-way under the 'Rules of the Air' in this crossing situation but 'the Rules' can only work if the other ac is seen in good time to avoid it. Here, the helicopter was spotted at a very late stage, which the Board concluded was the other part of the cause. Therefore, after weighing all the various factors carefully for relevance the Board agreed unanimously that this Airprox had resulted from a very late sighting by the AA5 crew and effectively, a non-sighting by the R44 pilot.

Regarding the inherent risk, although the AA5 was fitted with Mode C, no level information was evident on the radar recording which prevented an accurate determination of the minimum vertical separation that pertained here – but apparently no more than 50ft according to the AA5 pilot. Members reinforced the importance of ensuring that Mode C was selected all the time which, whilst not necessarily intrinsic to the outcome here, denied altitude data about the AA5 to ATC which might have allowed more complete traffic information to be provided. Moreover, it potentially denied altitude information to other acs' TCAS - where fitted. Whilst the R44 was not fitted with this device, TCAS was an important safety net of proven effectiveness; pilots should be in no doubt that merely selecting Mode C with Mode A on all the time (in accordance with national procedures) might, in other circumstances, be the significant difference between an accident and an incident. The radar recording had confirmed that the respective tracks had merged in azimuth at a range of <200yd. Whilst the R44 pilot reported that he applied R bank, which might have increased the horizontal separation somewhat at close quarters, it did not alter his own flight path significantly and so had little effect on the overall outcome as this was done after the AA5 pilot was already turning away. So in the Board's view, although the AA5 instructor had detected the presence of the small helicopter in sufficient time to avoid a collision, the safety of the ac involved had not been assured by any means.

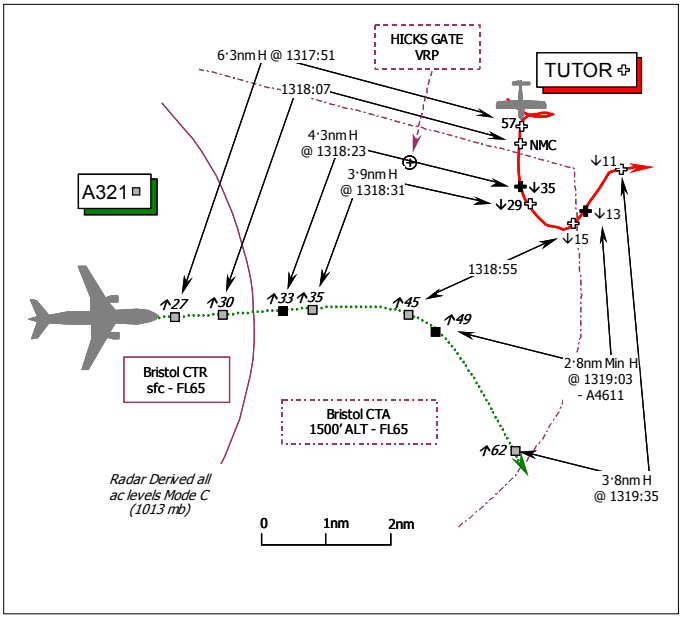
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sighting by the AA5 crew and effectively, a non-sighting by the R44 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 022/06

Date/Time:	26 Feb 1319 (Sunday)	
Position:	5123N 00228W (9nm E of Bristol elev: 622ft)	
Airspace:	Bristol CTA	(Class: D)
Reporter:	Bristol APR	
	First Ac	*Second Ac*
Type:	A321	Grob Tutor
Operator:	CAT	HQ PTC
Alt/FL:	↑FL40 (SAS)	FL60↓ (SAS)
Weather	IMC in Cloud	VMC CLOC
Visibility:	NR	5nm
Reported Separation:	Bristol APR: 800ft V/2·5nm H	
	NR	NR
Recorded Separation:	200ft Min V @ 4·3nm H.2·8nm Min H @ 3600ft V.	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APPROACH RADAR CONTROLLER (APR) reports that the APR position was bandboxed with the LARS position as there was little or no LARS traffic and the overall traffic level was light. Colerne Airfield was notified as being active. The A321 was a 'pending' departure from Bristol to join airway L9 at WOTAN climbing to FL90. A contact squawking A4576 – the Grob Tutor - was observed just outside Bristol CAS at various levels around FL60 directly on the WOTAN departure route. Although the Grob was operating in the FIR, as there were other WOTAN departures pending he telephoned Colerne ATC to ask that if it was possible for the Grob pilot to operate in a less problematic area. Colerne ATC advised they would ask the Grob pilot to contact the APR on the Bristol RADAR frequency. Consequently, because of the presence of the Grob, he released the A321 "straight ahead only". Additionally, he asked his assistant (ATSA) to request both a higher level and more easterly airways joining point from LACC Sector 23 in order to keep the A321 away from the Grob. This was agreed, just as the A321 became airborne, whereupon he observed that the Grob had tracked S into Bristol's CAS descending through FL50 Mode C. On first contact with the A321 crew on RT he passed TI under the RCS about the Grob but it's Mode C temporarily disappeared. Further TI was passed and the Grob's Mode C reappeared indicating FL35, so an avoiding action R turn onto a heading of 155° was issued to the A321 crew. At this point horizontal separation was 4nm but this was eroded before it increased once the A321's turn was established. The Grob pilot then contacted him on RT descending to 1500ft and was identified after issuing an A4611 (Bristol assigned) squawk. Once the confliction had been resolved, the A321 was given a heading back towards airway L9 and transferred to LACC Sector 23 on 134.75MHz. Whereupon the Grob was transferred back to Colerne ATC. Both pilots were "briefly advised" of the Airprox.

The Bristol 1320UTC weather was noted as Surface Wind: 050/19kt; 10km+ nil weather; cloud: BKN @ 3200ft; QNH1024mb.

THE A321 PILOT reports he was outbound from Bristol Lulsgate and in receipt of a RCS from Bristol RADAR on 136·075MHz. His departure clearance from RW09 was to continue straight ahead instead of the standard L turn to WOTAN. Climbing out to FL40 heading 086°(M) at 230kt whilst switching to Bristol RADAR, they were IMC in cloud and about 5nm E of the Airport they were given an avoiding action R turn onto 155°. TCAS showed proximate traffic on their port side, which disappeared from the display during the R turn, but shortly afterwards the other ac's pilot called on the frequency - the Grob Tutor. Due to the timely intervention of ATC, TCAS did not enunciate either a TA or RA. The other ac was not seen and he did not specify the minimum separation that obtained because no assessment of the range of the proximate traffic was possible, but he assessed the risk as *"medium"*.

AIRPROX REPORT No 022/06

THE GROB TUTOR PILOT reports that he was operating VFR from Colerne on a training sortie in his white coloured ac; the wing-tip HISLs were on. Whilst in communication with Colerne APPROACH he was not in receipt of an ATS, but a squawk of A4576 [an unverified/unvalidated conspicuity code for use by Colerne ac] was selected with Mode C.

After operating VFR above cloud at FL60 he identified his position over the Kingswood area of Bristol approximately 2nm NE of the Bristol CTA using VOR/DME. He found a large gap in the cloud – some 2½nm across - through which he could safely descend whilst maintaining VMC for recovery back to Colerne. The ground features appeared to confirm his VOR/DME position and he commenced a gentle LH turn avoiding cloud - and potential airframe icing - concentrating on lookout and cloud avoidance. At this point he was called by Colerne APPROACH who asked him to call Bristol RADAR. This he did straight away. The next RT call he heard was to civilian traffic being given an avoiding action heading. After this call had been acknowledged he called Bristol RADAR and was assigned a discrete Bristol squawk. However, by this point he was under the cloud and realised that he had drifted into their Class D CAS, so he immediately turned NE to clear the CTA and remain clear of the built-up areas on the outskirts of the City. He informed Bristol RADAR that he was transiting back towards Colerne at 1500ft RPS, but Bristol RADAR did not speak to him again before he informed them he was switching to Colerne APPROACH. At all times he had remained clear of cloud and in sight of the surface. Neither the risk nor the minimum separation was assessed.

[UKAB Note (1): Analysis of the Clee Hill Radar recording in conjunction with the RT transcript shows at 1317:10 a contact squawking A4576, subsequently identified as the Grob Tutor, to the NE of Bristol outside CAS at a range of 8·3nm from the A321, which is shown climbing through 2000ft (1013mb) having departed RW09 at Bristol. The A321 crew first made contact with the Bristol APR at 1317:50, *"…3000 feet climbing FL90 straight ahead"*. The Bristol APR advised the A321 crew of the other traffic - the Grob – (the type known as it was wearing a Colerne conspicuity squawk) *"…continue straight ahead I have Grob Tutor traffic operating just on the boundary of controlled airspace north east of you by 6 miles indicates FL60"* [unverified Mode C]. The Grob was at this point in the A321 crew's 11 o'clock – 6·3nm and outside CAS, just steadying southbound. After one return of NMC, the radar recording then shows the Grob as having penetrated the NE corner of the Bristol Class D CTA [base 1500ft QNH (1024mb) – about 1170ft (1013mb)] indicating FL35 at 1318:23, and simultaneously initiating a L turn about still in the A321's 11 o'clock - 4·3nm as the latter passes FL33 some 200ft below the Grob and climbing. At this point the Bristol APR gave the A321 crew an immediate avoiding action R turn, transmitting just before 1318:30 *"..that traffic now left 11 o'clock at a range of 4 miles left to right avoiding action say again avoiding action turn right immediately heading 155 degrees that traffic FL30 unverified"*. The A321 crew acknowledged the instruction *"roger turning right heading 155 degrees avoiding action* [C/S]". The Grob pilot made contact with the Bristol APR at 1318:51, and was immediately instructed to squawk A4611, which was readback. Moments later the Grob pilot reported to the APR, "[C/S] *is at..1500 feet descending on the regional"*, which was acknowledged. From 1318:55, the A321 can be seen established in the R turn passing FL45, with the Grob indicating 1500ft (1013mb) in a L turn 3·1nm away to the NE and some 3000ft below the A321. The next sweep at 1319:03, shows the point of minimum horizontal separation of 2·8nm as the A321 climbed through FL49 Mode C, whilst the Grob descended through 1300ft Mode C having exited the Class D CTA with 3600ft of vertical separation apparent, the ac now displaying A4611. Just before 1319:30, the APR reported to the A321 crew "[C/S] *is now clear of that traffic* [the Grob] *turn left heading..060 degrees and climb flight level 110"*, which was read back. Just over 1min later the Grob pilot advised that he was *"…now routeing back to Colerne and north abeam Bath"*. Whereupon the APR replied *"thank you …just before you go there was a definite infringement of controlled airspace which resulted in avoiding action with commercial jet traffic there and obviously appropriate action will be taken".* The A321 crew was also advised by the APR that he would be filling an Airprox report.]

ATSI reports that the Unit's local investigation report reveals that at 1317, the Bristol APR contacted Colerne with reference to traffic in the Hicks Gate area (a VRP, 8nm ENE of Bristol Airport) and asked if it could be moved elsewhere. The report states that the flight was transferred to Bristol.

There are no civilian ATC factors apparent in this Airprox.

MIL ATC OPS had nothing further to add.

HQ PTC comments that the pilot admitted, that whilst descending VMC through a gap in the clouds, he inadvertently drifted into Class D airspace. Pilots at Colerne are aware of their close proximity to the Bristol CAS and this was a momentary lapse of concentration by an experienced pilot.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

When considering the assessment of cause and risk, the Board only ever deals with what actually happened and not what might have occurred under different circumstances. It was evident that there was potential for a conflict between the departing A321 and the Grob Tutor operating outside CAS in the 'see & avoid' environment of the Open FIR: this had been recognised by the Bristol controller. Once the Bristol APR had identified that the Grob was a Colerne-based ac, he wisely attempted to take action to forestall further difficulty by requesting that its pilot call on RT. It was clear to the Members that the Grob pilot was operating legitimately in Class G airspace before he initiated his recovery back to Colerne and descended through the CTA. The Command had made it plain that this was an inadvertent infringement by an experienced, locally-based instructor and it was unfortunate that whilst executing his VFR descent through a large gap in cloud the Grob pilot had unintentionally strayed into the NE corner of the Bristol CTA. This had occurred just as the A321 was departing and the Bristol controller had conscientiously issued avoiding action when it was plain that the Grob had descended to the same the level as the airliner. It was not until after he had turned the A321 away from the Grob that the latter's pilot established RT contact for the first time and it became clear to the controller that the Grob was descending down to an altitude of 1500ft, thereby resolving any apparent conflict with the A321. Whereas it was opportune that the Grob pilot had contacted the APR when he did, it was also evident that he did not receive any traffic information about the A321 for his efforts. For their part the A321 crew, flying IMC in cloud promptly complied with the controller's avoiding action R turn which, coupled with the Grob pilot's descent, had not only forestalled a TCAS RA but removed any further potential for a conflict.

Some Members considered that the APR's prompt corrective action had in fact prevented the situation from deteriorating any further and were puzzled as to why he had filed an Airprox. Whilst it was plain that the Grob pilot should not have entered the CTA as he did, CAT pilots and controller Members alike found it difficult to comprehend that an Airprox report had resulted. Some Members thought that there might have been scope for this occurrence to have been investigated as an MOR. That said it was clear that the controller had an absolute right to file this Airprox if he so wished and give voice to his concerns in this manner. A controller Member pointed out that the APR had a responsibility to effect avoidance of traffic which was either lost, experienced a radio failure, or had penetrated CAS without clearance. Nevertheless, it was plain to the Board that the conflict here was short lived and once the Grob pilot appreciated what had happened he exited CAS with all speed by turning NE - away from the A321 - and descending into Class G airspace without further bidding.

Following this wide-ranging debate the Board concluded that this Airprox had resulted following an inadvertent penetration of CAS, where the proximity of the Grob Tutor to the A321 caused the controller concern. Members agreed that the controller had acted correctly. This, coupled with the A321 crew's prompt compliance as the Grob pilot turned and descended, ensured that separation was not less than 4nm as the A321 climbed through the Grob's level, thereby removing any risk of a collision whatsoever in these circumstances.

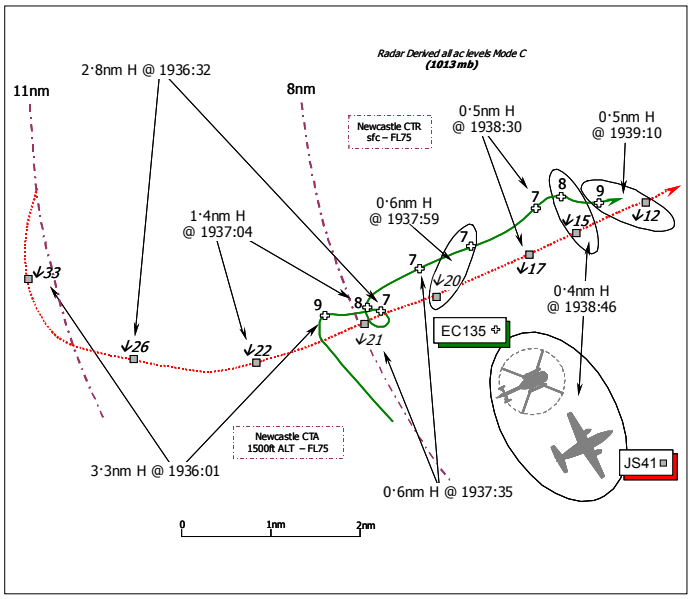
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following an inadvertent penetration of CAS, the proximity of the Grob Tutor to the A321 caused the controller concern.

Degree of Risk: C.

AIRPROX REPORT NO 023/06

Date/Time:	21 Feb 1938	Night
Position:	5501N 00150W (5nm FINALS RW07 at Newcastle - elev 266ft)	
Airspace:	Newcastle CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	JS41	EC135
Operator:	CAT	Civ Comm
Alt/FL:	1500ft↓ (QNH 1030mb)	1000ft (QNH 1030mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	10km	10km+
Reported Separation:	NR	Nil V @ 2nm Min H
Recorded Separation:	0·4nm Min H @ 1938:46 Nil V @ 0·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JS41 JETSTREAM PILOT reports the ac's lighting was on whilst inbound from Aberdeen to Newcastle under IFR at Night in VMC and in receipt of an ATS from Newcastle. The assigned squawk was selected with Mode C and TCAS is fitted.

Although the lights of the helicopter had been spotted about 2-3nm ahead passing from R – L and below them before the commanded TCAS RA, at the time of the occurrence they had lost visual contact with the EC135. Fully established on the ILS to RW07, heading 070° at 130kt and descending through about 1500ft QNH at about 4½nm DME, a TA was enunciated by TCAS, followed soon after by an RA - "ADJUST VERTICAL SPEED". This was complied with but almost instantly "CLEAR OF CONFLICT" was enunciated. The PF – his 1st Officer – who was hand flying the ac - initiated the correct action which necessitated a momentary reduction in their descent rate but after receiving "CLEAR OF CONFLICT", the approach was continued normally without further incident.

He added that it was his understanding that the helicopter was going to self-position onto the ILS behind them and that its pilot had also declared that he was visual with their Jetstream. The risk was not quantified. After landing he telephoned ATC who expressed their concerns regarding the helicopter pilot's actions.

THE EC135 PILOT reports that his helicopter has a distinctive dark blue/yellow colour-scheme and the navigation lights and HISL were on whilst en route to a Police task. He was in receipt of a RCS from Newcastle RADAR on 124·37MHz whilst squawking A0055 with Mode C. TCAS I is fitted and he was flying in VMC some 1500ft below and 10km clear of cloud whilst in transit through the Newcastle CTR/CTA at 1000ft Newcastle QNH (1030mb).

They were crossing through the centre-line to RW07 at about 5nm FINALS, at 120kt, when the task was cancelled. ATC informed him that a Jetstream was descending inbound on RW07 and he was told to hold so he carried out a tight orbit to try to establish visual contact with the Jetstream. Once he was visual he continued on a track of 070° to the N of the RW07 centre line but at 2nm was told to slowdown. He did feel that the Jetstream was overtaking him and it was sighted on the starboard beam as it passed 2nm away on a similar heading descending through his altitude. He opined that there was *"nil"* risk: he stressed that he was *"visual and maintaining adequate separation*".

UKAB Note (1): Flight Ops Inspectorate (Helicopters) reports that the JS41 was displayed to the EC135 pilot by the helicopter's TCAS.

THE NEWCASTLE RADAR 1 CONTROLLER (APR) reports that the EC135 was in transit through the Newcastle Class D CTA/CTR, operating under Special VFR not above 1500ft QNH (1030mb) to pass about 7nm W of Newcastle Airport to an incident at Otterburn. The Jetstream, operating under IFR, was being vectored for an ILS approach to RW07, restricted initially to not below 3000ft QNH (1030mb) because of the transit traffic. As the Jetstream was being vectored behind the EC135 on a closing heading for the ILS, the EC135 was observed to turn towards the Airport. Traffic information had been passed to both crews about each other's ac, whereupon the EC135 pilot reported that his mission had been cancelled and he was inbound to the Airport. The EC135 pilot was instructed to hold not above 1500ft QNH at 7nm FINALS to allow the Jetstream to overtake him and then to follow it in. Both the EC135 pilot and the Jetstream crew reported each other's ac in sight. The Jetstream pilot was instructed to descend to 2500ft QNH and then further descent with the ILS and the EC135 in sight. The EC135 pilot advised he had the Jetstream in sight and would follow this ac on final approach. But the EC135 was observed on radar to continue inbound, disregarding the instruction to hold. Further traffic information was passed to both flights and the EC135 pilot again instructed to "*hold in present location"* at 5nm FINALS to allow the Jetstream sufficient space to facilitate a descent. Eventually adequate spacing was achieved and the ac was transferred to the TOWER. The Jetstream pilot later telephoned to discuss the occurrence.

[UKAB Note (2): The Newcastle RTF transcript gives only 30sec and 1min time injects].

ATSI reports that the EC135 pilot established communication with Newcastle APPROACH at 1924, on a task towards Otterburn, and was provided with a FIS. Some 3min later the Jetstream crew made its initial call on the frequency, inbound to Newcastle. The Jetstream was identified 32nm N of the Airport (outside CAS) and provided with a RAS, for vectoring to the ILS for RW07. Subsequently, the Jetstream was instructed to descend to 3500ft QNH and the EC135 pilot was requested to operate not above 2500ft QNH and to report if a higher altitude was required. Traffic information was issued to both flights when they were about 10nm apart. [After 1932:30, the APR advised the Jetstream crew *"…maintain altitude 3500 feet on reaching there is helicopter traffic to transit below you from…south to north"* which was read back. This was followed after 1933:00 by traffic information to the EC135 pilot about the Jetstream *"…inbound traffic will be descending 1000 feet above you it's a Jetstream 41 in your 1 o'clock at 10 miles"* that was also acknowledged.]

The Jetstream crew was cleared to descend to 3000ft QNH (1030mb) and, at 1935:30, positioned onto a closing heading of 100° for the ILS. Shortly after 1936:00, the EC135 pilot reported that the task was cancelled and he requested to route to the airport. The radar recording shows the Jetstream indicating 3300ft Mode C (1013mb) [about 3800ft QNH], 3·3nm W of the EC135 which was at 900ft Mode C (1013mb) [1400ft QNH] as both ac are approaching the boundary of CAS. The APR responded to the EC135 pilot, *"…if you maintain not above 1500 feet* [about 1000ft (1013mb)] *please and..you'll be overhauled very shortly by a Jetstream which is just the west of you by 2 miles you can follow that aircraft down the ILS"*. [The EC135 crew replied, "*that's copied not above 1500 feet looking for the traffic".*] The Jetstream was cleared further descent and updated traffic information about the EC135 was issued *"...descend to altitude 2500 feet police helicopter on the centreline about 2nm ahead of you well below at the moment".* By now, both flights had entered Newcastle's Class D CAS - the Jetstream within the Newcastle CTA and the EC135 the CTR - although neither pilot was advised of this nor that the ATS had changed. The EC135 pilot reported visual with the traffic [before 1937:00] and was instructed by the APR to *"..just keep the speed back until he overhauls you and then follow the traffic in"* which the EC135 pilot acknowledged at 1937:00. After this the Jetstream crew reported established on the LLZ, visual with the helicopter, and were cleared to descend on the RW07 ILS 'number one in traffic'. At 1937:30, the Jetstream pilot was advised by the APR, *"probably copied the helicopter's holding for you, you'll be overhauling very shortly and then he'll be following you down the ILS"*. [The radar recording at 1937:35 shows the helicopter at 700ft Mode C - about 1200ft QNH - 0·6nm ahead of the Jetstream passing 2100ft Mode C - about 2600ft QNH - having ceased orbiting and now routeing towards the airport.] As the helicopter continued towards the airport, still ahead of the Jetstream, the APR instructed the EC135 pilot, *"if you just hold there to allow the Jetstream to overtake you please"*. By now [~1938:30] the ac were 0·5nm apart approximately 6nm W of the airport with vertical separation of 1000ft. At 1938:46, vertical separation had reduced to 700ft as the Jetstream was 0·4nm S of the helicopter and about to overtake it. However, the helicopter is now just turning R towards the Jetstream. The radar recordings shows that the minimum horizontal separation did not reduce below 0·4nm as the helicopter turned, initially, towards the Jetstream before following it. The levels of the two flights crossed at 500ft Mode C (1013mb), [about 1000ft QNH when the Jetstream was 0·8nm ahead of the helicopter], by which time the Jetstream and the helicopter had been transferred to the TOWER frequency.

The Jetstream was inbound on an IFR clearance. Although no reference was made on the frequency, the APR in his written report stated that the helicopter was operating on a Special VFR clearance. Consequently, in Class D airspace, the two flights had to be separated. However, in accordance with MATS Part 1 procedures,

'In the vicinity of aerodromes, the standard separation minima may be reduced if:

(a) Adequate separation can be provided by the aerodrome controller when each aircraft is continuously visible to this controller;

or

(b) Each aircraft is continuously visible to the pilots of other aircraft concerned, and the pilots report that they can maintain their own separation;

or

(c) when one aircraft is following another the pilot of the succeeding aircraft reports that he has the other in sight and can maintain separation.'

On this occasion, the APR was utilising this procedure at *(c)* above, albeit that he did not receive confirmation from the pilot that he could maintain separation. However, the helicopter pilot's written report stated that he was *"visual and maintaining adequate separation"*.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The reporting JS41 pilot was manifestly concerned at the proximity of the EC135 to his airliner as he descended on the ILS. It was evident from his account that although he had spotted the helicopter before the two ac got to close quarters, the EC135 was not in view when the RA was triggered. However, the JS41 crew themselves had little impact on the overall outcome, the catalyst to this Airprox occurring sometime earlier when the EC135 pilot's task was cancelled and he elected to head for the airport. It was evident from the comprehensive ATSI report and the RT transcript that the APR's recollection of the instructions that he passed to the EC135 pilot to integrate him into the arrival sequence did not gel entirely with what was actually said to the EC135 pilot. A civilian controller Member explained that in general ATC might afford Police helicopter crews more latitude when operating special VFR at night, given their wide ranging equipment fit and the crew composition which invariably includes additional observers. It was clear from the ATSI report, however, that when the two flights were in Class D airspace the APR was responsible for effecting separation between the IFR JS41 and the EC135 that was reportedly flying under Special VFR. After the helicopter pilot advised his task was cancelled the APR mistakenly thought that he had instructed the EC135 pilot to actually enter a "hold" not above 1500ft QNH at 7nm FINALS to allow the Jetstream to overtake, the intention being for the EC135 to follow the airliner into the airport as No2 in the traffic sequence. Whereas the EC135 pilot had indeed orbited just inside the CTR - possibly to sight the Jetstream approaching from astern - the RT recording revealed that the APR had actually said *"…if you maintain not above 1500 feet please and..you'll be overhauled very shortly by a Jetstream which is just the west of you by 2 miles you can follow that aircraft down the ILS"*. A controller Member expounded his view that this did not constitute a positive instruction to 'hold' at 7nm FINALS. Other Members agreed that this transmission was not an instruction to 'hold'; hence it was reasonable for the EC135 pilot to turn in towards the airport, albeit the EC135 had not been cleared to enter CAS nor was the change of ATS specified. Separation between the two flights at that stage was assured before the IFR JS41 closed on the EC135, which the APR had specified would subsequently be overtaken, within the CTR, and also when the APR cleared the JS41 for further descent to *2500ft* and updated the traffic information about the EC135 when it was *about 2nm ahead*. This point was reached about the time that the EC135 was turning R on the centreline and it was unfortunate that the helicopter pilot was not instructed to hold where he was, at this range, although it seemed that the APR had thought that he had done so. Although the EC135 pilot had executed one orbit inside the CTR he had then tracked inbound just N of the centre-line. Controller Members believed that the EC135 should not have been allowed to fly toward the airport, as close as he did to the centre-line, without a more positive instruction being issued by the APR. This brought into question the method that the

APR was using to ensure separation was maintained. The ATSI report had specified that the APR was utilising the MATS Pt 1 procedure, which allowed him to reduce the standard separation minima:

"..when one ac is following another [the JS41] *the pilot of the succeeding ac* [the EC135] *reports that he has the other in sight and can maintain separation".*

Notwithstanding that each pilot had sighted the other ac before the Airprox had occurred, it was clear from the recorded radar data that up until the point of minimum horizontal separation the JS41 was still astern of the EC135 before the airliner overtook the helicopter to starboard. Although the FOI (H) had reported that the JS41 was displayed to the EC135 pilot on the ac's TCAS, it was clear to the Members that it was difficult to maintain situational awareness on the airliner and maintain visual separation against it when the other ac was astern. Moreover, as the responsibility for separating these two ac had effectively been imposed on the EC135 pilot, the APR had not received confirmation from the pilot that he could do so beforehand - as the ATSI report had made clear. An experienced controller Member opined that by allowing the helicopter to continue in toward the airport the APR had permitted horizontal separation to be eroded but had not issued any clear instruction to ensure that the EC135 pilot held clear of the centre-line at a suitable range. The next transmission again merely asked the helicopter pilot to *"..just keep the speed back until he* [the JS41] *overhauls you and then follow the traffic in"*: nevertheless, over 1000ft of vertical separation was apparent at that point. Thus the EC135 was allowed to encroach into the CTR just N of the approach 'funnel' - where the JS41 would be descending on the ILS – but it was not until the APR issued his next instruction and acknowledged by the EC135 pilot at 1938:30, to *"…just hold there to allow the Jetstream to overtake you please"* that positive action was taken. Thus the ac had been allowed to close to a range of 0·5nm some 6nm W of the airport and it was from this point that standard vertical separation of 1000ft was eroded. Now, having been issued a positive instruction, it was up to the EC135 pilot to hold in this location but he did not do so, instead turning R toward the RW07 centreline and climbing slightly as he did so, thereby reducing the vertical separation, albeit slowly. It was this climb in close proximity to the JS41, now under ½nm to the S, that probably induced the JS41's TCAS passive RA. Helicopter pilot Members were concerned that the EC135 pilot had flown as close as he did to the RW centreline in the first instance and then, when instructed to hold, turned R toward the centreline – possibly to see where the JS41 was. This also illustrated the difficulties of trying to use the 'succeeding ac reduced separation' method in this way. Pilot Members suggested that it would have been wiser for the helicopter pilot to have turned L away from the perceived location of the JS41 which would also potentially have increased the separation. Controller Members agreed and a L turn away from the JS41 should have been specified by the APR. As it was, Members agreed that although the APR's RT transmissions indicated a lack of positive control initially, it was not until the latter stages of the encounter when separation was about to be eroded that the APR issued a positive instruction to the EC135 pilot to hold. However, the EC135 pilot did not comply with this instruction, because he then pressed on towards the airport which the Board agreed unanimously was the fundamental factor here - albeit that by then the JS41 was overtaking and opening ahead as it descended once more on the ILS. An experienced controller Member sagely pointed out that controllers must be wary of pilots on occasion not doing what they are instructed to do: in his view if more positive control had been exercised beforehand, till the JS41 had passed clear and then allowing the EC135 pilot to take his own separation based on the 'succeeding ac' method this Airprox would not have occurred. Taking all these various factors into account the Board agreed unanimously that this Airprox had resulted because the EC135 pilot did not comply fully with the APR's instruction to hold and flew close enough to the JS41 to cause its pilot concern.

Although the recorded radar data had made plain that JS41 overtook about 0·4nm on the beam and 700ft above the EC135 and considerably closer than the helicopter pilot had assessed, he was nevertheless visual with the JS41 and maintaining his own separation. Furthermore, the JS41 was 0.8nm ahead when it descended through the helicopters level. The Board concluded, therefore, that no risk of a collision had existed in the circumstances reported here.

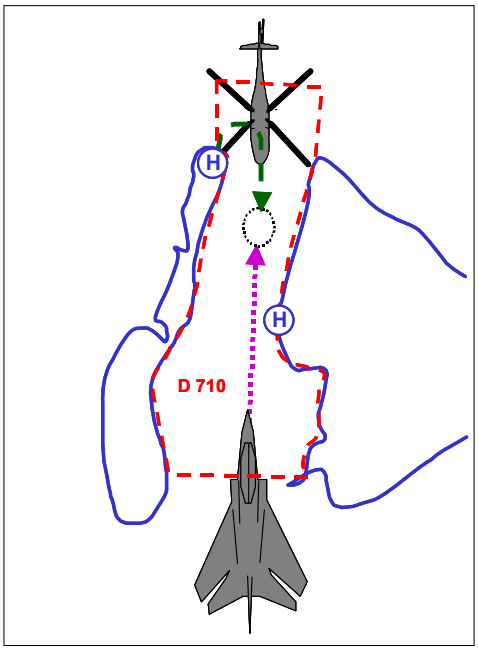
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The EC135 pilot did not comply fully with the APR's instruction to hold and flew close enough to the JS41 to cause its pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 024/06

Date/Time:	24 Feb 1600	
Position:	5732N 00555W	
Airspace:	Scot FIR/UKLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	AS 365S	Tornado F3
Operator:	Civ Comm	HQ STC
Alt/FL:	600ft	250ft
	(QNH 1030mb)	(RPS NK mb)
Weather	VMC CAVOK	VMC NK
Visibility:	>10km	40
Reported Separation:		
	50ft V/0 H	NK
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS 365S PILOT reports flying a maroon and gold ac with nav lights, landing light and HISLs switched on squawking 7000 with Mode C on a return flight from Rona to an intermediate stop then onwards to Kyle Heliport. Having departed the Island of Rona helipad heading N due to the NE wind, he made a right turn onto a Southerly heading at 140kt departing for his intermediate stop. He levelled at approx 600ft above the sea and due to the low sun and bright conditions aviation sunglasses were worn from take off.

Before passing W abeam the next landing helipad, a grey military fast jet appeared directly ahead of them and slightly below his aircraft, heading N and appearing to be climbing.

As it appeared so fast he had to take severe avoiding action by pulling back on the cyclic control and turning slightly to the right. He could not identify the type of jet but it had 2 engines and he clearly saw the intakes directly below the front of the nose of his aircraft as he took the avoiding action. He did not see the jet take any avoiding action.

He was also not aware of any noise of the jet before or after the incident. From first seeing the ac to loosing sight of it lasted only a second and when he levelled off he was above 1000'. He made no more turns but looked for another aircraft in case it was in a pair. After seeing nothing else he landed at his planned HLS.

Immediately following briefing the passengers he passed details of this Airprox to his company AFIS and they acknowledged his report as did the watchkeeper at the weapons range (D710) who stated that he had heard the ac. On landing he passed the details to Scottish ATC.

THE TORNADO F3 PILOT reports flying a grey Tornado F3 ac with another pilot in the rear seat, with HISLs switched on, squawking 7001 with Mode C on a routine training sortie as a target for another F3 to intercept. At the time his radar had failed and he was unable to detect or identify other ac. At the reported time of the incident he was booked into the UKDLFS and was at the reported position, heading N at 450kt and 250ft, positioning to the N of the operating area to act as an aggressor for the other Tornado. He routed to the W of Skye Bridge then N past Plockton towards Torridon before returning S inbound as a target. He did not see any other ac.

UKAB Note (1): Neither D710 nor the R610 were active on 24 Feb.

UKAB Note (2): Although the Airprox itself is not recorded on radar both ac can be seen very intermittently just after the event. Although the levels are unreliable, the helicopter is seen to be at 600ft (1013mb) which equates to about 1100ft amsl 30 sec after the reported time of the incident (and probably after his climb). At the same time the other ac shows a level of zero ft which equates to below 500ft amsl.

THE AS 365S PILOT'S OPERATOR reports the flight took place within D710 which was not active at the time. This flight is regular and departs Rona at 4.30 pm Monday to Thursday and 4 pm on a Friday subject to weather etc.

HQ STC comments that it is unfortunate that the F3's radar was inoperative as this may have given them an indication of the helicopter's presence. However, this should have ensured that the crew were concentrating on lookout to detect their playmate, and the Squirrel.

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 Tornado and AS 365S operating authorities.

A Member familiar with the helicopter operation involved in this incident briefed the Board. Members were also informed that even had the Tornado radar been operative, due to the nature of the task and the ac crewing, it was probable that they would not have detected the helicopter on the radar.

Both ac were operating legitimately in Class G airspace; neither was TCAS equipped and therefore the prime means of collision avoidance was 'see and avoid'. The helicopter was flying into sun which had been a major factor in the pilot not seeing the grey Tornado until very late. The Tornado's crew had been in a high workload situation with the rear seat crewmember in an unfamiliar role. They would have been concentrating on positioning their ac stealthily to meet their training objectives and possibly not concentrating on lookout at the critical moment.

That neither the AS 365S pilot nor the Tornado crew saw the other ac in time to take effective avoiding action was of concern to the Board: this had clearly led to an unsafe situation. Members debated extensively whether or not there had been a real risk of collision; that is, was this a Risk Category A or Category B event. Members' opinion was exactly equally divided. The Chairman stated that it was his view that the Tornado had been at 250ft as reported and below 500ft as confirmed by the radar replay. The helicopter had been at 600ft which meant that there was a little vertical separation as the ac approached and this had been increased slightly by the action of the helicopter pilot. The Chairman was therefore persuaded that whilst safety had definitely not been assured, there had not been an actual collision risk.

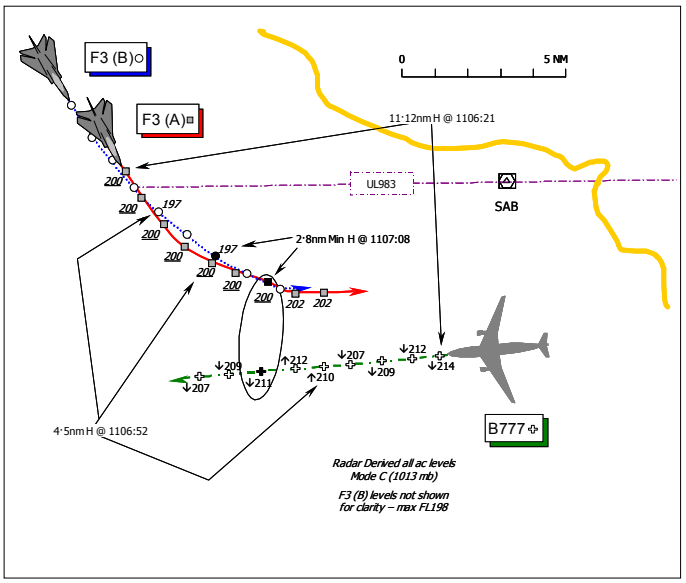
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Tornado crew and very late sighting by the AS 365S pilot.

Degree of Risk: B.

AIRPROX REPORT NO 025/06

Date/Time:	1 Mar 1107	
Position:	5548N 00222W (8nm SW of ST ABBS VOR)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B777	Tornado F3 pr
Operator:	CAT	HQ STC
Alt/FL:	FL210↓ (SAS)	FL200 (SAS)
Weather	VMC NIL	VMC
Visibility:	NR	>99km
Reported Separation:	700ft V/4nm H	4nm H
Recorded Separation:	1100ft V @ 2·8nm Min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B777-300 PILOT reports he was inbound to Glasgow under IFR, in receipt of a RAS, he thought, from ScACC and squawking the assigned code with altitude reporting and Mode S. TCAS is fitted. He was flying in VMC descending through FL210, heading NW he thought, some 70nm from the GOW VOR at about 475kt (TAS), when they received a traffic call from ATC about two military ac on their starboard side. The traffic "showed up" on TCAS in their 1 o'clock climbing, he believed, to FL200 whereupon TCAS enunciated a TA followed by an RA 'ADJUST VERTICAL SPEED' which was followed by adjusting the pitch attitude. ATC was advised and the other ac, which were not seen, passed some 700ft vertically about 4nm away with, he assessed, a *"low"* risk of a collision.

THE TORNADO F3 PILOT [F3 (A)] reports his ac has an air defence grey camouflage scheme but the HISL was on whilst outbound from Leuchars in VMC to participate in a routine air defence training sortie whilst flying in formation with another F3 – F3 (B). He was operating under VFR with a RIS from CRC Boulmer and the assigned Mode A squawk was selected with Mode C.

Whilst transiting southbound, flying into sun, to their CAP station, an AI radar contact and 'tally' (visual contact) was gained on a large airliner transiting through the Open FIR 'on the nose' at a range of approximately 10nm flying at about 20,000ft. The large, white, low-wing airliner appeared to be 'cutting the corner' from the airways structure into Edinburgh. At that point they were in the process of being handed over to GCI who after the 'check-in' called the traffic to them which was by now about 7nm away. At this range when it was apparent that the traffic was descending and they would be roughly 'co-alt', as he was still climbing they 'offset' slightly to the E to ensure that the two jets would pass behind and well clear of the airliner. A visual call was made to inform the GCI controller that they were aware of the traffic and that they were positioning behind it. He assessed visually the distance between his ac and the airliner to be about 4nm horizontally – because at the closest point they had 'gimbled' the traffic off their AI radar - but they were in formation with the other F3 [F3 (B)] that might have been closer by ½nm or so, but whose crew was also visual with the traffic as they flew past with a *"low"* risk of a collision.

THE ScACC TAY SECTOR CONTROLLER (TAY) reports that he was providing a RIS to the B777 that was descending in Class G airspace in vicinity of St ABBS VOR (SAB) inbound to Glasgow via LANAK. Boulmer traffic was spotted NW of the B777 and called to the crew as the other ac was climbing up to levels the B777 was descending through. The B777 pilot reported a TCAS climb. TAY SC assessed that the other ac passed about 5nm away with vertical separation of some 500ft.

THE CRC BOULMER FIGHTER CONTROLLER (FC) reports that the two F3s were airborne from Leuchars and in transit to operate within Operational Training Area E (OTA E). The crew of F3 (A) advised AI radar contact with the B777 at a range of 20nm, he thought, after reporting the traffic to him with reference to the 'bullseye' datum.

The radar contact was confirmed and the FC gave the F3 crew additional information that this ac was descending through FL220 inbound to Glasgow. Both F3 (A) & (B) continued on a heading of 150° until he called the B777 at BRA [a bearing and range of] 130/10 from the fighter descending through about FL205. The crew of F3 (A) called visual on the B777 and said they were going behind the traffic. Shortly afterwards, F3 (B) replied with the same message and both fighters turned L onto a heading of 110°.

ATSI reports that at the time of the Airprox a mentor and trainee operating both the PLANNER and TACTICAL roles were manning the ScACC TAY Sector. The B777 crew established communication with the sector at 1102:00 and reported passing FL300 in the descent to FL260. Its position was approximately 54nm N of Newcastle – some 32nm E of SAB - following the centreline of UL983 tracking West. The trainee controller instructed the crew to continue their descent to FL180 and informed them that it would be a RIS below FL245 [within Class G airspace]. However, this was not read back by the crew. As the B777 approached SAB, traffic was seen to the NW squawking A2441 and 2443, subsequently established to be the two Tornado F3 ac. The controller ascertained that these codes were part of the block allocated to CRC Boulmer and so the Mode C information could be regarded as verified. At 1105:50, traffic information was passed to the B777 crew on these tracks as they were in the B777's 2 o'clock position with the closest at a range of 17·6nm. The closer F3 was passing FL198 whilst the other was passing FL170 as the B777 descended through FL224. The B777 crew replied that they had the traffic on TCAS and asked the controller to confirm they would pass above the B777. The controller responded by saying that she would keep the crew updated and advised that one ac was passing FL180 and the other FL200. At 1106:20, the controller reminded the crew that they were in receipt of a RIS only, which the crew simply acknowledged but did not read back. The F3s continued to close on the B777, from its 2 o'clock, and the controller transmitted "[B777 C/S] *the military contact in your 2 o'clock range 1-0 miles is maintaining flight level 2 hundred I say again maintaining flight level 2 hundred*". The crew responded by saying that they were responding to a TCAS climb. At this time, the B777 was passing FL207 and the closest F3(A) was in the B777's 2 o'clock at a range of 6·2nm maintaining FL200 whilst the other F3(B) was 2·3nm behind its leader passing FL195. The B777 climbed to FL212 before resuming its descent and the F3s both turned L onto an easterly track. At the closest point the closest F3(A) passed 2·8nm N of the B777 and 1100ft below it. The B777 crew subsequently advised that they were clear of the conflict and descending back to FL180.

At the time of the Airprox the B777 was in receipt of a RIS and the controller complied with the requirements by passing frequent and updated traffic information on the two F3s.

MIL ATC OPS reports that the formation of 2 F3s was outbound to OTA E under a RIS from CRC Boulmer Weapons Controller 4 (FC) operating up to 23000ft TYNE RPS (995mb). At 1106:22, the FC passed traffic information to the F3 crews on the conflicting B777 as "[F3 formation C/S] *stranger BRA 130/10 tracks west descending through 21000"*. The crew of the lead F3 – F3 (A) - responded "[C/S] *visual going behind"* and F3 (B) reported, "*tied*" immediately after. No further RT transmissions were made regarding the B777.

Analysis of the Great Dun Fell Radar recording shows the B777 17nm E of St Abbs, tracking 260° descending through FL288 Mode C. Simultaneously, the F3 formation is NW of St Abbs at a range of 24½nm tracking 160° climbing through FL83 Mode C (1013mb). The B777 descends through FL245 into Class G airspace at 1105:01, at this stage the F3s being in the B777's R 2 o'clock 20nm with F3 (B) 1½nm in trail of F3 (A), indicating FL163 and FL131 Mode C respectively. At 1106:48, F3 (A) is level at FL200 in the B777's R 2 o'clock, 6nm. The horizontal separation is reduced to 4·5nm at 1106:52 when the B777 is shown in a climb through FL210: simultaneously F3 (A) is seen in the L turn to pass behind the B777. As separation reduces horizontally to 3·3nm the B777 indicates a slow climb to FL212 with F3 (A) maintaining FL200. At 1107:08 - at the point of minimum horizontal separation - the B777 is shown now descending once more through FL211 as the closest of the pair – F3 (A) - maintains FL200 still in a shallow L turn, 2·8nm to the N and now abaft the B777's starboard beam. After this point the separation increases as the 3 ac continue on diverging tracks.

The CRC Boulmer FC fulfilled his responsibility to the F3 crews by providing accurate and timely traffic information on the conflicting B777, which allowed the F3 crews to become visual and take their own separation.

HQ STC comments that the F3s saw the B777 both visually and on radar. They adjusted their track to go behind the other ac.

AIRPROX REPORT No 025/06

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 controllers involved and reports from the appropriate ATC, Air Defence and ac operating authorities.

It was immediately apparent to the Members that the B777 crew was under a misconception if they believed that they were in receipt of a RAS after descending into Class G airspace from the UAR. A civilian controller Member stressed that controllers at ScACC will not provide a RAS to flights in Class G airspace and in fact only a RIS was being afforded by the Mentor and Trainee operating the ScACC TAY Sector. It was evident from the comprehensive report provided by ATSI that the TAY Sector controllers had emphasised the nature of the ATS to the B777 crew on two occasions and had provided traffic information under the RIS, thereby discharging their responsibilities which did not include ensuring separation between IFR flights and other observed traffic in the FIR. Controller Members wondered if the B777 crew had fully understood the nature of the airspace and the radar service provided here, as the B777 pilot had asked TAY to confirm the F3s would pass above the B777 which seemed indicative of a lack of understanding on the B777 crew's part. For the avoidance of doubt it was worth repeating here that a RIS provided by civilian controller is:

…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 ac whether or not the controller has passed traffic information.

A military controller Member questioned whether it was wise for TAY to descend the B777 out of the relative sanctuary of the Class B UAS [Class C from 16 Mar 2006] when they did. But a controller Member familiar with the routeing advised that this was a commonly used route into Glasgow from the UAS but that there was no underlying CAS in the middle airspace here until the Scottish TMA was reached and it was axiomatic that the flight had to be descended at some point. Whilst it was mentioned that an ADR had existed some time previously, to some Members this routeing through Class G where 'see and avoid' prevailed was rather unsatisfactory. Furthermore a pilot Member suggested it might have been helpful if the crew had been advised by TAY that they were exiting CAS.

Consequently, having twice been passed traffic information by TAY – and in good time – the Board recognised that it was the B777 crew's responsibility to afford appropriate separation against other ac in the FIR. Moreover, the B777 crew had a responsibility under the 'Rules of the Air' to 'give-way' to traffic approaching from their starboard side, as was the case here. The Mil ATC Ops report had shown that the F3 pilots, who were in receipt of a RIS from the Boulmer FC, had been alerted to the presence of the airliner. The account from the pilot of F3 (A) had shown that the crews of both of the F3s had also acquired the airliner at range beforehand; had been advised of its routeing by the FC and had themselves initiated a turn to pass astern of the B777, in excess of 11nm away. The radar recording evinced that the B777's TCAS RA started to take effect as the range between the B777 and F3 (A) approached 4·5nm, as the B777 descended through FL207 – some 700ft above F3 (A). In the event, unbeknown to the B777 crew, the F3 leader had elected to turn his formation to pass astern and give the airliner a wide berth but unfortunately it was not enough to prevent a TCAS RA. It might have been that this intervention by TCAS in addition to the 'ADJUST VERTICAL SPEED' RA, including a short 'CLIMB' RA as the B777's Mode C revealed a reversal into a climb for two sweeps, the airliner ascending to a maximum of FL212 before the descent was resumed at the point of minimum horizontal separation of 2·8nm, the F3s having passed by on the starboard beam. Taking all these factors into account, Members agreed unanimously that this Airprox had stemmed from a sighting report of traffic operating in Class G airspace displayed on TCAS [the B777 crew did not sight the F3s visually] where no inherent risk of a collision had existed.

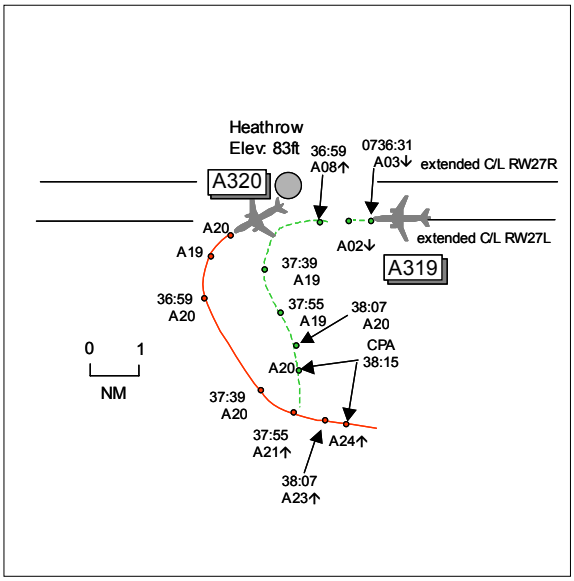
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS) in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT NO 026/06

Date/Time:	4 Mar 0738 (Saturday)	
Position:	5125N 00027W (4nm S Heathrow - elev 83ft)	
Airspace:	CTR	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A319	A320
Operator:	CAT	CAT
Alt/FL:	2000ft (QNH 1000mb)	2000ft (QNH 1000mb)
Weather	VMC CAVK	VMC CAVK
Visibility:	10km	
Reported Separation:	Nil V/1nm H	Not seen
Recorded Separation:	400ft V/1·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports heading 150° at 210kt after a go-around called by ATC at Heathrow on 118·7MHz squawking an assigned code with Mode C. A standard missed approach was flown but when steady and level an A320, which had gone around ahead of them, was seen in their 1 o'clock range 1-2nm crossing ahead co-altitude. ATC then instructed them to turn onto heading 180° which led to the A320 passing about 1nm ahead. He assessed the risk as low.

THE A320 PILOT reports inbound to Heathrow and in receipt of an ATS from Heathrow Arrivals on 118·7MHz squawking 4354 with Mode C. Prior to the incident they were on short finals RW27L with an A319 behind at 2·5nm standard spacing, in CAVOK and awaiting landing clearance with A/P out and Autothrottle engaged. At just 111ft Rad Alt above an apparently clear RW with no obstructions ATC unexpectedly instructed them to go-around. A standard go-around was initiated, climbing with a high workload at 2950fpm towards the initial ATC level of 2000ft QNH. With GA TRK mode established, NAV was selected at 720ft and they passed through 1000ft climbing rapidly. FDR information shows the Flight Directors started to indicate the required L turn to track 150° 3sec later at 1220ft. A turn was commenced 2sec later at 1385ft, albeit with a slightly slow turn rate, whilst simultaneously levelling at 2000ft and he heard ATC instruct the A319 flight behind also to go-around. Shortly afterwards ATC vectored them for an approach to RW27R with climb to 3000ft but this was later changed for RW27L. He queried the reason for the go-around and subsequent double RW change and was advised that a previous landing ac on RW27L had reported undercarriage problems and that debris was suspected on the RW. This was unfounded and RW27L was reopened for their second approach. Later his Operations Dept informed him that the A319 crew had filed an Airprox. He was somewhat surprised as no TCAS alerts (TA or RA) were received at any stage of the flight; no visual sightings of the A319 had been made during the go-around manoeuvre and no comments were made to ATC by the A319 crew, or by ATC, at any time during the go-around, subsequent approach, landing and taxy-in.

THE HEATHROW AIR ARRIVALS CONTROLLER reports RW27L was in use when he heard that a previously landed ac had undercarriage problems. This led him to believe that the RW was contaminated so he sent the A320 around and then coordinated the use of RW27R with the Departures controller. He then asked the next arriving ac, the A319, if he could accept a visual switch to that RW but the pilot replied 'negative'. Next he coordinated the A320 with radar on a standard missed approach and transferred the flight to a non-standard frequency of 119·72MHz, as TC INT was bandboxed to N position. He then sent the A319 around, having switched the ac behind, after which he phoned TC INT N and coordinated, receiving heading 180° climbing to altitude 2000ft. Whilst he passed this to the A319 flight, he checked that he was visual with both ac and phoned radar to confirm if they were happy to accept the ac and that he was visual with both.

AIRPROX REPORT No 026/06

ATSI reports that the controller had been operating the Air Arrivals position, RW27L, for approximately 35min, describing his workload as moderate until the A320 made its missed approach. Thereafter, it became high because of the extra coordination and RT loading required.

The Heathrow weather observation for 0720 included surface wind 290°/4kt, in CAVOK.

The landing sequence for RW27L was: AC1; AC2; the A320 and the A319. AC1 landed, apparently normally, and was transferred to Ground Control. As AC2 landed, an Aircraft Ground Incident was activated because it was noted that AC1 was experiencing smoke from the undercarriage. The controller realised, in accordance with MATS Part 1 instructions, (Section 2, Chapter 1, Page 16), the necessity for RW27L to be inspected prior to its further use. Accordingly, at 0735:30, the Arrivals Controller instructed the subject A320 flight to go-around. As the ac was on very short final at the time - the pilot later reporting he was at 111ft Rad Alt - there was no time to explain the reason. The Missed Approach Alarm, which activates at LTCC and Northolt, was selected. The published missed approach procedure for the ILS RW27L is to *'Climb to 2000 (ft altitude) - straight ahead until passing 1077 (ft altitude) or I-LL DME zero inbound, whichever is later, then left onto track 150°M. When established and passing LON DME 6 climb to 3000 (ft altitude) without delay. Continue as directed*.'

Having instructed the A320 crew to make a missed approach, the Air Arrivals Controller, following the agreement of the Air Departures Controller, decided to offer the A319 crew a visual switch to land on RW27R. However, when asked if he was visual with RW27R, the pilot reported it was too late to change. He was warned to expect a missed approach because of possible debris on the runway. The Air Arrivals Controller telephoned LTCC to advise of RW27L's closure. As he was finishing this message, the pilot of the A319 asked if it would be a standard missed approach and this was confirmed. The controller mentioned that, with hindsight, he thought that this call might have distracted him from the task of planning how to separate the subject ac, after their respective go-arounds. At 0736:30, i.e. 1min after the A320 was instructed to go-around, the same instruction was issued to the A319. The Air Arrivals Controller explained that he delayed this instruction in order to widen the distance between the subject ac. At the time, the A320 had just commenced its L turn, slightly later than the standard missed approach procedure turning point and was maintaining 2000ft. The A319 was on final approach at altitude 300ft, 2·8nm behind the A320. The controller realised that the latter had made a late turn but assessed that separation would be maintained. He telephoned LTCC Approach to report that the A320 and the A319 were making missed approaches. The latter controller acknowledged the call. At 0737, as it was passing a S'ly heading at 2000ft, the A320 was transferred to TC Approach. The RW 'Checker' vehicle was then cleared to enter RW27L for an inspection.

At 0737:40, the Air Arrivals Controller telephoned the INT N DIR to request the heading required for the A319. This was agreed as *"south from there please"*. The radar shows the A319 turning through S at 1900ft, 2·4nm N of the A320, which is tracking SE, still at 2000ft. The heading instruction was issued to the A319. The following recordings show the A319 stopping its turn tracking SSE before turning back to S. The horizontal separation between the 2 flights decreases to about 2nm (0737:55), when the A320 commences its climb to 3000ft and further to 1·6nm (0738:07), when the vertical separation increases to 300ft.

[UKAB Note (1): The CPA occurs at 0738:15 with the A320 tracking 100° at 2400ft climbing, 1·4nm SE of the A319 tracking 175° indicating 2000ft.]

At 0738:20, when the A319 is tracking S at 2000ft, with the A320 1·4nm SE at 2600ft, the controller telephoned TC Approach *"I'm visual with that are you happy to accept A319 c/s now?"* This was approved *"we'll take it now"*. The A319 flight was transferred to TC with no further comments. Vertical and horizontal separation continues to increase and at 0738:56, standard vertical and horizontal separation existed. The controller said that he was monitoring visually the progress of the two ac and only when he considered that there was no risk of collision did he transfer the A319. No traffic information was passed to either pilot: the A319 crew reported sighting the A320 in his one o'clock, 1-2nm away and the latter's pilot never sighted the former.

The MATS Part 1, Section 2, Chapter 1, Page 1, states that: *'Aerodrome control is responsible for issuing information and instructions to ac under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between: aircraft flying in, and in the vicinity of, the aerodrome traffic zone'*. Within Class A airspace IFR ac have to be separated. The MATS Part 1, Section 1, Chapter 3, Page 1, allows: *'In the vicinity of aerodromes, the standard separation minima may be reduced if: a) adequate separation can be provided by the aerodrome controller when each aircraft is continuously visible to this controller; or b) each aircraft*

is continuously visible to the pilots of other aircraft concerned, and the pilots report that they can maintain their own separation; or c) when one aircraft is following another the pilot of the succeeding aircraft reports that he has the other in sight and can maintain separation'. The Heathrow MATS Part 2, Page 1-3-2, states that one of the responsibilities of the Air Arrivals Controller, with respect to missed approaches, is to: *'Ensure separation is maintained and monitor aircraft visually or with the ATM. After separation is assured co-ordinate with INT North or South'*. On this occasion, the controller agreed that he should have resolved any potential confliction earlier. He agreed he had a number of options: he could have instructed the A320 to climb to 3000ft without having to co-ordinate this with TC Approach; the A319 could have been instructed to climb straight ahead until it was suitably spaced from the A320 and he could have requested assistance from TC Approach to provide separation. Additionally, he agreed that he should have passed TI to the ac concerned. He added that he had experienced multiple go-arounds previously and had then used these techniques. He could only reason that the workload had increased significantly, at the time, to affect his operation. Another factor, which he did not realise at the time, was the differing speeds of the subject ac after the missed approaches. Whilst the A320 had been flying at about 180kt, the A319 was flying at approximately 210kt. He commented that it is possible to show ac ground speeds on the Aerodrome Traffic Monitor but the display becomes congested if they are permanently selected. In view of the high workload, he did not consider that he would have had sufficient time to arrange the provision of ac speeds using the display monitor.

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 ATSI Advisor informed Members that the Air Arrivals Controller was dealing with ac on and approaching the airport so he could not continuously monitor the progress of the A319 and A320 on their missed approaches to fulfil the requirements of MATS Part 1 and Heathrow MATS Part 2. The Airprox seeds were sown when the A320 crew had been given a very late go-around and had reported turning L at a slightly higher altitude than ideal and the A319 had also been sent around. Missed approach procedures which require a turn at a specified altitude invariably lead to the tracks flown by 2 ac on successive go-arounds, executed at different stages of final approach, being different. As shown in this case, the A319 reached the specified altitude to commence the L turn sooner than the A320 and had turned towards it. Pilot Members thought that it should have been apparent to the Air Controller that the situation would need intervention to keep the ac separated as they left the Heathrow environs whilst following the same missed approach procedure. Several options were open to the controller as the arriving traffic had been switched to RW27R so there were no immediate departures to affect. One option would have been to climb the A320 immediately to 3000ft or to instruct the A319 crew to climb straight ahead initially whilst coordinating with the INT radar controller. In this case however, the Air controller did not ensure separation between the A319 and A320 and this had caused the Airprox.

The A319 had levelled at 2000ft tracking SE and its crew had seen the A320 on a crossing track in their 1 o'clock range 1-2nm at the same level. Although aware of its go-around, the A320 had been transferred to the TC INT and so by then was frequency separated. The A319 crew were then given a R turn onto a S'ly heading whilst they watched the A320 pass an estimated 1nm ahead. The A320 crew were unaware of the A319s presence behind them – neither crew received any TCAS TA alerts or RA warnings. The radar recording reveals the A320 commencing its climb as it passes 2nm S of the A319 as it turns R as instructed onto 180°. Thereafter the flights paths deconflict as the A320 is diverging clear to the E and climbing with the CPA occurring as the A319 level at 2000ft passes through the A320's 7 o'clock separated by 400ft range 1·4nm. Although untidy, the combined actions taken by all parties and the visual sighting by the A319 crew were enough to persuade the Board that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Heathrow Air Arrivals Controller did not ensure separation between the A320 and A319.

Degree of Risk: C.

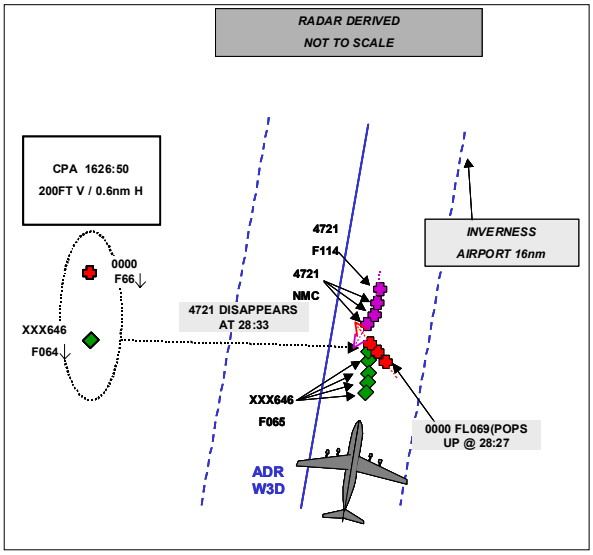
AIRPROX REPORT No 027/06

AIRPROX REPORT NO 027/06

Date/Time:	6 Mar 1630	
Position:	5721N 00405W (16nm S INS)	
Airspace:	ADR W3D	(Class: F)
	Reporting Ac	*Reported Ac*
Type:	BAe146	Jaguar
Operator:	CAT	HQ STC
Alt/FL:	FL65	250 - 10000ft (RPS)
Weather	NR	VMC CAVOK
Visibility:	50nm	50nm

Reported Separation:
<400ft V/0.25nm H Not Seen

Recorded Separation:
200ft V/0.6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe146 PILOT reports that he was flying a scheduled passenger flight to Inverness and after having been in receipt of a RAS from Lossie Radar he was handed to Inverness TWR at 20 DME and level at FL65. Prior to making contact with Inverness, TCAS gave an RA with *"monitor vertical speed"* when his ROD was between 500 and 1000 fpm. Almost instantly the TCAS instructed *"descend"* with a required ROD of approx 2000 fpm and a Jaguar was seen dead ahead on the same track and descending. Both BAe146 pilots estimated the separation to be about ¼ mile. The TCAS instruction was followed until *"clear of conflict"* was passed. A TCAS vertical separation of 400ft was observed during the incident. Immediately after the CPA the Jaguar was seen to engage reheat and bank to the right.

On clearing the conflict radio contact was established with Inverness ATC and the ac returned to FL65 after an estimated departure of 2000ft from the assigned level.

Weather conditions at the time were good with no cloud and the visibility was over 50nm and he was continuously in sight of the surface. He was aware of NOTAM'd military exercises in the Scottish FIR.

THE JAGUAR PILOT reports flying a 2-ship exercise tactical sortie in grey ac with HISLs switched on in receipt of a FIS from an AWACS. After they had prosecuted a simulated attack on a target on the banks of Loch Ness at low level, both ac climbed out of low level and flew to their holding area to the E the ADR, to receive further tasking from the AWACS. During this period the tactical lead was handed from one ac to the other to increase the training value. The next target allocated was situated somewhere along a road directly under the ADR and the weather was good enough to allow a visual search for the target from medium level. During this period they were operating in and around the ADR with a FIS and TI being passed to them by the AWACS. Neither pilot recalled any mention of conflicting traffic. The target was not identified from medium level so, in turn each Jaguar made a low level pass over the target area and subsequently climbed back to medium level and no other ac were sighted during the period.

UKAB Note (1): The incident is seen on the recording of the Aberdeen Radar with all 3 ac painting (both Jaguars intermittently). The Jaguars appear in the BAe146's 12 o'clock climbing from low level. Although both Jaguars were in close proximity to the BAe146, the No2 (at the time) was the closer. The CPA of the other ac was 500ftV/ 0.6nm H.

UKAB Note (2). The exercise in which the Jaguars were participating was the subject of ACN 061 and corresponding NOTAMS. The ACN states at Para 15 c:

"Advisory Routes. Due regard is to be taken by participants of the published Advisory Air Routes in the Scottish FIR and are to be aware of their probable use by non-course aircraft."

THE JAGUAR STATION comments that this Airprox was undoubtedly avoidable. That the weather was so good may have been a factor in both sets of pilots choosing the course of action that they did. Operating in the vicinity of an ADR with a FIS rather than a RIS was not good airmanship on behalf of the lead Jaguar pilot; furthermore, the acting leader should have expected his No2 to have assumed the responsibility for monitoring any service provision as well as looking out – even more so considering their area of operation. Equally, the early release from RAS and calling Tower at 20DME in a known area of intense military ac activity may also be considered as not the best course of action in the circumstances, notwithstanding the Advisory nature of the airspace. However, this is undoubtedly another case of see and avoid, and the Jaguar pilots' preoccupation with locating their Close Air Support target was undoubtedly a significant factor.

MIL ATC OPS reports that a formation of 2 Jaguar ac was participating in a large military exercise in N Scotland under a FIS from an E3D AWACS. The AWACS controller had identified the Jaguars and was passing TI on numerous conflicting tracks including the conflicting BAe146, which was passed as "*Jaguar C/S, further traffic manoeuvring BRA south 3 miles just climbing through 6000ft"*. This track was the conflicting BAe146 which was actually descending through 6000ft. The formation leader reported *"looking*" and no further reference was made pertinent to the Airprox on the RT.

During a period of high workload AWACS passed TI to the Jaguar formation regarding the conflicting BAe146. At the time the TI was passed to the Jaguar formation regarding the BAe146, AWACS described the lateral separation as 3nm but it was actually 1.4nm. In addition, AWACS described the BAe146's flight profile as climbing when in fact the BAe146 was descending. Although the controller is under no obligation to pass TI under a FIS, had the TI that was passed been more accurate regarding profile and position it may have given the crews more chance of acquiring the BAe146 visually.

The BAe146 had been receiving a RAS from Lossiemouth prior to transfer to Inverness but was transferred clear of any conflicting traffic and in accordance with the LoA between the 2 units. Lossiemouth had attempted to offer TI via landline to Inverness when the confliction became evident but had been unable to pass the information before the Airprox had occurred due to Inverness being engaged with other calls.

ATSI reports that the BAe146 was inbound to Inverness from Gatwick. It had been provided with a radar service from Lossiemouth and instructed to descend to FL65 in accordance with agreed procedures. The crew were instructed to contact Inverness TWR/APP when approximately 20nm from Inverness. Shortly before the crew made contact with the Inverness controller, Lossiemouth ATC called and said "*Ah Lossie there's traffic just north of the (BAe146 company)*" but were asked to 'standby' due to traffic calling on Inverness frequency. Once the frequency was clear the BAe146 called and stated that they had just been involved in an 'Airmiss' with a Jaguar, to which the Lossiemouth controller advised "*That's what I was gonna tell you*".

Inverness Airport has no radar and the Airprox occurred immediately prior to the BAe146 crew establishing contact with the Inverness controller. Furthermore, the controller had no knowledge of the Jaguar and so could not have passed any TI to the BAe146 crew. It is therefore assessed that there are no civil ATC errors or contributory factors.

HQ STC comments that notwithstanding the good weather, it was inadvisable for the Jaguar formation to be searching for a target, which they knew to be below an ADR, from medium level. Furthermore, the advice from the AWACS, even though given whilst providing a FIS, could have been more exact.

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

The Board was briefed by the ASACS Advisor on the role of the AWACS controllers in this incident and that their involvement was peripheral. They were in a busy situation and the Jaguars were in receipt of what was essentially a FIS and (surface) target allocation service. In the circumstances prevailing this was the only type of service that

the AWACS controllers could be expected to provide. Notwithstanding that they were not required to do so, the AWACS controllers provided several TI messages to the Jaguar formation, including at least one regarding the BAe146. Although this message was not as accurate as it might have been, it did however warn of the presence of the BAe146; as events transpired this was not relevant as the Jaguar pilot had no recollection of any TI at all being passed by the AWACS. A civilian controller Member questioned the Advisor on whether ADRs were marked on the AWACS displays and was informed that airspace relevant to an operational area can be manually 'drawn' on the displays.

The DAP Advisor advised the Board that as a part of the changes of airspace classification in the UK FIRs, a review of ADRs has been conducted, in conjunction with NATS. The review is not yet complete, a response being awaited from NATS.

The Board was also advised that, at 20DME, the incident had occurred close to the commencement point of the Inverness instrument approach procedure. There was thus limited opportunity for either ATC or the BAe146 pilot to manoeuvre the ac.

The Board was briefed that due to the lack of communications channels and procedures it was not currently possible for civil controllers to co-ordinate their traffic with AWACS controllers who are controlling military ac in the same area. One civilian controller Member considered this to be a major shortcoming since such a facility would, in his opinion, prevent incidents such as this one. Subsequent to the meeting, the ASACS Advisor and the Member have taken the matter up to seek an improved understanding of the available communication processes.

Since neither Jaguar pilot had been aware of nor seen the BAe146 and both had come within about ½nm of it, the Board considered that there had been a significant erosion of normal safety standards. The converse had also applied namely, however, since both Jaguars were over ½nm away at the CPA, there was no actual risk that they would have collided with the BAe146 which was in receipt of, and reacting correctly to, a TCAS RA.

The Board was briefed that this was one of several incidents (some yet to be investigated) involving military exercise traffic and civil traffic on ADRs. A Member opined that exercises should only take place in areas well clear of ADRs and CAS but was informed that, due to paucity of suitable areas of a size large enough to accommodate the exercise 'play', this would not be possible. Although accepting the need for large Military Exercises and the attendant responsibility for non-Exercise flights to heed the relevant NOTAMs. It was clear to the Board that there are challenges for the planners since much of the military exercise activity was conducted in the Scottish FIR where the majority of the ADRs are located.

In addition to the ASACS Advisor and an ATCO Member taking up the matter of an improved understanding of the available communication processes, the following actions were agreed. The HQ STC Member undertook to discuss the issues arising from this Airprox with STC Exercise Planners. The DASC Advisor agreed to bring the matter to the attention of as broad a military audience as possible by publicity. Also, the Director of the UKAB will discuss this Airprox with the MOD and CAA as soon as practicable. Reassured by the proposals agreed, the Board decided not to make a formal safety recommendation for the time being.

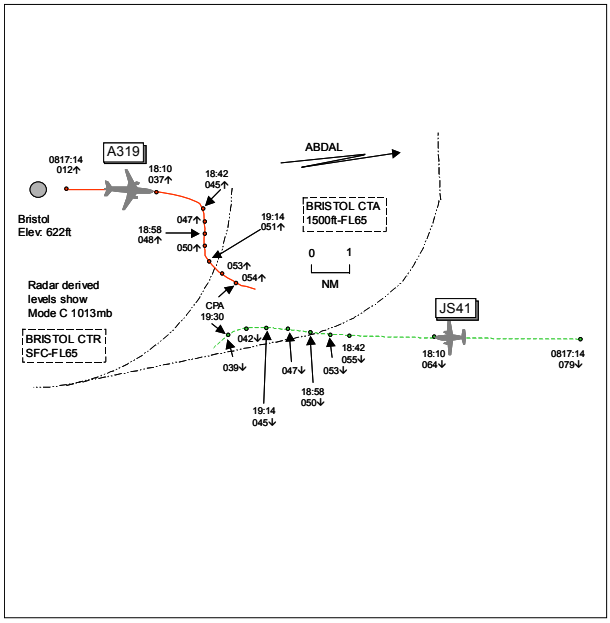
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jaguar pilots disregarded the ACN guidance regarding Advisory Routes and flew into conflict with the BAe 146 which they did not see.

Degree of Risk: B.

AIRPROX REPORT NO 028/06

Date/Time:	7 Mar 0819	
Position:	5120N 00234W (7nm SE Bristol - elev 622ft)	
Airspace:	Bristol CTA	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	JS41	A319
Operator:	CAT	CAT
Alt/FL:	5000ft↓ (QNH)	↑FL150
Weather Visibility:	IMC KLWD	IMC NR
Reported Separation:	400ft V/2nm H	3nm H
Recorded Separation:	600ft V/2·3nm H OR 1500ft V/1·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JS41 PILOT reports inbound to Bristol IFR heading 270° at 200kt and in receipt of a RAS from Bristol Radar on 136·07MHz squawking an assigned code with Mode C. About 8nm SE of Bristol whilst approaching 5000ft, cleared to 3000ft, under radar vectors downwind RH for RW09, they heard a transmission from the A319 crew on departure from Bristol stating that they were turning R. Bristol ATC immediately instructed the A319 flight to 'climb straight ahead'. They did not hear a response to this call nor a subsequent call although there may have been blocked transmissions from the A319 flight. The FO, PNF, advised he was watching traffic on the TCAS display climbing and turning towards their ac. Shortly afterwards a TCAS TA was received at the same time as ATC told them to 'turn left onto 180° avoiding action'. They immediately followed the instruction but it was a few seconds before they could respond to ATC owing to further calls being made to the A319 flight. At no time did they receive a TCAS RA. After a further 5sec the TA alert disappeared and a short while later further vectoring was received from ATC onto the ILS RW09. The A319 was not seen but TCAS indicated that minimum vertical separation was 400ft and horizontal separation was 2nm, assessing the risk as medium.

THE A319 PILOT reports outbound from Bristol and was cleared to line-up and take-off RW09. They were instructed by Bristol Tower to maintain RW heading on departure and after taking-off they changed frequency to Bristol Radar on 136·07MHz. During the initial climb, they became distracted when the A/P-Flt Director misbehaved – the ac did not accelerate, speed was decreasing to below 'F' speed with Flt Director showing pitch-up. The PF therefore selected 'green dot' to accelerate and the flaps were retracted on schedule. During this sequence of events, however, the ac started to turn R in NAV mode. ATC then called and gave them heading 050° for avoiding action (heading at the time was 130° and speed was increasing through 200kt) with another ac, the JS41, approx 5nm ahead 20° to the R. Vertical separation was unknown as they were climbing rapidly to FL150. At this point a TCAS TA was received and horizontal separation was estimated as 3nm from the TCAS indications on the NAV display; the other ac was not seen visually. When clear of traffic ATC cleared them direct to EXMOR. He assessed the risk as low.

THE BRISTOL APR reports the JS41 called inbound to the BRI NDB in the vicinity of ABDAL (6nm SE Lyneham) descending to FL110. The flight was left at this level to remain within CAS then when the ac had ceased garbling with Lyneham departing traffic, he noticed that the flight had left CAS on a S'ly heading. The crew apologised for the NAV error and he, the APR, proceeded to vector the flight RH downwind (D/W) as another ac was also routeing inbound from ABDAL (an unusual routeing for both ac) descending to 3000ft. The A319 flight, an EXMOR departure from RW09, was released to climb 'straight ahead' but on first contact the crew reported passing 3000ft in the climb and turning R. He said 'negative, straight ahead' in the hope of stopping the turn but the flight kept turning so he gave the A319 crew an immediate L turn and avoiding action to the L, against the JS41. Both crews

reported TCAS TA alerts but no RAs and he estimated the minimum separation as 300ft vertically and 1·5nm horizontally.

The Bristol METAR shows EGGD0820Z 14019KT 8000 –RA SCT010 BKN040 04/03 Q1014=

THE CAA FLT OPS INSPECTORATE reports that during the A319s departure, the Flt Director was not performing as expected in pitch and, while the crew were distracted by this, they did not select a heading to comply with ATC instructions. As a result the Flt Director defaulted to NAV, which resulted in a RH turn.

ATSI reports that the JS41 crew established contact with the Bristol APR at 0812:10, and reported at FL110 routeing direct to the BRI. The APR advised the crew they could expect vectoring to the ILS for RW09 and that information 'November' was current. At this time the ac was just passing 6nm S of Lyneham. The JS41 was seen to turn onto a S'ly track and so the APR instructed the crew to fly a heading of 270°, and at 0814:20, placed the flight under a RAS. Descent instructions were issued, first to FL080 then FL050 before, at 0817:10, when the ac was 15nm ESE of Bristol, to 3000ft. Meanwhile, the Tower controller had contacted the APR and requested departure clearance on the A319 which was routeing to join airways at EXMOR climbing to FL150. The APR advised: *"A319 c/s climb straight ahead and released*", which was read back by the Tower controller. This was subsequently passed to the A319 crew who correctly read it back. At 0816:15, the Tower controller cleared the A319 for take off. The A319 crew contacted the APR at 0818:40 stating "*Bristol Radar hello A319 c/s four thousand five hundred climbing FL150 in the right turn*". Analysis of the radar recording shows the departing A319 had followed a heading of around 110° immediately after departure but, by the time its first transmission to the APR had been completed, the heading was 146°. The APR replied: "*Negative straight ahead please (A319 trip number but no company c/s) straight ahead"*. At this point the JS41 was in the 12 o'clock position of the A319 at a range of 4·9nm, as the JS41 was passing FL055 and the A319 passing FL045. There was no response to the APR's call and so she transmitted: *"Left turn heading zero five zero A319 c/s"* to which the crew replied *"Sorry left turn heading zero five zero A319 c/s"*. The APR then transmitted (0819:00) *"Traffic information for you in your left eleven o'clock at a range of three miles flight level five zero turn left immediate"*. The APR then proceeded to give the JS41 avoiding action but transmitted *"(A319 company – JS41 trip number) turn left immediate heading one eight zero*" immediately followed by *"(A319 company – JS41 trip number) avoiding action turn left heading one eight zero"* to which the crew of the JS41 acknowledged using their correct callsign. The APR then passed TI to the JS41 crew but, again, only used the trip number and not the company c/s. The radar analysis shows that the A319 had turned R to a heading of 201° before reversing the turn. Separation reached a minimum at 0819:14, when the A319 was in the 2 o'clock position of the JS41 at a range of 2·3nm and 600ft above the JS41 climbing.

[UKAB Note (1): The CPA occurs 16sec later at 0819:30. the JS41 descending through FL039 tracking 250° in a L turn passing 1·3nm S of the A319 as it climbs through FL054 turning through 110°.]

Although the APR did not use standard phraseology for the avoiding action instructions and confused the callsigns, it is assessed that this did not significantly contribute to the Airprox taking place.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Pilot Members wondered why the A319 crew had not selected the ATC assigned heading on the ac's A/P control panel, overriding the default NAV mode. Having been given the ATC clearance to climb straight ahead before taking off, the A319 crew became distracted by an apparent Flt Director problem during the initial climb. Cockpit CRM should have ensured that the revised departure clearance - climb straight ahead - was correctly selected, enabled and followed by way of cross-cockpit checks in accordance with SOPs. However, for whatever reason, the A319 crew did not follow the ATC departure clearance and turned their ac into conflict with the JS41 which caused the Airprox.

Following the A319 crew's initial call on the APR's frequency, the APR immediately challenged the A319's erroneous turn and reiterated the 'straight ahead' clearance. As this transmission went unanswered, the APR then gave the A319 flight a corrective L turn onto 050°, which was acknowledged, followed with TI on the JS41 and an instruction to make the turn immediately. The APR then issued an avoiding action L turn to the JS41 crew, which

was acknowledged, and then passed TI on the A319. The A319 crew had continued their climb, whilst following the avoiding action L turn given by ATC, and had then received a TCAS TA alert as the subject ac closed. Meanwhile the JS41 crew had heard the RT exchange between the A319 crew and ATC and this had led to them 'see' the A319 on their TCAS display, in potential confliction. Shortly after this a TA alert was generated simultaneously with the ATC avoiding action L turn and this was actioned promptly. All of these actions, when combined with the actual geometry of the encounter, allowed the Board to conclude that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

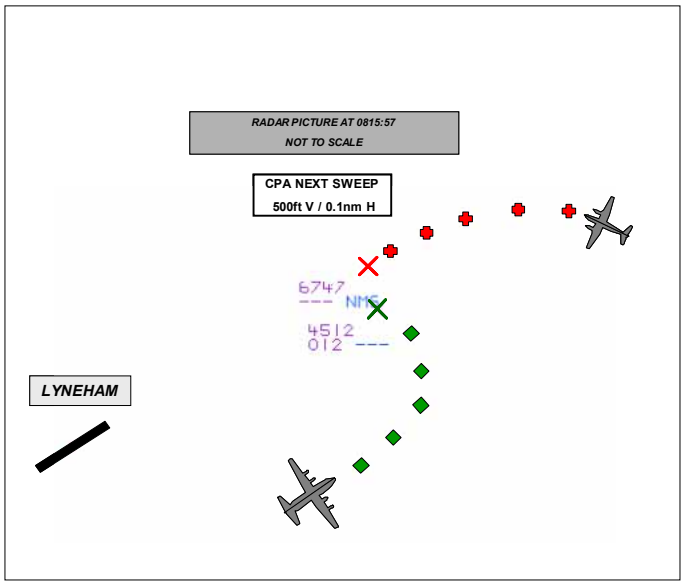
Cause: The A319 crew did not follow their ATC departure clearance and turned into conflict with JS41.

Degree of Risk: C.

AIRPROX REPORT No 029/06

AIRPROX REPORT NO 029/06

Date/Time:	28 Feb 06 0816	
Position:	5131N 00157W (2nm ENE Lyneham - elev 513ft)	
Airspace:	Lyneham CTZ	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	C130	Beech 200
Operator:	HQ STC	Civ Comm
Alt/FL:	800ft (QFE N/K)	700ft (QFE)
Weather	NR	VMC
Visibility:	NR	>10km
Reported Separation:	300-500ft H	NR
Recorded Separation:	500ft /0.1nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C130 PILOT reports flying a visual circuit on RW24 and as they commenced the finals turn they were in visual contact with another ac well above them. The TCAS indicated that the other ac was flying level, 1400ft above them, when they were maintaining 1000ft QFE around the first half of the finals turn. At no time did ATC inform them about the other ac until a definite risk of collision occurred. Their first radio call to ATC of *"finals, gear down"* was not answered so they called again and at that point they lost sight of the other ac as it passed above the upper limit of visibility from their cockpit: TCAS still indicated that it was at +1400ft. They commenced their descent and turn onto final approach. About ¾ of the way round the turn the other ac appeared from above in their 1 o'clock position with a steep nose down attitude, descending through their level and passing within 300-500ft laterally. At that point ATC instructed them to *"Go around – another a/c with late call".* By that stage they were at 700ft QFE and he took evasive action to prevent a collision.

THE BEECH 200 PILOT provided a very brief report stating that he was flying a black and white ac with SSR and Modes C and S selected on but with no TCAS fitted. At the time he was conducting a visual approach to Lyneham and was at 700ft QFE (equivalent) and at 180kt when the incident occurred. He did not see the other ac. He was overseas based and his company ops were unable to provide any further information.

THE C130 STATION COMMENTS that the details of the incident were as the pilot reported and that the ac was one of two C130s operating in the visual circuit. On the completion of the downwind leg, the subject C130 commenced the finals turn and transmitted *'finals gear down'* to ATC whilst being in visual contact with a light ac in his 12 o'clock at 2500ft, 1½ miles away, which was thought by the crew to be in the Lyneham instrument pattern. The C130 was informed *'continue, one ahead'.* This call was thought to pertain to the other C130 in the circuit which had just been cleared to roll. In fact the ADC was operating VHF and UHF frequencies but not transmitting on both simultaneously and the *'one ahead'* call was referring to a light ac joining L base for RW24. This was the ac that the crew of the C130 thought was in the instrument pattern. The ADC did not transmit a message to the active visual circuit that a light ac was joining from the NE.

Lacking this situational awareness (SA), the C130 continued the finals turn and descent which resulted in visual contact being lost with the light ac and it was believed that it would pass above and behind. In fact the light ac was also continuing a descent for a straight-in towards RW24, which resulted in both ac coming into close proximity at 2¼ miles finals and 700ft QFE. On becoming visual with the light ac at the same level and abeam, the C130 Captain took control from the co-pilot and aggressively manoeuvred his ac to avoid a collision. Concurrently, the ADC asked for confirmation that the C130 was "*going around".* A previous call to go around had been transmitted to the C130 but on VHF and therefore the crew had neither heard nor responded to it. Once a

potential collision with the light ac had been avoided the C130 executed a go-around; the ac Captain's actions were timely and appropriate faced with the potential danger.

It would appear that this incident took place because of the lack of TI being passed to the C130s already in the visual circuit by the ADC as the VHF-equipped light ac joined. The ADC's failure to transmit instructions on both VHF and UHF frequencies exacerbated the situation and prevented the visual circuit traffic from maintaining a higher level of SA. If the crew of the C130 had been aware of the light ac's intentions they may have elected to go around earlier or extend downwind behind that traffic.

MIL ATC OPS reports that a foreign BE200 had been pre-noted inbound to Lyneham Director (DIR) by LACC Sector 23 for a radar-ILS with a MALBY [A standard reporting point NW of Lyneham; civil controllers release ac pointing towards it in the descent to FL70] estimate of 0819 to make the approach using a VHF frequency. At 0811:25, the Beech called DIR requesting "*left-base join for RW24*." DIR then ascertained that the Beech would be recovering on the QNH and instructed the crew to descend to 2600ft on QNH 1009mb (2000ft QFE equivalent). The crew then read back the altitude incorrectly and were twice corrected by DIR who then managed to obtain the POB. At 0813:10, the pilot of the Beech called visual with the airfield and requested a visual recovery to RW24. Nineteen sec later, DIR prenoted the Beech inbound to the ADC and passed the ac type and POB. DIR then erroneously stated that it would be for a "*visual right-base join"*, squawking airways; ADC acknowledged this with *"contact"* and passed the visual circuit state of *"2 in".* At 0813:47, the Beech repeated that he had the field in sight and requested a visual approach to RW24. DIR asked the pilot if he was familiar with LYE as published and asked the crew to *"report established on finals confirm"*. DIR repeated the instruction and the crew responded with simply *"roger".* Simultaneously, a C130 was downwind in the visual circuit and operating on UHF. At 0814:20 the C130 crew reported to the ADC "*downwind to roll*" and the ADC transmitted that there was one ahead and passed the surface wind. At 0814:30 DIR passed the Beech crew the circuit state and transferred the ac to ADC's VHF frequency. Some 15sec later the Beech called on VHF and reported that he was on L base RW24. ADC responded by asking if it was for a QFE or QNH approach and the pilot confirmed it was for a QNH approach; ADC passed the QNH and reiterated that there were 2 ac in the visual circuit. The Beech read back the QNH and informed ADC that he was on finals RW24. ADC asked for a gear check and the crew responded *"in 30 seconds, Beech C/S."* ADC instructed the pilot to report gear down and the Beech pilot replied *"wilco".* ADC did not transmit a message to the active visual circuit that a light ac was joining from the E. At 0815:29, on the completion of the downwind leg, the C130 crew commenced the finals turn and transmitted *"finals gear down"* [see Note 1 below] to the ADC on UHF and the ADC instructed the C130 crew, erroneously on VHF to *"…go around late call, instrument, sorry on visual traffic joining 3 miles".* The C130 crew continued the finals turn and descent and, not having received a reply on UHF, then repeated the call at 0815:39. Only 3sec later, the Beech pilot called *"finals RW24 and gear down".* At 0815:46 the ADC responded to the C130 crew on UHF, *"C130 C/S go around, late call visual joiner 3 miles, Beech 200". Seven* sec later there was an unreadable call on UHF and at 0815:57 the ADC asked the C130 pilot to confirm that he was going around, to which the C130 crew responded *"yeah just getting out of his way".* At 0816:09, the ADC cleared the Beech to land and passed the surface wind to which the pilot replied *"landing RW24, Beech C/S".* From that point onwards the Beech landed and the ADC continued controlling visual circuit traffic. The C130 crew then called Lyneham Ground on the second UHF box to inform ATC that the crew of the C130 would be *"filing an airmiss on that one".*

DIR was being manned by a trainee and a Local Examining Officer combination on an endorsement examination. It is standard practice for 'radar to visual' approaches at LYE to be descended not below 1500ft QFE (2100ft QNH equivalent). In this instance, the Beech was correctly descended to 2600ft QNH initially iaw the Radar Vector Chart but was not descended further when closer to the aerodrome: therefore, the ac was 500ft higher than 'radar to visual' joins are normally. L and R base joins are quite common practice at LYE. The Beech requested a L base join for RW24. On the subsequent landline conversation between DIR and ADC, DIR pre-noted the Beech as a visual R base join, which ADC acknowledged and did not query, despite the position of the ac on the DFTI radar and in addition he did not inform ADC that the Beech would be carrying out the approach on QNH nor that it was on VHF. Although DIR passed the circuit state to the Beech, he did not inform the pilot of the circuit height and he had not received adequate confirmation that the crew were familiar with Lyneham procedures, despite his efforts at trying to extract the information. (When DIR asked the Beech if he was familiar with Lyneham as published, the only response he received was *"roger"*). It is therefore quite possible that the Beech pilot was not familiar and did not know the height of the visual circuit traffic, the visual circuit direction or the cable states. When the C130 crew called downwind to roll, ADC informed the crew that there was one ac ahead; however, another C130 (C130B), also in the visual circuit, had been cleared to roll only 20sec previously and it is highly likely that C130B was perceived by the C130 crew as the "*one ahead*". At no time did ADC inform the visual circuit traffic that there was

an ac joining visually from the E on VHF. The first time that the C130 crew were informed of the Beech's position was after they had called finals. It can be determined from some of the transmissions that ADC was changing between the VHF and UHF frequencies rather than transmitting on both. It is clear to see that more than once the ADC transmitted on the wrong frequency and had to change frequencies and make the same transmission again. As the ADC was switching between frequencies rather than transmitting on both, the visual circuit traffic on UHF did not hear any transmissions made by ADC on VHF. This, combined with the fact that the Beech was 500ft higher than normal radar to visual joins, would go some way to explaining why the C130 crew had misunderstood the intentions of the Beech crew.

Both ac involved in this Airprox were flying VFR within Class D airspace. Although ATC is not responsible for providing separation, TI must be passed on other VFR flights to enable pilots to effect their own traffic avoidance and integration – JSP 552 235 Annex B.100.1. The C130 crew did not receive TI in sufficient time to allow them to take their own separation against the Beech whilst the Beech crew took no action against the conflicting C130 or made comment as to its presence.

Note (1): The pilot of the C130 later reported that when he called finals he was in visual contact with a light ac in his 12 o'clock at 2500ft (estimated height by the crew), 1½ miles away, which was assumed by the crew to be in the LYE instrument pattern and never questioned to ATC.

HQ STC comments that there were a number of failures that contributed to this Airprox. Firstly it is HQ STC view that it is never a good idea to have ac deconflicted by frequency when using the same piece of airspace. This view is reinforced by this instance when the ADC was caught out by transmitting the instruction to go around to the C130 on VHF when it was operating on UHF. Secondly there was very little information passed by ATC to the C130 crew to make them aware of the Beech's intentions. The use of both frequencies together would undoubtedly have informed the C130 crew that there was another ac heading for the same very small piece of airspace. Perhaps allowing visiting ac who are unfamiliar with the airfield and, perhaps, military procedures, to integrate freely into the circuit should be reconsidered.

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.

This incident provoked much discussion among specialist controller Members. Class D airspace is not common at military air stations and the military procedures are not quite the same as those used at civilian airfields. For example, at military bases, unlike at civilian units, traffic conducting a visual approach is treated by ATC as being VFR even if flying on an IFR flight plan.

Although there is a reasonable aim to keep transmissions to a minimum, controllers must ensure that safety critical information is passed to all pilots who need it. Due to V/UHF confusion by the ADC, both pilots involved in this Airprox were placed in a situation where they did not have enough information to ensure safe separation while conducting different types of visual approach. While operating on different frequency bands and with the radio fit at Lyneham, it would never be possible for one pilot to hear the transmissions made by the other, had the ADC used the facility to transmit simultaneously on both frequencies then both pilots would have been aware of the presence and position of the other ac. Further, Members opined that the TI as regards the landing sequence passed was not accurate. The information available indicated that the plan was for the reporting C130 to land after the Be200. This being the case, the C130 was 'number 3' in the sequence not 'number 2' as passed by the ADC. A controller Member suggested that a call to the C130 such as *'No 3 to land after a similar type on short finals and a visual straight in'* would have been clear, unambiguous and would have given the C130 pilot enough information to either sequence behind the Beech or, if that was not practicable, to go-around from his position.

The RN Ops Member stated that it was policy at RN units for visiting ac not familiar with an airfield to conduct instrument approaches in order to avoid such incidents as this. The Chairman asked the Mil ATC Ops Advisor to take this policy difference away for review within her Command.

Since the C130 pilot did see the Beech, albeit late, and he did conduct an avoidance manoeuvre in sufficient time for it to be effective, there was no risk that the ac would have collided. The Board considered however, that normal safety margins had not been maintained.

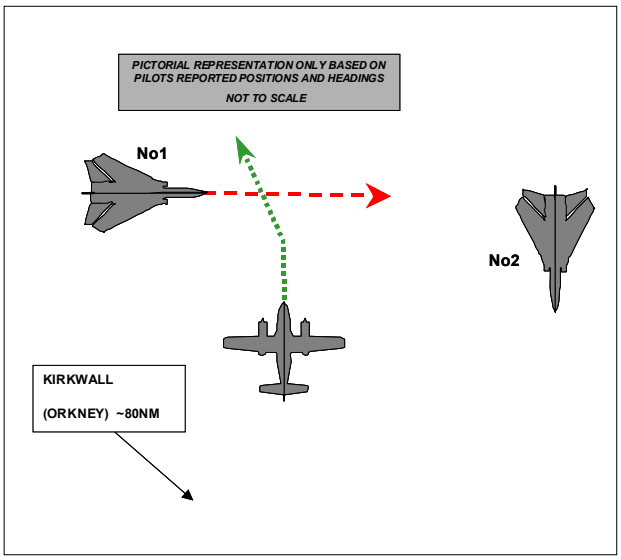
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Lyneham ADC did not provide sufficient TI to integrate the Be200 safely with circuit traffic.

Degree of Risk: B.

AIRPROX REPORT NO 030/06

Date/Time:	9 Mar 10:15	
Position:	6002 N 00435 W	(82nm NW Kirkwall)
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Cessna F406	Tornado F3
Operator:	Civ Comm	HQ STC
Alt/FL:	1200ft	1250ft
	(QNH 995 mb)	(Rad Alt)
Weather	VMC CLBL	VMC
Visibility:	40km	>10km
Reported Separation:		
	0ft V/0.5nm H	Not Seen
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA F406 PILOT reports flying a white and blue ac with Day-Glo wingtips and all available lights including HISLs switched 'on' on a fishery protection flight from Kirkwall. He was squawking 7400 [Fishery Protection conspicuity] with Mode C and was in receipt of an 'Oil Rig Traffic Information Service' from Foinavon Radio. While about 80nm NW of Kirkwall at 1200ft on the RPS, heading 360° at 150kt in very good visibility, he saw a formation of 2 Tornado F3s. The first ac [No2 in the diagram] was seen in his 2 o'clock and below them (estimated to be at 300ft amsl) and the other [No1 in the diagram] was in his 10-11 o'clock crossing his nose from left to right about ½ nm away and at the same height. He executed a rapid left turn. The second ac was seen to waggle its wings as it passed through his 12 o'clock and he felt the wake turbulence about 3sec later. No ACAS was fitted and he assessed the risk as being medium/high.

He was aware of a NOTAM'd military exercise in the area and he thought that the ac might have just exited the exercise area.

THE TORNADO F3 PILOT reports that at the time of the incident he was conducting medium to low level practise intercepts between 6000ft and 1250ft AMSL. His No2 was running on course 180° with the leader intercepting from the SW. Neither crew saw the Cessna F406: both ac were monitoring Guard and no transmissions were heard.

UKAB Note (1): The incident was well outside recorded radar cover and 10nm N of the NOTAM'd exercise area. [The F3 pair was not participating in the exercise].

UKAB Note (2): In accordance with company requirements the F406, as a precaution, diverted to the nearest suitable airfield to check for airframe damage. None was apparent so the 'thuds' were attributed to wake turbulence.

HQ STC comments that even in this lonely place there is the potential to come across another ac in the same piece of sky! The F3 crews were, perhaps, concentrating too much on the intercept at the time of the Airprox. However, there was probably just enough time available for the Cessna pilot to have avoided the F3's wake.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Even in the remotest and least congested areas of UK FIRs there is always the possibility of encountering another ac as this incident amply demonstrated. Almost invariably in these parts 'see and avoid' is the prime and occasionally sole means of collision avoidance. In this incident both crews were engaged in demanding tasks that required much of their attention, possibly to the detriment of their routine lookout. Under Rules of the Air regulations the F3 No 1 crew (the ac primarily involved) should have seen and avoided the Cessna; further the No2 crew would also have been in a position to see it but surprisingly did not.

Due to the non-sighting by the Tornado No1 crew and lateness of the F406 pilot's sighting which resulted in his very limited ability to manoeuvre, the Board considered that the safety of the respective ac had not been assured in this incident.

Although not a factor in determining the risk of collision, wake turbulence from fast jets can have a serious affect on smaller ac as witnessed by the F406 pilot's concern that he might have suffered a birdstrike.

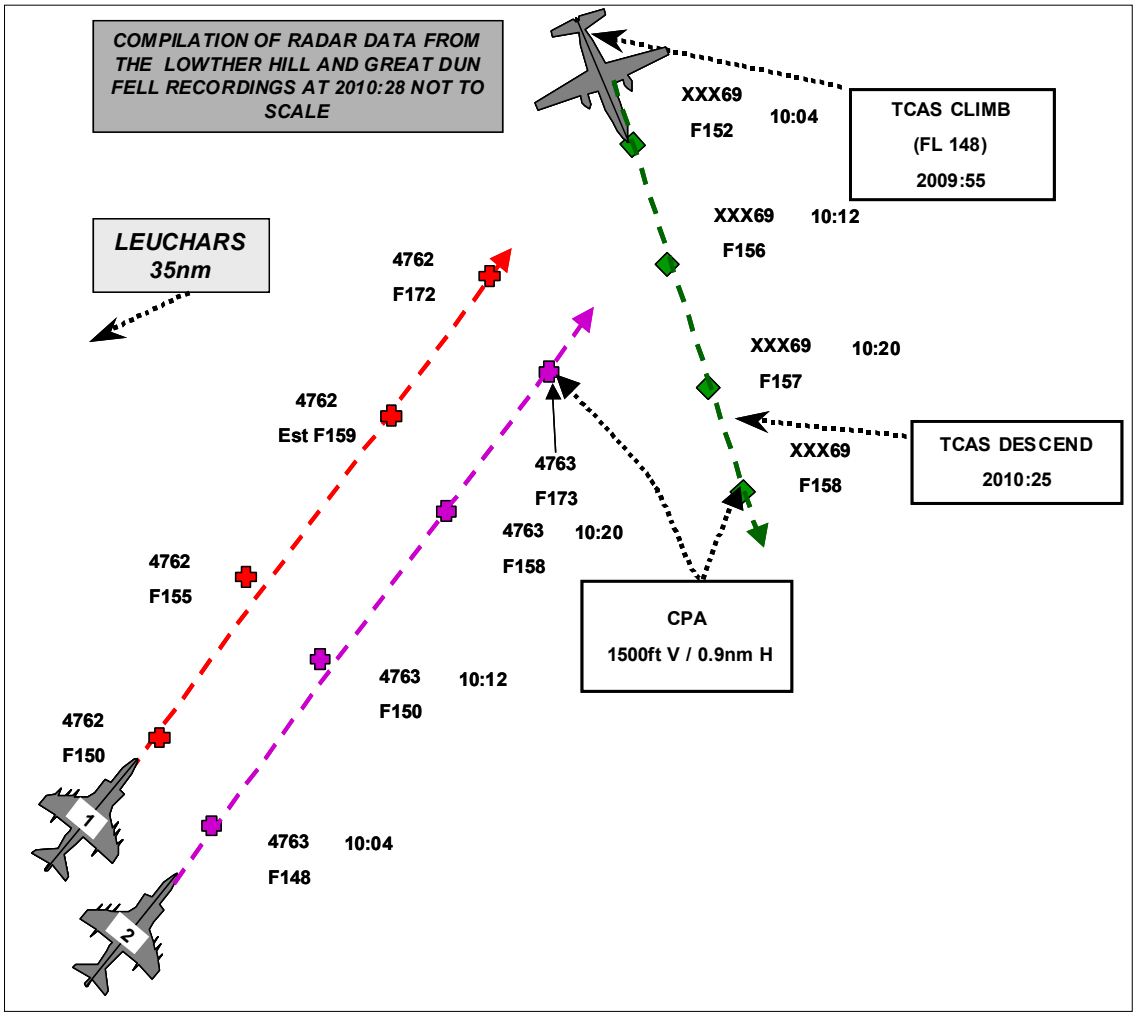
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Tornado F3 crews and late sighting by the Cessna F406 crew.

Degree of Risk: B.

AIRPROX REPORT NO 031/06

Date/Time:	15 Mar 2010 NIGHT	
Position:	5640N 00202W (8nm N BALID)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	JS41	Harrier x 2
Operator:	CAT	HQ STC
Alt/FL:	FL155	FL150↑
Weather	VMC CAVOK	VMC CAVOK
Visibility:	45NM	NR
Reported Separation:		
	Not Seen	1000ft V/ 0.5nm H
Recorded Separation:		
	1500ft V/0.9nm H (on Harrier No 2)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JS41 PILOT provided a very brief report stating that he was flying a scheduled passenger flight in receipt of a RIS in good weather through an area of Class G airspace noted for its high level of uncoordinated military air

activity. While heading 170° at 200kt and at FL155, he received a TCAS RA 'climb, climb' then 'crossing climb' then 'descend, descend now, descend'. He did not see any other ac but thought them to be between ½ and ¼ nm away from the TCAS and assessed the risk as being high. Nav and strobe lights were 'on'.

THE HARRIER PILOT reports that he was participating as the leader of a pair of ac in a Night Tactical exercise based at RAF Leuchars. They were flying with NVGs and FLIR and although a HISL was fitted it was not switched on [due to NVG ops]. Nav lights and the anti-collision beacon were on. He was departing on a SID1 heading 070° at 300kt and when he had levelled at FL150 TI was passed on a contact at 20nm left of his nose; at 10nm he saw it and called visual. The second Harrier was in arrow formation on his right and was also visual the traffic. The formation then commenced a climb to their exercise sanctuary level and the civil traffic was observed passing forward and right of their ac. He assessed the risk as being none as both Harrier pilots saw and avoided the other ac.

MIL ATC OPS reports that a formation of 2 GR7 Harriers (Harrier Lead & B) was participating in a night flying exercise and was departing from RAF Leuchars. Harrier Lead contacted Leuchars Departures (DEPS) at 2004:52 reporting climbing FL150. DEPS identified the Harriers and applied a RIS at 2005:38. Harrier Lead requested a formation left turn onto own navigation which was approved by DEPS at 2007:41. In the same transmission TI was passed on *"traffic left 10 o'clock, 20 miles crossing left/right indicating FL120 climbing possibly civil".* The TI was updated at 2008:37 as "*previously called traffic 12 o'clock, 15 miles crossing left/right indicating FL130*". TI was passed, for a third time, at 2009:24 "*Harrier C/S, previously called traffic 12 o'clock, 10 miles crossing left/right indicating FL140 climbing*". Harrier lead reported, "*traffic in sight*". At 2009:42, as DEPS was performing a handover of the Harriers to Boulmer, the leader requested a climb to FL190 and this was approved. The handover to Boulmer was completed and the ac transferred frequency at 2010:32.

Radar Analysis [of the Great Dun Fell only] shows, at 2009:34, the JS41 approximately 10nm N of BALID, climbing through FL143. The Harriers are in its right 2 o'clock at 8nm tracking NE, with Lead indicating FL150 and B NMC. The JS41 continues to indicate a climb and at 2009:45 the lateral separation is reduced to 7nm between the JS41 and the Harriers with the JS41 indicating FL146 Mode C climbing and Harrier Lead indicating FL150 with Harrier B indicating FL148. The JS41 and Harrier Lead indicate co-altitude, FL150, at 2010:02 with Harrier B indicating slightly lower at FL148: the lateral separation at this stage is 4.5nm. Harrier Lead commences a climb at 2010:07 to indicate FL151 with the JS41 indicating slightly above at FL153, the lateral separation reducing to 3.5nm. Both the JS41 and the Harriers continue to climb and the next sweep shows The JS41 passing FL157C and Harrier lead passing FL152C, Harrier B is indicating FL150C; the lateral separation is 2.2nms. All 3 ac lose Mode C indication on the next sweep with 1.3 nm lateral separation evident. The Harriers pass behind the JS41 with 0.9nm lateral separation, the JS41 indicates FL158C and Harrier Lead 173C from this point onwards separation increases.

DEPS applied a RIS to the Harrier formation as per JSP 552. DEPS passed accurate and timely TI to the Harrier crews on the conflicting JS41 on 3 occasions, with Leader reporting "visual" with the JS41 with 9.5nm lateral and 800ft vertical separation. At the time the Leader requested a climb to FL190, the JS41 was indicating 500ft below the Harriers but unbeknown to DEPS or the Harrier crews, the JS41 crew had received a TCAS RA climb which swiftly changed to a TCAS RA descent when the Harriers initiated their climb.

THE ScACC TAY SECTOR CONTROLLER provided a report which was verified by the ATSI report below.

ATSI reports that the JS41 was en route from Aberdeen to Teesside and established contact with the ScACC Tay sector at 2002:15. One controller acting in both the Tactical and Planner roles was operating the sector. The pilot reported passing 3400ft climbing to FL175 and routeing direct to ALASO (115nm south of Aberdeen). The controller instructed the crew to squawk Ident and this was done: however, the controller did not inform the crew they were identified nor pass their position as is required by MATS Part 1 (Section 1, Chapter 5, page 9 Table 5). The controller advised the crew that they were now in receipt of a RIS and this was correctly read back. The controller became aware of two squawks to the SW of the JS41 and closing towards it. These ac were squawking 4762 and 4763 which are 'special events' squawks so he had no indication as to whom they were working in order to achieve coordination. Furthermore, such squawks are deemed unvalidated and unverified. It was subsequently determined that these ac were a pair of Harriers in receipt of a RIS from Leuchars. At 2009:35, the controller transmitted "*And (JS41 callsign) for traffic information there's at least two contacts at present in your one o'clock range of about seven and a half miles they're heading northeast bound and they appear to be at flight level one five zero that's unverified*". The pilot acknowledged this and in the background the word "*Traffic*" can be heard as

an automated voice. The controller updated the TI when the Harriers were in the 2 o'clock position of the JS41 at a range of 4.2nm. The JS41 was passing FL149 and the Harriers were showing FL150 and FL148. Unfortunately, due to the close proximity of the two ac to each other, and the fact that they were both squawking, there was considerable overlap and garbling making it difficult for the Tay controller to assess what they were doing. The JS41 pilot reported a TCAS climb, which the controller acknowledged and then transmitted "*(JS41 callsign) just on your right hand side now just going to pass behind you*". The pilot replied, "*Okay we just got a TCAS climb then it TCAS descent*". Analysis of the [Lowther Hill- the source being used by the controller] radar recording shows the Harriers converging with the JS41 but the codes and Mode C readouts are difficult to decipher. Indeed, at one point a 0000 code appears between them. The two Harriers appear to pass down the right hand side of the JS41 and behind it. Unit investigation which was based on [Lowther Hill only] SMF data determined that minimum separation with 4762 was 1.14nm and 700ft whilst that with 4763 was 0.98nm and 300ft. The controller fully complied with the terms of a RIS and accordingly it is determined that there were no civil ATC contributory factors.

UKAB Note (1): The exercise in which the Harriers were participating was the subject of NOTAM H0369/06, that warned of intense military activity from surface to FL240. It also warned that ac may be operating with low intensity nav lights and without anti collision lights.

UKAB Note (2): The incident took place at the extremity of the cover of both the Lowther Hill and the Great Dun Fell radars. The diagram above is a composite representation of the information taken from the 2 recordings.

HQ STC comments that TI from the Leuchars DEPS ensured that the Harrier pilots acquired the JS41 and avoided it visually utilizing their EO equipment.

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 queried the NOTAM for the Exercise in which the Harriers were participating. Although fairly comprehensive it did not contain the exercise squawks. Some Members were initially surprised when informed that at ScACC controllers do not routinely brief themselves on NOTAMs. The NATS Advisor explained that there is an electronic briefing system which controllers use to ensure that when coming on watch they are briefed on all matters of significance, including relevant NOTAMs.

The Board considered that a more appropriate level of service for a CAT flight in Class G airspace at night would have been a RAS. Members were informed that ScACC controllers do not provide a RAS: only a RIS is available. Airline pilot Members also considered that it would be wiser for CAT ac to route via the Airway structure, in accordance with CAA recommended policy, which offers much more protection against incidents such as this. The DAP Advisor informed the Board of progress on the ATSOCAS review which is in its final stages of preparation.

Although under the Rules of the Air (Rule 19) arguably the Jetstream should have avoided the Harriers, its crew - despite accurate and timely TI - were not in position to see the jets as they climbed up from below the Jetstream, in its 2 o'clock. On the other hand the Harrier pilots, again assisted by accurate and timely TI, did see the Jetstream and would have noted that it was not taking any avoidance. Judging that they would pass behind the Jetstream, the Harrier pilots increased the separation by climbing above the airliner. Although the Harrier pilots assessed that the avoidance margin was perfectly safe, the geometry of the incident (and that the Harriers levelled for a short time at F150) was such that two TCAS RAs were triggered in the Jetstream, firstly to climb and then - as the Harriers out-climbed it - an (opposite) descent command. The Board encouraged military (and other) pilots to be cognisant of any possible effects on TCAS when visually avoiding any ac that might be fitted with such equipment: pilots have no option but to react when a TCAS RA is displayed. Had the Harriers turned even 10° to the left when they first sighted the Jetstream at 10nm, it is most likely that no RA would have resulted.

UKAB Note (3): A full TCAS analysis was requested from and provided by NATS but not included in this report. It showed that the Jetstream TCAS system and the pilot reacted appropriately to the Harriers' climb, level-off then further high-rate climb.

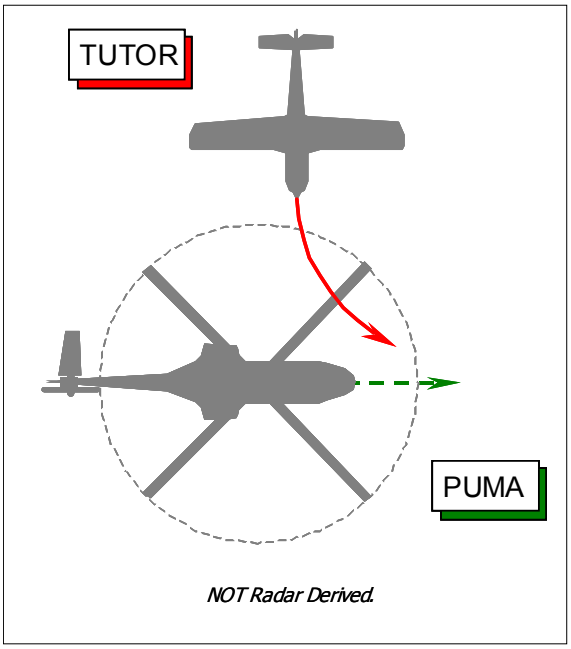
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Harrier leader flew sufficiently close to the JS41 to trigger two TCAS RAs.

Degree of Risk: C.

AIRPROX REPORT NO 032/06

Date/Time:	16 Mar 1505	
Position	5138N 00118W (1nm N Didcot Power Station)	
Airspace:	Oxford AIAA	(Class: G
	Reporting Ac	*Reported Ac*
Type:	Puma	Grob Tutor
Operator:	HQ JHC	HQ PTC
Alt/FL:	1000ft (1023mb)	1000ft QFE (1020mb)
Weather	VMC CLBC	VMC N/K
Visibility:	>10km	7km
Reported Separation:	Nil V/20m H	Nil V/200ft H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PUMA PILOT provided a very comprehensive account reporting his helicopter has a green camouflage scheme but the HISLs were on whilst conducting an airtest in the Vale of the White Horse. The pilot-in-command occupied the RHS and was handling the ac. The co-pilot occupied the LHS; an aircrewman was looking out in the centre and a rotortuner was in the rear cabin." The flight was operating VFR in VMC some 200ft below and 2000m horizontally clear of cloud and in sight of the surface [COCISS], whilst in receipt of a FIS from Benson APPROACH (APP) on UHF - 376·65MHz; a squawk of A3610 was selected with Mode C. Neither Mode S, TCAS nor any other form of ACAS is fitted.

At the time the Airprox occurred his helicopter was heading 090° at a position about 1nm N of Didcot, descending through an altitude of 1000ft (1023mb) at 130kt. He - the pilot-in-command seated in the RHS - sighted a Grob Tutor ac 'cross-cockpit' in their 9:30-10 o'clock about 2 rotor spans away [he quoted 30m – Main Rotor diameter is 15m] in a 20°AoB L turn and level with his helicopter's rotor disc. The Tutor was flying towards them, southbound and on a collision course. To avoid this ac he executed a "violent descent by collective and cyclic input" as the Grob Tutor passed over the top of the Puma with no avoiding action readily apparent from the other ac.] Minimum horizontal separation was 20m at the same level. An Airprox was reported to Benson APP on UHF and the ac recovered to Benson visually - using minimum collective movement - for a precautionary running landing. He assessed the risk as *"high"*.

The harsh avoiding action taken resulted in the main rotor blades striking the forward section of the Puma fuselage, causing damage to three main rotor blades and the engine intake cowlings together with other stress-related airframe damage. Two droopstops were found to be inoperative.

THE GROB TUTOR PILOT reports that he was conducting an air experience flight with a cadet. He was operating under VFR at 120kt whilst in receipt of a FIS from Benson APPROACH (APP) on UHF - 376·65MHz; a squawk of A3621 was selected with Mode C.

He was flying level at 1000ft Benson QFE (1020mb) in VMC some 200ft below and 2000m horizontally clear of cloud. Turning S with the intention of flying to the S of Didcot for a recovery to Benson, he observed an area of poor weather and low cloud ahead which was made worse by an extensive plume of smoke and water vapour from the power station. Therefore, he elected to turn L to avoid the poorer weather and to pass to the N of the power station. Whilst turning L onto a heading of 090° at 20° AoB, he saw a Puma helicopter as it emerged from directly

beneath his left wing. The Puma appeared to be about 200ft below and tracking in a NE'ly direction from the area of poor weather so as it was clear below no avoiding action was taken. The risk was assessed as *"high"*.

THE PUMA PILOT'S STATION COMMENTS that the aircrew involved were obeying procedures and operating in Class G airspace under a FIS. They were looking out but the weather and the orientation of the Tutor combined to prevent them seeing each other until the last possible minute. A violent avoiding action prevented collision – 'see and avoid' worked, but in this case only just.

The meteorological conditions on the day meant that it would have been difficult to see the white Tutor against what was a bleak, grey sky. Unlike other military training ac the Tutor is not painted black to aid conspicuity. Having discussed this issue with experts at Benson, there has been much debate about this issue in the past and extant policy is not to paint these ac black - this issue will be raised with HQ EFTS at Cranwell.

Despite squawking, the Tutor was not painting on primary or secondary radar at the time of the incident. Although it was under a FIS, a radar 'paint', either primary or secondary, might have aided conspicuity and it was intended to investigate this issue further in order to establish if a technical problem exists. Regarding the RT exchanges, an earlier ATC traffic information message passed to the Puma crew about another Tutor was not acknowledged. It is unclear whether the pilot did not hear this message or ignored it. However, his lack of response was not followed up by ATC. At a local level, they will review their RT procedures in order to remind aircrew of the benefits of good RT discipline.

The foregoing represented some of the concerns surrounding this Airprox but to ensure that all the issues arising including Human Factors are examined, advice was sought from HQ STC and an F765B Flight Safety Investigation Report raised in accordance with JSP551.

MIL ATC OPS reports with RT transcript that Benson APPROACH (APP) was providing a FIS to the Puma crew who were carrying out an airtest. Simultaneously, APP was also providing a FIS to the Tutor pilot that had departed Benson at 1500:36 on a VFR departure. A conversation ensued between APP and the Benson Aerodrome Controller (ADC) regarding "nasty weather" in the Didcot area. APP advised ADC that the Puma was moving his operating area due to weather and was requesting the cloudbase at Benson – reported as FEW @ 1800ft and BKN @ 2400ft. The ADC advised the weather was "pretty murky". The Puma crew requested a visual recovery from the W at 1503:34, to which APP responded with the runway in use – RW01 - and asked the crew to report visual with the aerodrome. At 1506:06, the Puma crew advised APP that they "..*would like to report an Airprox against the Tutor at Didcot".* Before APP replied, the Tutor pilot reported "..*visual with Puma about 300ft below".* No further reference is made to the Airprox on RT as the Puma pilot advised the Tutor pilot *"..we'll talk on the ground"*.

The Airprox is not seen on recorded radar: the Puma can be seen operating in the Didcot area but the Tutor does not paint due to its altitude.

At the time of the Airprox, both ac were under a FIS from APP. The Puma had been painting intermittently on radar but the Tutor was below the base of radar cover. No traffic information was passed to either crew about each other's ac but APP had passed traffic information to the Puma crew on other tracks which were painting on his radar [which included another Grob earlier]. There are no Military ATC factors apparent in this Airprox.

HQ JHC comments that this was a very serious incident only narrowly escaping a mid-air collision by the severe avoiding action taken by the Puma. The damage to the Puma's rotors and engine intake cowlings is testament to how close this Airprox was and the manoeuvring required to avert a collision. There were several factors that conspired against the crews on this occasion which we have seen in so many other Airproxs – poor weather, below full radar cover, and a dull aircraft against a dull sky. This HQ thoroughly supports RAF Benson's move to raise the Tutor's colour scheme with HQ EFTS. Although both ac were on the same frequency, this alone was insufficient to prevent the situation developing. Crews are well aware that a FIS is not an avoidance service, but this is a lesson to crews operating with a FIS to keep the provider updated with current position information and above all maintain a thorough lookout.

HQ PTC comments that this was an unfortunate encounter in class G airspace by 2 ac from the same base that came very close to disaster. Following this Airprox a thorough investigation was carried out by the Station but no definite cause could be determined other than a fortuitous late sighting by the Puma pilot on a light coloured aircraft

against a cloudy background. The Tutor pilot was clearly unsighted until after the event. However, local awareness has been significantly heightened following this incident and, yet again, it has to be emphasised that there is no substitute for good lookout.

UKAB Note (1): The 1450UTC Benson METAR was: Surface Wind: 030/12kt; Visibility >10km in Rain; Cloud: SCT @ 1500ft; OVC @ 2000ft. QNH1026mb; CC WHITE TEMPO SCT @ 1400ft GREEN. The 1520UTC Benson SPEC Surface Wind: 050/14kt; Visibility >10km in Rain; Cloud: SCT @ 1300ft; OVC @ 1800ft. QNH1026mb; CC GREEN TEMPO FEW @ 1300ft WHITE.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board recognised immediately that the crux of this Airprox was one of lookout in the 'see and avoid' environment of Class G airspace. The pilots' Unit had clearly articulated the difficulties which confronted both these crews and their Unit's comprehensive review into the events surrounding this Airprox had noted that several peripheral aspects were being looked at in more detail. The specific difficulties of sighting Grob Tutors had been reflected in other Airprox reports and the HQ PTC Member emphasised once again that the small cross-sectional area of the white aeroplane approaching at a head-on aspect made it very difficult to spot. A military helicopter pilot Member questioned the efficiency of the Grob's colour-scheme – a point that has been brought up in discussion of other Airprox in the past – and the Board was briefed on the technical difficulties associated with finishing the Grob in a more conspicuous colour-scheme. It was not just a simple matter of spraying the ac black as, in essence, a dark colour could materially affect the structure of the airframe because of heat absorption.

Given that the Puma was operating VFR under 'see and avoid' without the addition of a radar service to assist lookout, some Members questioned the suitability of the weather in view of the relatively high workload that airtests normally engender. Whilst both flights were conducted under 'COCISS', pilot Members thought that a radar service to enhance lookout might have been a sensible precaution. Whilst not entirely familiar with the nature of the airtest actually being flown here, it seemed that when confronted with weather that was allegedly "pretty murky" (the later weather report gave SCT cloud at 1300ft) in a promulgated AIAA, the additional benefits of acquiring either a RIS or RAS – even if that entailed climbing to a higher altitude to operate in an area of satisfactory radar coverage – might possibly have outweighed any other complications that might have arisen. Indeed, an experienced fast jet navigator opined that fast-jet airtests are executed under a radar service for this very reason. The learning point here was that, where feasible, aircrew should make use of all the Air Traffic Services which are established and available to them.

Turning to the specifics of this Airprox, it was evident from the Grob pilot's frank account that he was oblivious to the presence of the helicopter until after it had appeared beneath his port wing, which was after the Puma pilot had executed his avoiding action descent. Clearly, the 'Rules of the Air' can only work in the 'see and avoid' environment of Class G airspace if other ac are spotted in time to enable pilots to take appropriate action. Although the Grob pilot was required under the 'Rules of the Air' in this situation to give way to other ac approaching from starboard, it seemed plain to the Members that as the Grob pilot had been turning L 'belly-up', unsighted on the camouflage green helicopter, he had been unable to affect the outcome at all. In the Board's view, here was the first part of the cause insofar as this was effectively a non-sighting by the Grob pilot who was unable to influence events beforehand. From the Puma crew's perspective, without the benefit of a radar service nor a CWS to assist his lookout or alert him to the presence of the Grob, it was extremely fortunate indeed that the PF in the RHS saw the Grob 'cross-cockpit' when he did and managed to execute his avoiding action manoeuvre. The reporting Puma Captain had opined that he first saw the Grob a mere 30m away and then initiated his descent. Notwithstanding the difficulties already expressed about spotting Grob ac, Members agreed unanimously that this was a very late spot indeed – and consequently this very late sighting by the Puma crew was the other part of the cause of this Airprox.

The Board was briefed on the damage sustained to the Puma, subsequent to the helicopter pilot's robust avoiding action. Whilst recognising immediately the seriousness of this incident, the Board kept in mind that it was charged with assessing the risk of a collision between these two ac. Thus the damage actually occasioned by the helicopter pilot's robust action to avoid a collision, whilst evidently very serious indeed was only indicative of the

robustness of his avoidance manoeuvres and only a factor applicable to the Board's classification of the inherent risk. It was suggested that the Puma pilot probably saw the Grob somewhat earlier than he had reported as it seemed unlikely to the Members that the Puma pilot would have been able to manoeuvre his helicopter out of the way if he had actually seen the Grob at broadly the same level 30m away closing at 120kt. Even at the relatively slow closing speeds applicable here – about 60m/sec - if that was the case then the Puma pilot had less than ½sec to sight the Grob, decide what to do, effect the control input and move his helicopter through the air to descend below the Grob before colliding. Generally as a rule of thumb, in the order of 4sec is taken to be the period required to achieve this sort of reaction. Members were therefore of the view that the Puma pilot probably saw the Grob a little further away – not a lot more necessarily and it was not the Board's intention to decry the seriousness or closeness of the encounter at all. But clearly the Puma pilot had time from sighting the Grob to descend his helicopter sufficiently such that the two ac did not collide. Indeed the Grob pilot believed this had achieved about 200ft of vertical separation when he first saw the Puma below and tracking away – but this was some moments later. Without the benefit of recorded radar data illustrating the Airprox, it was not possible to ascertain independently either the actual separation that pertained or the exact geometry of this Airprox. Nonetheless, the available time in which to accomplish an avoidance manoeuvre was apparently minimal. This and inability of the Grob pilot to take any effective avoiding action as he was unaware of the helicopter until after the event convinced the Board that this was indeed a close quarters situation, leading the Members to agree with the pilots concerned that an actual risk of collision had existed in the circumstances reported here.

A civilian helicopter pilot Member was very concerned at the absence of any form of collision warning system such as TCAS I which might have alerted the helicopter crew to the proximity of the Grob or other traffic. Whilst recalling to mind a tragic mid-air collision involving military helicopters in an operational theatre, in his view the MoD was not doing enough to provision such devices for its rotary-wing fleets. A system such as TCAS I could potentially have detected the presence of the Grob and provided a traffic alert to the Puma pilot if his ac had been so fitted. The Member stressed that the civilian helicopter community has taken significant steps to fit TCAS I type devices and indeed the CAA had stipulated fitment for helicopters engaged in certain forms of low-level work such as Pipeline Inspection flights. Members were aware that PTC had conducted a trial with a TCAS I device fitted to a Tucano. Some 30sec warning had been achieved during the trial with this fixed wing ac, which attested to the desirability of a collision warning system to supplement lookout scan when operating in the lower airspace. This trial had proved the effectiveness of the system and convinced the MOD to equip this fleet of training ac, which are now being fitted with the device. Some reservations were expressed as to the efficacy of TCAS I and the potential for 'over interrogation' which might possibly have an adverse impact on other systems. Nevertheless, the Board has unequivocally endorsed the acquisition of such equipments to assist pilots when assessing other Airprox and the provision of a suitable CWS here might well have averted this Airprox. The Board wholeheartedly endorsed this view such that the Chairman's offer to highlight the Board's concern on this topic to Assistant Chief of the Air Staff was accepted.

PART C: ASSESSMENT OF CAUSE AND RISK

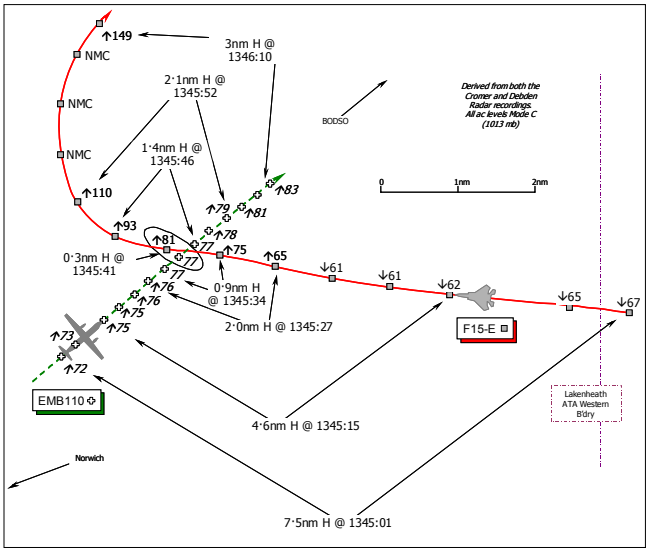
Cause: Effectively a non-sighting by the Grob pilot and a very late sighting by the Puma crew.

Degree of Risk: A.

AIRPROX REPORT No 034/06

AIRPROX REPORT NO 034/06

Date/Time:	23 Mar 1345	
Position:	5251N 00141E (18nm NE Norwich)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	EMB110	F-15E
Operator:	Civ Comm	Foreign Mil
Alt/FL:	FL80↑ (SAS)	FL65 (SAS)
Weather	VMC NIL	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:	<300ft V/150m H	500ft V/0·5nm H
Recorded Separation:	<200ft V @ 0·9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER 110 BANDEIRANTE PILOT reports that he had departed under IFR from Norwich bound for Esbjerg in his white coloured ac and the HISLs were on. He was in receipt of a RIS from Norwich APPROACH on 119·35MHz and squawking the assigned code of A3701 with Mode C, but TCAS is not fitted.

After departure from Norwich he was cleared to climb to FL90 towards BODSO – his CAS joining point. Heading 050° at 140kt, he thought some 10nm SW of BODSO [but actually some 20nm SW of BODSO] climbing through FL80, a grey fighter jet came "head to head" and crossed from R – L 150m ahead with a *"high"* risk of a collision. After passing them with less than 300ft vertical separation it climbed to a very high level - FL140 or higher he specified. ATC was informed about the encounter on RT and he continued the flight.

THE F-15E PILOT reports that his two-seat ac has a grey AD camouflage scheme and they were flying as the "bandit" during an Air Combat Manoeuvres (ACM) sortie involving another 3 F-15E ac. They were operating in CAVOK, VMC under VFR, whilst in receipt of a RIS from London MILITARY and squawking the assigned code with Mode C.

Extending away from the fight at a position some 25nm NE of Norwich, heading 300° at 350kt, they got a short-range radar lock on traffic 6nm away co-altitude – the EMB110. He immediately initiated a hard climbing turn to avoid the other ac and then conducted a belly check to visually acquire the ac, which they did just prior to the merge. The minimum separation was estimated to be 500ft vertically and at least 0·5nm horizontally with a "medium risk of a collision". As they continued to climb away they queried London MILITARY to see if they were working any traffic within the Lakenheath Aerial Tactics Area (ATA) or their immediate vicinity. The controller then "pointed-out" [issued traffic information] about the same EMB110 ac they had spotted after their query and they reported that they were visual with it.

He added that while he was curious that London MILITARY did not pass traffic information under the RIS earlier, neither he nor his navigator felt that they "came too close for conflict" and the controller did not indicate any concern expressed by the pilot of the other ac at the time. They "pointed-out" the EMB110 to the rest of the formation that he was operating with so it would not be a factor and continued with their sortie.

THE NORWICH APPROACH RADAR CONTROLLER (APR) [situated at Coltishall] reports that the EMB110 was routeing from Norwich to BODSO climbing to FL90 under a RIS. Another flight – an FK50 - was under a RAS also routeing via BODSO to Amsterdam climbing to FL190. A number of flights were also receiving a FIS; he assessed his workload as moderate.

A number of high-energy manoeuvres were taking place in the Lakenheath ATA with about 6-8 tracks identifiable under the control of LATCC (Mil) – he believed Console 15. One of the tracks broke away to the W moving extremely fast and whilst he was giving avoiding action to the FK50 the EMB110 pilot reported the same fast jet passing within 500ft. Further traffic information was passed as the track reversed course to pass ahead of the EMB110.

In the area of the high-energy traffic the picture was degraded with some clutter from the manoeuvring traffic which he thought, erroneously, was dropping CHAFF.

ATSI reports that the Norwich APR had been in position for 45min prior to the Airprox, describing his workload as moderate. The outbound EMB110 pilot established communication with Norwich APPROACH at 1339, reporting climbing to 2000ft. The flight was identified and after being asked what form of ATS he required the pilot requested a RIS. This was confirmed and after passing clear of known traffic, the flight was instructed to climb to FL90. The pilot read back the cleared level and reported enroute to BODSO [about 40nm NE of Norwich Airport]. Traffic information was passed about VFR ac [but not the F-15E] operating ahead and this information was updated about 90sec later. No further transmissions were made to, or from, the EMB110 until after the Airprox occurred [at 1345:41]. The APR confirmed he was aware of a number of military ac operating some 30nm NE of the airport, close to the Lakenheath ATA. He intended informing the pilot of the EMB110 of their presence as the ac approached the vicinity.

Meanwhile, at 1342, another flight had made its initial call on the frequency after departure from Norwich. The ac was identified and, in accordance with usual local procedures for this other flight, was provided with a RAS. It was instructed to turn L heading 360° and climb to FL190, its joining level for CAS at BODSO. Subsequently, at 1344, the flight was passed its airways joining clearance at BODSO. Shortly afterwards at 1345:12, the APR Controller instructed the other flight to make an avoiding action L turn onto a heading of 310° and issued information about traffic at 10nm NE on a westerly heading, at *"a similar level"* [the subject F-15E]. The radar photograph shows that, at the time, this other flight – the FK50 - was 16nm WSW of the F-15E, 200ft above it whilst the subject EMB110 was 5·5nm W of and 1000ft above the F-15E which had just crossed the western edge of the Lakenheath ATA. After the pilot of the other flight responded to the avoiding action message, no further transmissions were made on the frequency until the pilot of the EMB110 reported, at 1345:40, *"and Norwich we had just had a fighter about er less than 500 feet overhead us"*. The controller commented that the manoeuvring traffic was *"just around about Flight Level 80 as he went through"*.

[UKAB Note (2): The Debden Radar recording shows, at 1345:27, the subject F-15E at FL65, 1100ft below the climbing EMB110, when they were 2nm apart. On the next sweep at 1345:34, when the distance had reduced to 0·9nm, the subject F-15E was climbing through FL75, some 200ft below the EMB110 at FL77. The next sweep, timed at 1345:41, shows that the ac have passed and are now 0·3nm apart, the subject F-15E at FL81 and the EMB110 at FL77 suggesting that, by interpolation, the F-15E was in the order of FL78 as it crossed ahead of the EMB110 at FL77].

Traffic information was, subsequently, passed as the unknown ac operated in the area, climbing above the EMB110.

The APR explained that as soon as he was aware that one of the military ac had left the rest of the "pack" westbound, he decided, in accordance with recognised procedures, to prioritise his workload by issuing avoiding action instructions to the flight for which he was providing a RAS, especially as there was an apparent 1000ft vertical separation between the military ac and the EMB110. Subsequently, he did not have sufficient time to pass traffic information to the EMB110 crew before the Airprox occurred. At the time that the avoiding action turn was passed to the other flight, the subject F-15E was approximately 12nm away from the rest of the group of military ac flying at about 570kt.

The APR commented that he was aware of some apparent radar jamming affecting his primary radar returns in the military exercise area although this did not affect the SSR display.

The MATS Part 1, Section 1, Chapter 5, defines radar services RIS is defined as:

'A Radar Information Service (RIS) is 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.'

The MATS Part 1, Section 1, Chapter 5, Page 4, allows controllers to limit a radar service outside CAS. It states:

'In particular the service should be limited when:...the aircraft is operating in an area of high traffic density'.

The APR agreed that, in the circumstances, it would have been beneficial to warn the EMB110 crew, in advance, of the number of military ac operating randomly to his NE and possibly limit the RIS being provided.

On realising the presence of the subject F-15E, which was potentially conflicting with 2 ac to which he was providing a radar service, the Norwich APR decided to prioritise his workload by issuing an avoiding action turn to the other flight that was under a RAS – not the EMB110. Under the terms of a RAS, he had to seek to achieve separation of 5nm or 3000ft from the unknown ac. It is open to debate whether he would have had time to issue traffic information to the EMB110 crew first, before issuing avoiding action to the other flight. However, the subject F-15E was operating at high speed and early action needed to be issued to the other flight, due to the differing performances of the two ac. In the circumstances, it is considered that it would have been prudent to have at least warned the EMB110's pilot, earlier in his flight, of the presence of a number of military ac which were operating in the vicinity of his routeing and possibly have limited the radar service accordingly. This information might have allowed the pilot an earlier sighting of the F-15E.

MIL ATC OPS reports that LATCC (Mil) Controller 15 (CON 15) was providing a RIS to a formation of 4 F-15Es in the Lakenheath ATA in the block FL50 to FL240. Norwich APR called CON 15 requesting co-ordination and at 1345:34, Norwich asked to *"co-ordinate-155, north east of Coltishall 15 tracking west*". [UKAB Note (3): This landline co-ordination conversation was not brought to the attention of ATSI by the APR, hence the absence of any reference to it within the ATSI report.] This was the subject F-15E, tracking W, which had broken away from the other 3 ac of the group. CON 15 stated "*not below FL 50"*. APR replied initially *"okay my 33…"* but then asked for ratification that the [F-15E] track was manoeuvring and this was confirmed by CON 15. At 1345:50 [after the EMB110 & F15-E tracks had crossed] CON 15 passed traffic information to the crew of the F-15E, "…*traffic east 3 miles tracking north*" and then separately advised the APR "*FL80 and climbing*". Whereupon the APR terminated the landline call at 1345:54. CON 15 addressed further traffic information to the subject F-15E crew at 1346:03, "*Traffic, south east 4 miles, tracking north east, level FL80 and climbing".* After the lead crew replied to this transmission with "*visual*" the crew of the subject F-15E also reported *"..visual that traffic".* CON 15 advised the subject F-15E crew that they were clear of the traffic at 1348:00.

Analysis of the Cromer Radar recording shows 4 F15s carrying out high energy manoeuvres just north of the Lakenheath ATA. At 1344:11, the subject F-15E is seen breaking away and tracking NW indicating FL72 Mode C. The conflicting EMB110 - squawking A3701 - is 16½nm WSW of the subject F-15E and climbing through FL64. The F-15E steadies onto a westerly heading at 1344:26, indicating FL73, with the EMB110 L 10 o'clock - 14nm indicating FL66 climbing. Whereupon the F15E levels off at FL61 for 2 sweeps with the EMB110 indicating FL77 with 1600ft and 3·6nm lateral separation evident between the tracks. F-15E loses Mode C indication at 1345:32 with the EMB110 indicating FL77 1·7nm apart. The next sweep shows the EMB110 levelling at FL77 with F-15E in its R 2 o'clock – 0·8nm but still showing NMC. The subject F-15E, NMC, passes through the EMB110's 12 o'clock at 1345:41, with 0·2nm horizontal separation. As the ac are diverging the F-15E's Mode C appears on the next sweep indicating a climb to FL89. [UKAB Note: See ATSI analysis for Debden Mode C data.]

JSP 552 235.115.1 states:

"RIS is an air traffic service in which the controller will inform the pilot of the bearing, distance and, if known, the level of the conflicting traffic".

CON 15 was providing a RIS to the F-15E crew and did not pass traffic information pertaining to the EMB110 until after the Airprox had occurred. Although the pilot is responsible for separation against other traffic regardless of whether or not it had been called by ATC, CON 15 was not overly busy nor distracted by other tasks and should have passed traffic information pertaining to the EMB110 to improve the situational awareness of the crew of the F-15E.

HQ 3AF comments that it was fortunate that the F-15E crew acquired the EMB110 in sufficient time to take effective avoiding action. Despite both flights being in receipt of a RIS, it seems that neither was best served by their respective controllers.

As a point of note, none of the 4 F-15 aircraft involved in ACM at the time in question discharged CHAFF.

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 report that the Norwich APR had initiated co-ordination with LATCC (Mil) CON15 just before the Airprox occurred, his intent being to co-ordinate against his other traffic - the FK50 under a RAS - that was not involved in the Airprox. Whilst it was clear that this co-ordination was not germane to the cause of this close quarters encounter in Class G airspace, it did concern both of the controllers involved and one of the subject ac, the F15-E. Also, the landline conversation was taking place at the time the Airprox was occurring so at least the APR was aware of what the subject F15-E was doing just before the two contacts merged. Some Members thought that this co-ordination dialogue might have focused both of the controllers' attention at this spot in the FIR which might then have prompted them to pass traffic information to their respective flights under the RIS that pertained. As it was the APR had prioritised his workload and was concentrating on his other traffic at the time, which was in receipt of a RAS and was some distance to the west of the EMB110 but still in direct line. However, civilian and military controller Members alike thought there was little reason not to call traffic information to the EMB110 pilot under the APR's reportedly moderate workload at the time. If the APR had detected the presence of the F15-E and realised there was a confliction with the FK50 in time to call LATCC (Mil), he should have spotted the potential for a confliction also with the EMB110 at the same time and passed traffic information accordingly. Similarly, LATCC (Mil) CON 15 should have spotted the EMB110 in the course of her normal scan of the display and the confliction with the F15-E should have been readily apparent to the controller. Controller Members familiar with operating in this vicinity were keenly aware that the maintenance of a good scan was essential in order to detect such conflictions early enough to be able to pass a warning in sufficient time for the crews to make use of the information and there seemed little reason not to have done so here. Notwithstanding the terms of a RIS and the caveat which stipulates that "..*The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information"*, neither pilot here received any assistance from ATC to forewarn them of the conflict. Members agreed that there was scope for both controllers to pass relevant traffic information to the respective ac under their control before they flew into close proximity. Therefore, in the Board's view, the lack of traffic information to both flights was a contributory factor to the cause of the Airprox.

As it was the F15-E crew – operating VFR in the 'Open FIR' outside the ATA – acquired the EMB110 on their AI radar and spotted it in time to manoeuvre away – but not by much. A pilot Member, experienced in flying fast-jets in a variety of rôles, opined that when flying at high speed and having occasion to leave the promulgated ATA then there is an implicit responsibility on FJ pilots to ensure that their ac are flown with due regard for other airspace users. Here the EMB110 pilot was denied the invaluable assistance of TCAS and although theoretically required to give way under the 'Rules of the Air' had but little chance of doing so practically, having not detected the presence of the fast moving jet before it crossed ahead from R – L. Therefore the EMB110 pilot was probably unable to effect the outcome to any degree. Nevertheless, this Airprox had occurred in the 'see and avoid' environment of Class G airspace where pilots are solely responsible for their own separation from other traffic – even whilst operating IFR. The Board concluded, therefore, that although the reporting pilot had a reasonable expectation of being informed about other traffic in his vicinity, this Airprox had resulted from a conflict in Class G airspace.

To determine the minimum separation that applied here was not straightforward as the F15-E had crossed ahead of the EMB110 in between radar sweeps. The recorded radar data suggested that the separation reported by the pilots involved was not too wide of the mark but might have been slightly closer than they supposed. It was explained to the Board that the diagram (above) had been produced after comparing the recorded values from both the Debden and Cromer Radar data: this data showed that when the F-15E was climbing through FL75, some 200ft below the EMB110 at FL77, the range had reduced to 0·9nm and the F15-E was just about to climb above the airliner's level. The next sweep showed that the jet had passed through the 12 o'clock of the EMB110 and was

now 0·3nm away and 400ft above the EMB110 at FL77. Although the vertical separation was certainly less than 200ft within 0·9nm, by interpolation the data suggested that the F-15E was some 100ft above the EMB110 as it crossed ahead of the latter at FL77 without warning. Moreover, the EMB110 pilot had apparently not been able to take any action at all to forestall this encounter because he had not spotted the jet until it had crossed ahead. This, coupled with the separation at the time, convinced the overwhelming majority of the Members that the safety of the ac involved had indeed been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

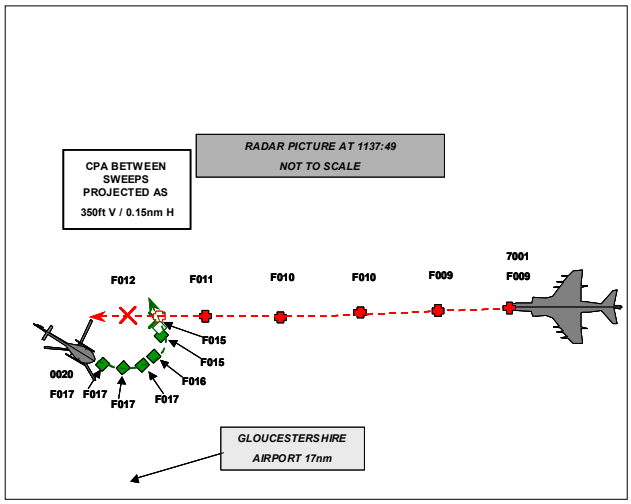
Cause: Conflict in Class G airspace.

Degree of Risk: B.

Contributory Factor: Lack of traffic information to both flights.

AIRPROX REPORT NO 036/06

Date/Time:	29 Mar 1138	
Position:	5200N 00146W (17nm NE Gloucestershire)	
Airspace:	Lon FIR/UKLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	EC135 T2	Harrier GR9
Operator:	Civ Comm	HQ STC
Alt/FL:	500ft (Rad Alt) (RPS 1002 mb)	250ft (Rad Alt) (RPS N/K mb)
Weather	VMC Showers	VMC Rain
Visibility:	>20km (reduced in showers)	40km
Reported Separation:	~200ft V/0m H	750ft V/0.25nm H
Recorded Separation:	350ft V/0.15nm H (both projected)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC135 PILOT reports that he was flying a Helimed flight which is operated on behalf of the County Air Ambulance charity and was carrying one pilot and two paramedics. TCAS is not fitted but he was squawking 0020 with Mode C.

They took off from Strensham at 1117 having been tasked with providing medical assistance to an injured member of the public near the village of Blockley and had flown outbound at 2000ft on the Cotswold RPS of 1002mb. They were in receipt of a FIS from Gloster APR until 1min from their landing site and had informed ATC they were landing. A further 5min was spent at 2000ft locating the exact site of the incident.

Once the casualty was located and a suitable landing site was found, the pre-landing checks were performed and an approach was planned into wind, heading about 240°. While turning L onto their final approach track and descending through ~500ft Rad Alt (at 1137), the front-seat crew member noticed a Harrier flying away from them in their 10 o'clock position having just flown directly beneath them. The vertical separation was estimated to be about 200ft and the altitude of the Harrier suggested the pilot had initiated avoiding action. A careful lookout was made to the N prior to continuing the approach to land in case the ac was part of a pair.

No report was made of the Airprox to ATC as their height at the time put them out of contact with Gloster APR. They continued with their tasking and returned to Strensham at 1229.

The flight visibility was very good, although reduced in showers. Cloud was estimated to be BKN 2500ft. Their ac was not in a shower at the time of the Airprox. He assessed the risk of collision as being high.

THE HARRIER GR9 PILOT reports flying a grey ac on a low level singleton tactical sortie squawking 7001 with Mode C. During a westerly leg of the flight he first saw a helicopter in his L 10 o'clock at about 3nm, heading about 360° and it appeared level. At that point there was no risk of collision. He was flying at 250ft Rad Alt and at that point thought that he was 750–1000ft lower than the helicopter. At 1.5nm to go he started to waggle his wings to show that he had seen them and he was then in the helicopter's right 2 o'clock passing from its right to left low. He passed 0.25nm across their nose waggling his wings 750ft below and continued on route. He assessed the risk of collision as being low.

UKAB Note (1): The incident was seen on the recording of the Clee Hill radar. The CPA occurs between sweeps, both the previous and the subsequent show both ac with Mode C. The degree of confidence in the projected separations above is therefore high.

HQ STC comments that it would appear that the Harrier pilot saw the helicopter in sufficient time to judge that there was no risk. However, the EC135 pilot may have been concerned as he had not seen the Harrier before it overtook him as he had been concentrating on his approach.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, and a report from the Harrier operating authorities.

This was one of a number of incidents in Class G airspace involving a helicopter preparing to land or engaged on ground surveillance, and another ac, with neither being TCAS equipped.

When approaching a site to land, a helicopter pilot is in a very high workload situation. The pilot will be concentrating more or less totally on locating an appropriate area; pin-pointing any obstructions which may affect his choice of flightpath; checking for people or vehicles on the surface as well as closely monitoring his height, speed and ac performance. Observers are therefore the prime means of locating other ac and warning the pilot of any hazard. In this case the helicopter was turning on a left hand approach and the observer was in the front left hand seat, on the inside of the turn. The Harrier was approaching the helicopter from the right. A combination of these factors would have meant that the Harrier would not have been visible to the observer for over 20 sec leading up to the incident and outside 20 sec would have been nearly 3nm distant.

The Harrier pilot did however see the EC135 at a reported 3nm, just as it was becoming obscured to the helicopter observer, a recorded 800ft above the Harrier's flightpath. He would not have been aware nor expecting the helicopter to be descending to land and possibly not conscious that he was then in slightly rising terrain. (The Harrier was approaching slightly rising ground which probably explained his increasing level on the radar recording as he maintained his height above the ground). At this point the helicopter then commenced a slow descent on its approach to land. Bearing this in mind, specialist military pilot Members were surprised that the Harrier pilot did not opt to take lateral separation behind the helicopter (assuming that he could determine the direction of its flight). However, having seen the helicopter at 3nm and avoided it vertically, Members considered that there had not been any collision risk.

PART C: ASSESSMENT OF CAUSE AND RISK

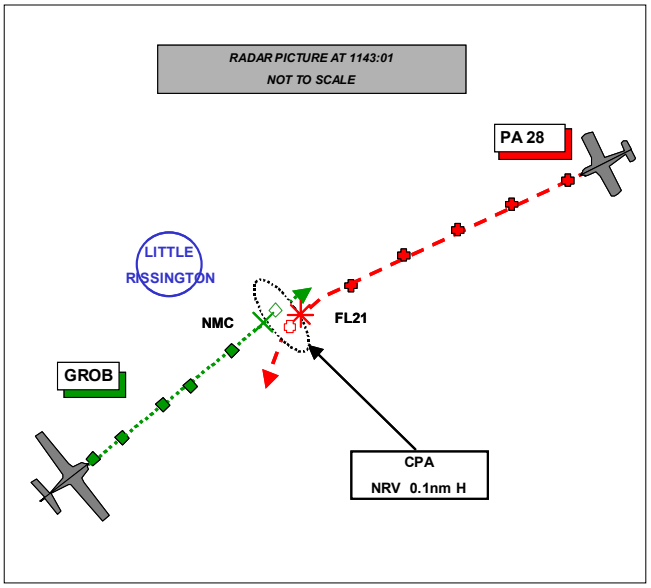
Cause: Despite an early sighting, the Harrier pilot flew into conflict with the EC135.

Degree of Risk: C.

Contributory Factors: While positioning his ac to land, the EC135 pilot did not see the Harrier.

AIRPROX REPORT NO 037/06

Date/Time:	25 Mar 1145 (Saturday)	
Position:	5151N 00139W (1nm ESE Little Rissington - elev 830ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Vigilant Glider	PA28
Operator:	HQ PTC	Civ Pte
Alt/FL:	1500ft (QFE)	1500ft (QNH N/K mb)
Weather	VMC CLBC	VMC N/K
Visibility:	>10km	N/K
Reported Separation:	50ft V/200m H	200ft V/500m H
Recorded Separation:	NR V/0.1nm H (185m)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT GLIDER PILOT reports that he was flying a standard instructional sortie with a student in a red and white motor glider with strobes and landing lights switched on, listening out on the Little Rissington radio frequency. He was teaching pitch control and he handed control to the student to practise. Having pitched the ac to about 15 degrees nose-up, the student was pitching down to the datum altitude when he spotted another ac as it appeared above the instrument panel about ¼nm away. The other ac was a blue and white Piper type with all lights switched on. At the time they were heading 050° at 60kt and 1500ft agl.

By the time he saw the other ac it appeared to have already started to take avoiding action consisting of a slightly ascending left turn. It passed to his right about 200m off the right wing and about 50ft below them. He took no action as he considered that the other ac's action was sufficient to prevent a collision and ensure that the risk was low.

He believed that he had carried out a good lookout throughout the sortie, but the conditions were poor(ish) with a very grey sky and no well-defined horizon. He thought that they might have been heading straight towards each other at a similar altitude and therefore there had been no relative movement.

THE PA28 PILOT reports flying a green, gold and white ac on a VFR flight listening out on Brize Radar. At the time he was heading 260° at 120kt and 1500ft on the QNH about 2nm SE of the Little Rissington Glider site. He was flying outside Little Rissington airspace (sic), about to turn onto the final leg of the return journey to Oaksey Park with his beacon, strobes and landing light illuminated when he saw an approaching motor glider just below the cloudbase. He commenced an avoiding action descending turn to the left since the other ac was higher and to his right. In his opinion it was not an Airprox as appropriate action was taken by both pilots.

UKAB Note (1): Both ac can be clearly seen on the recording of the Clee Hill radar. The Vigilant is heading NE with no Mode C readout and the PA28 is heading SW with a level of FL22 reducing to FL21 as the ac pass. The CPA occurs between sweeps but by projection of the ac tracks it is assessed that they pass about 0.1nm apart with the PA28 the S of the 2 ac. The left turn made by the PA 28 can be seen on the recording but the separation increase is not evident until the ac pass.

UKAB Note (2): The Brize Norton (10nm SE of the incident position) METAR was:

1150Z 25/03/06 EGVN 251150Z 21010KT 9999 FEW012 BKN022 12/08 Q1001 WHT BECMG SCT012 GRN=

HQ PTC comments that although these aircraft flew close to each other in Class G airspace, each saw the other in time for one to take appropriate avoiding action and the other to consider that no risk of collision existed. Good lookout is always important, perhaps even more so when ambient light and cloud conditions make light coloured aircraft difficult to spot.

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 Grob operating authority.

The Board thought that even though the Grob pilot had been engaged on a relatively low-pressure instructional task, his lookout might have been degraded as he concentrated on instructing his pupil. The PA28 pilot however, had seen the Grob head-on in good time to avoid it and ensure that there was no compromise of the safety of both ac.

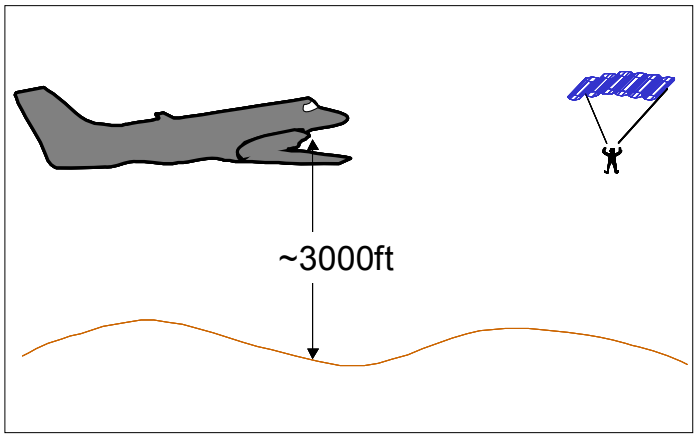
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the PA28 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 038/06

Date/Time:	5 Apr 1506	
Position:	5104N 00116W (6nm NNE Southampton)	
Airspace:	Solent CTA	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	Jetstream 41	Paraglider
Operator:	CAT	Civ Pte
Alt/FL:	3000ft (QNH)	4200ft (QNH)
Weather	VMC NR	VMC CLBC
Visibility:	20-30km	40km
Reported Separation:	0 V/100m H	1000ft V/1nm H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports flying a scheduled passenger flight from Southampton to Leeds Bradford. A few minutes after take off from Southampton RW02 they were heading 360° at 200kt and having just levelled at 3000ft they saw a powered [he thought] parachute just left of 12 o'clock and level with them, moving L to R in their field of vision. By the time they had determined its movement in relation to themselves, it was too late to take avoiding action and it passed down their right side at their level.

THE PARAGLIDER PILOT reports flying a VFR flight from Newbury to the Isle of Wight. While N of Southampton he saw a red passenger propeller ac on the RW at Eastleigh, get airborne and climb towards him. At its closest it was a mile behind him heading N and it attained his altitude when it was on a bearing of about 300° from his position and going away.

He became concerned that he may be out of position and immediately descended to land. His heading had been 082° at 4200ft and he was trying to stay to the N of the Solent CTA.

UKAB Note (1): The position and height of the Airprox given in the paraglider pilot's report was 4nm inside the lateral boundary of the Solent CTA and 2200ft above its base altitude.

ATSI reports that the JS41 took off from RW02 at Southampton, climbing to 3000ft. As part of their departure clearance, the crew had been instructed to turn L heading 360º on completion of the noise abatement procedure. They established contact with the Solent APR at 1504:55 and reported passing 1400ft which the APR acknowledged. Shortly afterwards the APR instructed the crew to climb to FL50 but there was no response. The APR repeated the instruction and this time the crew acknowledged. They then stated "*About four and a half to five miles just after we took off - four and a half to five DME just passing about two thousand feet - we passed a powered parachute going the other way and about a quarter of a mile I suppose*". The APR acknowledged this and enquired whether the parachute was manned which the crew confirmed it was. There was no contact from this ac displayed on the APR's radar nor did he have any knowledge of such activity taking place. Subsequently, the JS41 crew advised that they would be filing an Airprox. The reported position of the Airprox was within the Solent CTA.

BHPA comments that the lack of any engine or propeller, as this was a paraglider and not a powered paraglider as reported by the JS41 crew, indicates that the separation was probably much greater than the 100m reported by the JS41 crew: the radio report of ¼nm is probably closer to the actual distance. However that does not change the fact that this incident took place well inside airspace that the paraglider pilot did not have a clearance to enter. This pilot's poor navigation in the vicinity of CAS that he knew he could not enter, over an area known to him,

possibly compounded by poor flight planning is to be regretted. The elimination of this flight from the National League will act as a wake-up call to other cross-country pilots. In addition the BHPA will be using this incident as an education tool in its monthly Skywings magazine.

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.

Although the precise geometry of this incident was not resolved due to differences in the reported altitude and miss-distances, the cause was quite clear to the Board namely the paraglider's unauthorised penetration of CAS. Due to the discrepancies between the two pilots' reports and in the absence of any radar information, the degree of risk was much more difficult to determine with any degree of confidence. After much debate however, the Board considered that the situation had not been entirely safe due to the lack of any effective avoidance by either ac.

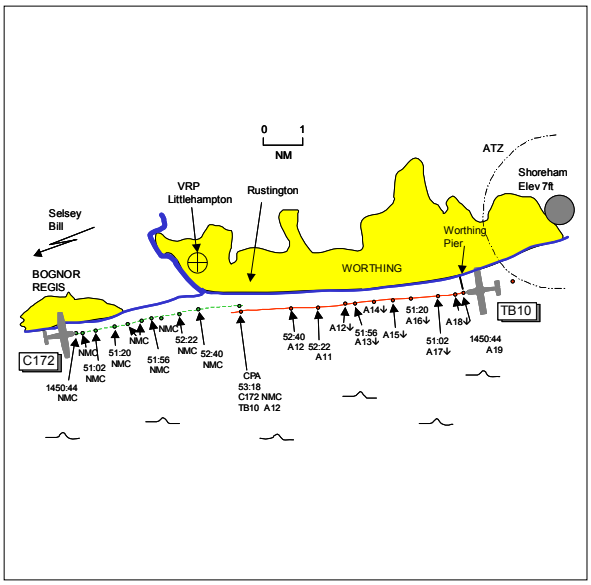
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The paraglider entered the Solent CTA without clearance.

Degree of Risk: B.

AIRPROX REPORT NO 039/06

Date/Time:	4 Apr 1453	
Position:	5047N 00031W (2nm SE Littlehampton)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C172	TB10
Operator:	Civ Club	Civ Pte
Alt/FL:	1100ft (QNH 1019mb)	1100ft (QNH 1019mb)
Weather	VMC CLBC	VMC CLOC
Visibility:	>20nm	10nm
Reported Separation:	Nil V/40-50m H	20ft V/200m H
Recorded Separation:	0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C172 PILOT reports inbound to Shoreham VFR and in receipt of an Aerodrome Control service and AFISO from Shoreham on 123·15MHz squawking 7000 with Mode C switched off. The visibility was >20nm 1000ft below scattered cloud in VMC and the ac was coloured white with red stripes; anti-collision and strobes were switched on. Flying S of the coast heading 100° at 125kt, he had descended to 1600ft QNH 1019mb from 2000ft owing to turbulence near the cloudbase. He called Shoreham early between Selsey and Bognor and was told to expect no delay and possibly a L base join at Worthing Pier. Also he was told to use full c/s owing to another ac on frequency with a similar c/s. He was told to look out for opposite direction ac, which he presumed would be flying N of the coast, and he was offered descent VFR to 1100ft. After reporting level he was asked to report visual with the opposite direction ac at 1600ft which was somewhere between his position and Worthing Pier. The pilot of the ac with a similar c/s reported '3 miles to Worthing', he thought. Just after that, he saw a low-wing white/blue coloured single engined ac just R of his 12 o'clock 1-2nm away (¾ front profile) flying head-on and descending. Any avoidance turn to the R made by either pilot would have resulted in a collision so he turned slightly L to raise his starboard wing to keep visual contact with the other ac which then passed 40-50m down his RHS at the same level 1100ft. He assessed the risk as 90%. ATC had excelled in their coordination of his and the other ac on opposite direction tracks but it seemed that the other pilot did not comply with the given advice, instructions and level restriction.

THE TB10 PILOT reports outbound from Shoreham VFR and in receipt of a FIS from Shoreham on 123·15MHz squawking 7000 with Mode C. The visibility was 10nm flying into sun in VMC and the ac was coloured white/blue with anti-collision beacon switched on. He agreed with ATC to depart initially to the E over Brighton and then to track W'bound along the coast towards the Isle of Wight. He ensured that this was understood by ATC as the track would take the flight just S of the ATZ and could conflict with ac on final for RW02. As he routed W'bound he was requested to stay above 1600ft to avoid traffic and to report at Worthing Pier; by now he was just S abeam of Shoreham and actively looking out, with help from his passengers, for ac in the cct. Also, he heard an initial call on frequency from another pilot whose ac had a similar c/s which led ATC to tell him to use his full c/s and that the expected crossing point was Worthing Pier and to report visual with the traffic and passing the pier. The next call to him from ATC appeared to be instructions that should have been addressed to the pilot of the other ac with similar c/s (the C172) – he pointed this out to ATC and the call was corrected. Passing Worthing Pier he had not seen the other ac but he could hear ATC telling the pilot of the C172 to stay at 1100ft on 1019mb. He then reported his position at the Pier and that he was not in contact with the C172. He selected Goodwood ATC frequency on Box 2 as he was expecting to change to their frequency in the near future to obtain a FIS. The conflicting traffic was still not seen but he was sure that they had passed as he was now past the expected crossing point given by ATC. He continued towards Selsey and gradually descended as he was intending to fly under the Solent CTA just N of the I-O-W at about 1100ft and wanted to be level prior to contacting Goodwood. He could still hear RT calls

between the C172 pilot and ATC and he continued his slow descent for several minutes. At about 1455, when at GWC110R/13nm, (approximately halfway between Littlehampton VRP and Worthing Pier), heading 250° at 120kt he noticed a high wing ac 1nm ahead slightly R of his track and just below. Realising immediately that this must be the C172, which he thought was behind him, he reported 'visual with the traffic' to Shoreham as he was approaching the 1100ft altitude that the C172 pilot had been asked to maintain and he wanted to ensure that everyone knew that he had seen the ac and that there was no impending collision and no avoiding action was necessary. ATC then asked him to report passing the traffic, which he did a few seconds later, and he was then transferred immediately to Goodwood. The C172 passed about 20ft below and 200m to his R and he assessed the risk as medium. He opined that, with hindsight, firstly it would have been easier to reverse the legs of his flight to follow the 'fly right rule' rather than flying further out to sea in an attempt to avoid oncoming traffic. Secondly, his understanding that the crossing point with the C172 would be Worthing Pier and then basing his later decisions on this information. Thirdly, he descended under a FIS without informing ATC because he was expecting imminent transfer from Shoreham to Goodwood and believed that the conflicting traffic had passed and an RT call to the effect would tie-up an already busy frequency for no reason.

THE SHOREHAM ADC/APP reports that both ac had similar registrations so their respective pilots were instructed to 'use full callsign, similar callsign on frequency'. It was an ongoing traffic situation with RW02 in use LH cct with both Tower and Approach operating as a combined service on frequency 123·15MHz. The TB10 had departed Shoreham for Compton Abbas but initially set course to the E low-level before returning W'bound at an agreed crossing level passing S of the ATZ. The TB10 pilot was in receipt of TI then an ATZ crossing clearance and subsequently TI. The C172 was inbound from Bembridge receiving a FIS and joining instructions. Both flights were fully VFR in the FIR and full TI with updates were passed to both pilots. The TB10 had turned at Brighton at 1445 to route W'bound and, owing to cct traffic at 1100ft, was cleared to cross through the southern edge of the ATZ not below 1600ft to effect 500ft minimum VFR separation. The flight crossed S abeam at 1448, its pilot reporting at 1700ft. The C172 pilot called inbound at Selsey Bill 1600ft requesting FIS and joining instructions and was cleared to join L base RW02 and asked to report at Worthing Pier. When the TB10 pilot called S abeam it was obvious that with both ac at about the same level (1600/1700ft) they would conflict at a point W of Worthing. Therefore, although not ideal in respect of his cct traffic, he descended the C172 to 1100ft to join L base at that level and instructing him to leave 1600ft 'now' (approx 1449). TI was passed on the opposing traffic (the TB10) at 1600ft with his estimate of the crossing point, and the pilot was asked to report when visual with the TB10. The TB10 pilot was likewise given TI on the C172 and was asked to report visual contact and was told to maintain 1600ft. At one point there was a confused transmission from the C172 pilot which gave the impression that he was at Worthing Pier but subsequent exchanges revealed this was not so. It is possible that the TB10 pilot was also confused by this transmission but he was never instructed to descend. Once he had confirmed both ac had crossed he was proposing to descend the TB10 as its pilot was looking for a lower level. Both acs' pilots reported visual contact at about 1451-1452 and it was at this point the C172 pilot reported that the TB10 was at the same level. He checked with the TB10 pilot who confirmed that he had descended but this had not been reported to him. About 1min later the TB10 changed frequency to Goodwood and the C172 landed at Shoreham at 1459.

ATSI comments that the Unit provided a comprehensive retrospective Controller's report which indicates that both ac were operating under VFR in Class G airspace, and were, at the time of the Airprox, in receipt of a combined ADC/APC service from Shoreham ATC.

The controller provided timely TI to both flights and, although outwith his terms of reference as a Controller operating in Class G airspace, additionally attempted to ensure safety by building in a measure of vertical separation. Both pilots should have been operating on 'the see and be seen' principle and the additional measure implemented by the controller would have provided a safe buffer had it been followed by both pilots. The RT transcript shows that the Controller, while showing a 'chatty' and sometimes non-standard format, complied with, and, in an attempt to provide an additional safety buffer, went beyond the basic service he should have provided. It also substantiates the statements in his report.

The C172, inbound to Shoreham, was, during the process, given the Shoreham QNH. The TB10 pilot reports using a QNH of 1019mb in his report. Effectively both ac were on the same pressure setting. From the RT transcript between time 1445 and 1445:30 (the recording only has 30sec time marks), the TB10 pilot agreed to a restriction of not below 1600ft. The actual transmission was *"Affirm No problem sixteen hundred"*. ATSI have not analysed the radar recordings but it is apparent that at some point the TB10 pilot did not comply with the agreed level restriction of 1600ft.

Not withstanding the above, adequate TI was passed appropriately by the Controller. No ATC errors disclosed.

UKAB Note (1): The Shoreham RT transcript just after 1447:30 reveals the TB10 pilot calling *"TB10 abbreviated c/s is at the power station at seventeen hundred feet for heading t- towards Worthing Pier looking for traffic TB10 abbreviated c/s"*. The ADC/APP replies to the TB10 with *"Er TB10 full c/s thankyou use full callsign for the moment and er report passing the Worthing Pier opposite direction er traffic same callsign as yourself or similar and er will be five hundred feet below you as you go pass the Pier"*. The pilot replies *"Affirm looking for Pier I'm just trying to confuse you between us TB10 full c/s"*. The C172 pilot reports level at 1100ft and *"...er we copied the possible confliction"*. The ADC/APP replies *"... he's at er seventeen hundred feet at the moment but going not below sixteen hundred probably pass you around Worthing or just to your side of Worthing"*. The TB10 pilot reports at Worthing Pier just before 1451:00 to which the ADC/APP replies *"C172 full c/s thankyou and er continue on left base you're number one now and report turning final but continue on that QNH one zero one nine for the moment"*. The TB10 pilot immediately responds *"that was TB10 full c/s not C172 abbreviated c/s"*. The ADC/APP transmits *"Oh correction"* followed by *"TB10 full c/s thankyou just give me a call if you see the opposite direction traffic then five to six hundred feet below you Cessna one seven two"*. The TB10 pilot transmits *"Affirm not visual with the traffic but currently Worthing Pier so I assume they've gone past"* to which the ADC/APP replies *"I think he has yeah"*. The C172 then calls *"C172 full c/s just approaching Littlehampton"* to which the ADC/APP replies *"That's fine okay give me call when you pass the other traffic sir it'll about midway about Rustington probably somewhere like that"*. The C172 acknowledges with *"Yep"*.

UKAB Note (2): The Pease Pottage radar recording at 1450:44 shows a 7000 squawk, believed to be the TB10, S abeam Worthing Pier tracking 265° G/S 130kt indicating 1900ft altitude (QNH1019) with another 7000 squawk, believed to be the C172, 3·6nm SW of Littlehampton tracking 080° G/S 100kt showing NMC. The next radar sweep shows the TB10 commencing a slow descent until levelling at 1100ft altitude at 1452:22 when the C172 is 3·6nm ahead. The subject ac continue on steady tracks until passing starboard to starboard at the CPA, 2nm SE of Littlehampton VRP at 1453:18, separated by 0·1nm with the TB10 showing altitude 1200ft and the C172 showing NMC.

UKAB Note (3): The ANO Section 2 The Rules of the Air Regulations 1996 Rule 19 Right-hand traffic rule states: - *1) Subject to paragraph (2), an aircraft which is flying within the United Kingdom in sight of the ground and following a road, railway, canal or coastline, or any other line of landmarks, shall keep such line of landmarks on its left. 2) Paragraph (1) shall not apply to an aircraft flying within controlled airspace in accordance with instructions given by the appropriate air traffic control unit.*

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

In the absence of any further information, Board Members were disappointed to note that the C172 pilot had his transponder Mode C selected off, contrary to the recommended procedures promulgated in the AIP. This altitude reporting element provides controllers at radar equipped ATSUs with additional information on displayed traffic thereby assisting them in their provision of an ATS. Moreover, the important flight safety nets of STCA and TCAS are either inhibited or have reduced functionality when Mode C is not carried or not switched on.

Turning to the Airprox per se, GA Members agreed that this was a complex incident for what was basically a conflict within Class G airspace. The Shoreham ADC/APP had exceeded his responsibilities with respect to the airspace and, commendably, had endeavoured to build in 500ft separation between the subject ac whereas TI to both crews would have discharged his formal responsibilities. However, although the ADC/APP was talking to both flights, he had alluded to a different crossing position with each pilot. He had told the TB10 pilot that the crossing point would be Worthing Pier whereas he had informed the C172 pilot that it would be near to Worthing or just to the W. The TB10 pilot had then 'fixed' Worthing Pier in his mindset and he then carried on thinking ahead of his flight's requirements with apparently reduced situational awareness. After reporting at the Pier, the TB10 pilot was asked to report when visual with the C172 which would be 500-600ft below. He had reported being not visual with the C172 but had again stated his position at Worthing Pier and that he was assuming the other ac had passed. This assumption was not challenged by the ADC/APP who replied *"I think he has"* which would have further reinforced the TB10 pilot's mindset. However, the ADC/APP had acknowledged the C172 pilot's position report at Littlehampton with an updated crossing point as Rustington. This RT exchange between ATC and the

C172 flight (ie updated TI) apparently went unheard by the TB10 pilot and the revised estimate of the crossing point was not given to him directly by ATC. Members thought that the ATS provided by Shoreham ATC had raised both pilot's expectations, giving both a 'comfort zone' that ATC had sorted out any potential confliction, whereas ultimately the onus was on both pilots to 'see and avoid' all other traffic including ac which could have been flying in the area and whose pilots were not talking to ATC. Both crews had agreed to participate in a FIS after passing their details and both accepted the allocated separation so any change of these flight details should have been exchanged with ATC. A call from the TB10 pilot stating that he was descending would have alerted both ATC and the C172 pilot to the fluid situation. This was not done and, believing that he had passed the traffic and without announcing his intentions, the TB10 pilot descended into conflict with the C172 which had caused the Airprox.

Members were clear that the TB10 pilot should have complied with Rule 19, the Right-hand traffic rule whilst following the S coast W bound. In not doing so, he had not followed one of the basic airmanship Rules which is in place to reduce the chances of meeting other traffic head-on whilst pilots visually navigate either side of a prominent line feature. This had contributed to the Airprox.

Turning to risk, the C172 pilot was undoubtedly surprised to see the TB10 just to the R of his ac's nose as he was anticipating it to be to his L: on-shore, almost head-on and slightly above and descending. In the limited time available, about 15sec with a closure rate of 230kt and visual acquisition at 1nm, the C172 pilot quickly assessed that a L turn was required to increase separation whilst enabling him to maintain visual contact with the TB10 as it passed an estimated 40-50m to his R. Similarly, the TB10 pilot had seen the C172 just R of the ac's nose about 1nm ahead and below and had reported this sighting to ATC whilst he monitored its flight path, content that it would pass clear to his R, which it did, just below and by 200m without a need to take avoiding action. The radar recording had revealed 0·1nm (185m) separation at the CPA. Although this had been a close encounter, the Board believed that both pilots were in a position to manoeuvre their ac further, if necessary, to avoid collision and were able to conclude that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Believing that he had passed the conflicting traffic and without announcing his intentions, the TB10 pilot descended into conflict with the C172.

Degree of Risk: C.

Contributory Factor: The TB10 pilot did not comply with the Right-hand traffic rule (Rule 19 of the Rules of the Air Regulations).

AIRPROX REPORT NO 040/06

Date/Time:	3 Apr 1045	
Position:	5210N 00259W (10nm NW Hereford)	
Airspace:	UK DLFS LFA 4	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Untraced Heli
Operator:	HQ STC	N/K
Alt/FL:	580ft	NR
	(RPS 1009mb)	NR
Weather	VMC CAVOK	NR
Visibility:	10km	NR
Reported Separation:		
	100ft V/0m H	NR
Recorded Separation:		
	NR	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports flying as No 4 in a 4-ship tactical low-level formation in good weather but into sun in the UKDLFS. The formation was in offset-card formation and the lead pair (which had already turned E and climbed towards the Daventry Corridor) was about 8km SE of his position with the No 3 (his element lead) about 5km to his W. The rear pair was heading 180° at 438kt and 580ft [See Post Meeting Note (1)] and was just about to turn and pull out from LL to rejoin the front pair when the No2 crew called *"Light ac overhead pull-up point".* Three to four sec later, as No 4 was in a LH turn towards the pull-up point, a helicopter (probably an R22 or 44) passed immediately above the canopy with a miss-distance estimated at the time to be 50ft. The No 3 crew saw the helicopter immediately after the Airprox and assumed it was the light ac previously mentioned by the No 2 crew.

Subsequent analysis of HUD video suggested that the miss-distance may have been greater than originally estimated, in the order of 100ft, and he estimated the risk as being high.

UKAB Note (1): The reporting pilot and the recording of the HUD video suggested that the reported ac was an R22/44. The radar recording shows both ac before the incident but only the reported ac afterwards. The latter disappears well to the N of the incident position and not in the area of any known ac operating location. Despite extensive procedural tracing action, including contacting the owners/operators of all British-registered Robinson ac within 200nm of the incident position, the reported ac could not be traced.

THE TORNADO PILOT'S STATION comments that the sortie was planned, briefed and authorised correctly and in accordance with current regulations and that the sortie was conducted in the Class G airspace of the UKDLFS where the "see and avoid" principle applies.

The Airprox occurred during a period of relatively high workload for the Tornado pilot when he was concentrating on the turn which had been initiated by Tornado 3, the westerly aircraft. The pilot of Tornado 4 states that there had been no in-cockpit activity or external distractions at the time but that forward vision was impaired by flying into sun.

Analysis of the HUD video from Tornado 4 showed that the helicopter was evident for a total of about 8 seconds; prior to the time the pilot initiated the left turn it would probably not have been visible to the crew.

From the HUD video, the SFSO concurs the Tornado 4 pilot's assessment of 'High Risk'.

HQ STC comments that from the HUD video, the two ac would appear to have been on almost exactly reciprocal headings. This is a known difficult area to identify a confliction with the double problem of no relative movement

and rapid 'blossoming' of the other ac. Combined with the GR crew flying into sun this made the possibility of spotting the helicopter very difficult indeed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of a report from the Tornado pilot, a radar recording and a HUD video.

In the absence of a report from the helicopter pilot and the lack of necessary level and other information - at the time of the Airprox - on the recorded radar data, Members found it difficult to assess events with any degree of accuracy. Small helicopters - particularly Robinsons, if this was indeed the type involved in this Airprox - are notoriously difficult to see when they are encountered head on. In this instance the sighting difficulties would have been temporarily exacerbated by the Tornado's turn through an into-Sun heading. Members assumed that the helicopter pilot had most probably not seen the Tornado and therefore concluded that the cause of this Airprox was an effective non-sighting by the Tornado crew and presumed non-sighting by the helicopter pilot. As regards degree of risk, on the basis of the Tornado pilot's report and assessment of the HUD video, Members agreed that whilst there was no actual risk of a collision, safety had been compromised.

Notwithstanding the guidance referred to in Post Meeting (2) below, the STC Member pointed out that there were numerous occasions when military ac - fast jets, training ac and others - operate at 500ft or occasionally above. The AIC is guidance based on the likelihood of encountering military ac rather than a guarantee that they will always fly below 500ft. Military crews are however very aware of the band in which helicopters try to operate and will, where possible, avoid it.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sighting by the Tornado crew and presumed non-sighting by the helicopter pilot.

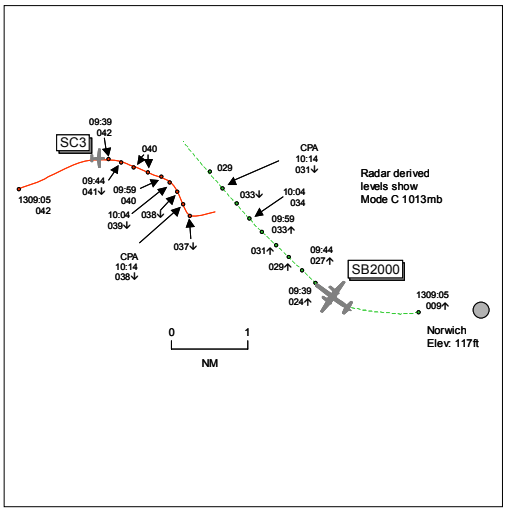
Degree of Risk :B.

Post Meeting Note (1): The Tornado's HUD Video was reviewed again. Whilst the Rad Alt cannot from time to time be discerned against a background of sunlight or clouds, in the 15secs before the Airprox the Tornado is at +/-420ft. As the Tornado passes under the helicopter, the height readout momentarily increases, remaining below 500ft, before decreasing again.

Post Meeting Note (2): Although not relevant to this Airprox, there was discussion at the Board regarding the normal operating heights of military fast jets and helicopters when conducting pipeline or powerline inspections. The Board's Low Flying Advisor noted that in practice, most military low flying takes place between 250ft and 600ft MSD, decreasing in intensity up to 1000ft MSD and reducing further in the 1000ft to 2000ft height band. Occasionally however, military aircraft perform high-energy manoeuvres between 250ft and 2000ft, during which rapid changes in height and speed and direction of the aircraft will occur. (AIC 93/2006 Para 3.1 refers). To reduce the risk of confliction with low flying military aircraft, civilian pilots conducting transit flights under Visual Flight Rules (VFR) during the working week are recommended to fly above 2000ft agl if possible. In particular, they should avoid operating in the 250ft to 1000ft height band. When departing from aerodromes in the FIR, pilots should endeavour to reach 1000ft as quickly as possible, and to delay descent below 1000ft for as long as possible when approaching such aerodromes. (AIC 93/2006 Para 4.2 refers). Aircraft engaged on pipeline inspection flights are recommended to operate in the height band 500ft to 700ft agl where they will be above, and skylined to, the majority of military low flying aircraft that operate below 500ft. However, since both pipline inspection and military aircraft can be expected to operate outside of these height bands pilots are not absolved from maintaining a good lookout and applying visual avoidance criteria. In particular, it should be noted that helicopters involved in pipeline inspections will continue, when required by the inspection, to descend to 300ft in accordance with their dispensation from the provisions of the Rules of the Air Regulations 1996, Rule 5(i)(e). (AIC 92/2006 Para 3.1 refers). The sentiments of this statement are also included in the Mil AIP Vol 3 Part 1 Sect 7 - PINS. In addition military crews are given the following direction: 'Therefore military FW aircraft are, wherever possible, to avoid LF in the 500 to 700ft agl height band.' Since it was not notified as such and could not be traced, the small ac most certainly had not been a helicopter engaged on pipeline or powerline inspection operations.

AIRPROX REPORT NO 041/06

Date/Time:	3 Apr 1310	
Position:	5242N 00111E (4nm WNW Norwich - elev 117ft)	
Airspace:	FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	SB2000	SC3 Bulldog
Operator:	CAT	Civ Pte
Alt/FL:	↑FL40	4000ft↓ (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	10km	>10km
Reported Separation:	100-200m V/600-800m H	2500ft V/2nm H
Recorded Separation:	700ft V/0·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SB2000 PILOT reports outbound from Norwich, IFR and in communication with Norwich Tower on 124·25MHz squawking an assigned code with Mode C. The incident occurred just before they were about to enter IMC, 500ft below cloud with visibility 10km. About 4nm WNW of Norwich heading 330° at 190kt climbing through FL040, he thought, a TCAS TA alert was received on traffic in their 11 o'clock range 2nm. An RA 'descend descend' was received immediately thereafter and the FO, PF, executed a descent promptly. Simultaneously with the TCAS alerts/warnings, Tower requested they change to the Approach frequency 119·35MHz. The other ac was sighted visually at range 1-1·5km, a Beagle Pup or Cirrus type (although looking into sun it was difficult to identify the type or colour) which appeared to be starting a R turn to avoid their ac. The other ac passed 600-800m down their LHS and about 100-200m above. They had not been informed by ATC of this traffic nor were they on the same frequency at the time. He assessed the risk of collision as high without avoiding action.

THE SC3 BULLDOG PILOT reports flying a local solo sortie from Norwich, VFR and in receipt of a FIS from Norwich Approach 119·35MHz and squawking 7000 with Mode C. He called for a rejoin at 4000ft, he thought, adjacent to Attlebridge (7nm W of Norwich). The weather was clear blue sky with puffy white scattered cumulus cloud, base 5500ft. He reduced power and was descending at 100kt and 500fpm in a clockwise spiral. After being told of an airliner (the SB2000) which was about to take-off, he was asked to route S and hold level. He watched the white coloured airliner depart, climb ahead and then turn R on course, climbing as it went; ATC told him of the ac's intended course. The SB2000 was well below his ac (2500ft) and well clear to his L (2nm). He heard the SB2000's pilot say that he was filing an Airprox and wondered who with. He had watched the SB2000's full take-off and climb-out and was never in any danger. The SB2000 crew had made no attempt to avoid his ac, he thought, nor had he taken avoiding action as none was necessary.

THE NORWICH APR reports that the SB2000 was released IFR on track NALAX climbing to FL050 against London Mil traffic to the NE operating above FL100 whilst the Bulldog was operating VFR on a local flight under a FIS. The Bulldog had been transferred to his frequency, 119·35MHz, on departure operating to the SW of Norwich before the SB2000 was released but, owing to a complex Tower traffic situation, was not airborne for a further 4-5min. At the time of the release the track to NALAX was clear of confliction except for the London Mil track. Traffic levels were moderate but there were 3 IFR flights either inbound or on release plus a number of VFR flights under a FIS as well as some GH formation traffic working London Mil in the vicinity, most of this activity being within 15nm of Norwich. The Bulldog pilot had, since his departure, worked his way around to the NW; this flight was not identified and had operated throughout, apart from its initial call, without speaking to him. The Bulldog pilot then called to rejoin downwind RH for RW27 and, from the ac's DF trace, he immediately realised that the ac was in the likely path of the departing SB2000. He passed TI on the SB2000 to the Bulldog pilot who reported visual with it although the SB2000 was barely airborne from RW27. The SB2000 was seen to climb to about 3000ft on Mode C and then descend again and he realised that a TCAS RA manoeuvre may have occurred prior to the

SB2000 flight calling on frequency. When the SB2000 crew called, he passed TI on the Bulldog and that the flight was VFR and had been visual with their ac. The SB2000 crew reported visual with the Bulldog and that they had taken TCAS RA avoidance. At this time the SB2000 was not under a radar service and avoiding action was not given, as by the time the SB2000 flight called the confliction had been resolved. The SB2000 flight was then identified and placed under a RAS. Only later did the crew report that they wished to file an Airprox.

THE NORWICH ADC reports he obtained IFR departure clearance for the SB2000 from the APR and transferred the flight at about 1309. The SB2000 pilot acknowledged the frequency change, stating that he had traffic on TCAS at a similar level. He used the ATM to inform the pilot that he appeared to be 200ft above the conflicting traffic but the SSR labels were coincident and he was unable to proffer any further information. The relative positions and tracks of both ac displayed on the ATM suggested that the SB2000's track was the best course to restore lateral separation. It later transpired that the conflicting traffic was VFR working the Norwich APR.

UKAB Note (1): Met Office archive data shows the Norwich METAR as EGSH 1250Z 28014KT 9999 SCT030 10/M01 Q1017 NOSIG= and EGSH 1320Z 27016KT 9999 SCT030 11/M01 Q1017 NOSIG=

ATSI reports that the Norwich APR had been in position for 1hr 40min. He described his workload as moderate at the time of the Airprox, adding that the traffic situation was complex with a number of IFR and VFR ac, as well as military flights, operating in the area. Norwich Airport is situated in Class G airspace.

The Bulldog flight established communication with Norwich Approach at 1240, having departed on a VFR local flight from RW27, squawking 7000. The pilot requested a FIS and this was agreed. He stated his intention of routeing to the W to manoeuvre at 4000ft. The APR replied *"...before you start manoeuvring I'd like you to move out of the climb-out either one way or the other south or north"*. The pilot reported departing to the L. Shortly afterwards, the pilot was given information about traffic turning back to the hold. He acknowledged the call but some 10min later, when additional TI was issued, no response was forthcoming. No further transmissions were made with this ac until the pilot requested to rejoin at 1309.At 1305:45, the ADC requested a release from the APR for the SB2000, on an IFR departure. The flight was released with a R turnout from RW27 direct to NALAX climbing to FL050 initially. The controller commented that the level restriction was because of military traffic operating to the N above FL100. The radar recordings show that, at the time, an ac showing a 7000 squawk (the Bulldog) is 10nm WSW of the airport at FL038. Two minutes later the SB2000 was cleared for take off. The 7000 squawking ac, the Bulldog, was now 8nm W of the airport indicating at FL039.

The APR commented that he had not observed the unknown traffic to the W of the airport. At the time of the SB2000's departure he had been occupied providing avoiding action instructions to an inbound commercial ac. At 1309:05, the Bulldog flight re-established communication with Approach, requesting to rejoin from the WNW at 4000ft. The pilot was informed to expect to rejoin RH downwind for RW27. The radar recording shows the Bulldog 6·5nm WNW of the airport indicating FL042, with the SB2000 just airborne from RW27. Although not identified, the APR believed, from the DF trace, that the 7000 squawk was the Bulldog. Accordingly, at 1309:37, the Bulldog flight was informed *"...there is traffic just climbing out of Norwich on your right in t- southwest of you correction southeast of you by a range of four miles"*. The pilot responded *"...I'll stay to the north of that"*. The APR continued *"roger he's turning right onto north climbing through your level very shortly if you could just come right on to south"*. The pilot reported turning R on to S and visual with the traffic. Meanwhile, at 1309:43, the ADC instructed the SB2000 flight to contact Approach. However, the pilot did not transfer straight away and at 1310 commented that he had traffic ahead. The radar recording shows the subject ac, on conflicting tracks, 1·5nm apart; the Bulldog is showing at FL040 and the SB2000 at FL033. By the time another ac's pilot had finished transmitting on the ADC frequency, the subject ac were passing, the ADC reporting that from the Aerodrome Traffic Monitor (ATM), the other ac was passing to the SW with vertical separation of 200ft. Shortly afterwards, the SB2000 flight made its initial call on the Approach frequency. The controller replied *"...you're identified on departure, Radar Advisory Service VFR traffic which had you in sight just passed down your left hand side"*. The pilot commented *"...we had him in sight but we had a TCAS call for descent"*.

[UKAB Note (2): The radar recording at 1310:04 reveals the SB2000 levelling at FL034 when it is 1·1nm and 600ft from the Bulldog. The next sweep shows the SB2000 descending through FL033 and passing 0·8nm E of the Bulldog which indicates FL038. The CPA occurs on the next sweep at 1310:14 as the SB2000 continues its descent through FL031 and passes 0·6nm NE abeam the Bulldog at FL038; the SB2000's descent continues to FL029 after the CPA.]

The APR explained that when the ADC requested the SB2000's departure, he had looked at the radar display and observed no local conflicting traffic to affect its release. He commented that the SB2000 did not take off straight away owing to other aerodrome traffic. During this time he had been busy providing service to VFR ac and vectoring ac inbound to Norwich, including having to issue avoiding action instructions. He had not observed the 7000 squawk (the Bulldog) routeing to the W of the airport until its pilot contacted him to request a rejoin. His first reaction was to pass TI and suggest action to avoid the SB2000's routeing. Owing to lack of time, he did not telephone the ADC, whom he realised was busy anyway with aerodrome traffic, to warn him about the presence of the Bulldog. There is not a priority telephone system at Norwich. In accordance with MATS Part 1 procedures, standard separation shall be provided between 'IFR flights in Class G airspace being provided with a service by an approach control unit'. There is no requirement to separate IFR/VFR traffic in Class G airspace.

The APR commented that since RAF Coltishall ATC closed, Norwich has taken over responsibility for providing LARS. Consequently, Norwich has now been issued with another sixteen allocated squawks. His opinion was that local traffic showing a Norwich squawk, throughout a detail, would be more apparent on the radar display to the APR. He could not confirm whether the confliction in this instance would have been recognised earlier if the Bulldog had been squawking a Norwich SSR squawk but it was possible. He expects this issue to be considered at the next local competency meeting.

The Norwich ADC is supplied with an ATM but MATS Part 1 procedures state that ATMs 'must not be used as a surveillance radar to provide approach radar services'. Consequently, there was no responsibility for the ADC to check the departure path for conflicting traffic.

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 agreed that at the time of the Airprox, both ac were in receipt of an Approach Control Service. Although at the time that the departure release was given on the SB2000 by the APR to the ADC there was no confliction apparent, several minutes elapsed before the SB2000 became airborne. During this period the Bulldog pilot had manoeuvred his ac towards Norwich, presumably in preparation for his rejoin, and this had gone unnoticed by the APR. The Bulldog pilot had called on the frequency and the APR then realised that the subject ac were in potential confliction. The APR had passed TI to the Bulldog pilot on the SB2000, with its intended routeing, and had suggested a R turn to the S to keep clear. This turn was actioned by the Bulldog pilot who reported visual with the SB2000. However, this series of RT exchanges had meant that there was little time available for the APR to give TI to the SB2000 crew who had been already told by the ADC to contact the APR. The SB2000 crew had acknowledged the frequency change but had shortly afterwards recalled the ADC reporting traffic ahead, the Bulldog. Owing to other transmissions on the ADC frequency, the subject ac were passing by the time the ADC was able to pass further information (later found to be erroneous) to the SB2000 crew. With the incident unfolding over a very short period of time, the APR had done his best to resolve the confliction when it became apparent. Members understood the SB2000 crew's concern that no TI had been received on the Bulldog even though it was technically 'known' traffic to Norwich ATC, but in the circumstances Members agreed that the APR had acted appropriately and the Airprox had been a conflict in Class G airspace.

Fortunately, the SB2000 crew were given the 'heads-up' of the potential confliction by TCAS, first a TA alert then an RA 'descend' warning. Whilst following the TCAS guidance, the Bulldog was acquired visually in their 11 o'clock and it was seen to pass clear to their L and above. This TCAS avoidance manoeuvre went unnoticed by the Bulldog pilot who estimated that the SB2000 had passed well clear (2500ft V/2nm H) and without taking avoiding action. The separation distances revealed from the radar recording accorded with the SB2000 crew's estimate of 700ft V and 0·6nm H. However, both crews had sighted each other's ac in good time and had acted appropriately which allowed the Board to conclude that safety had been assured during the encounter.

PART C: ASSESSMEN OF CAUSE AND RISK

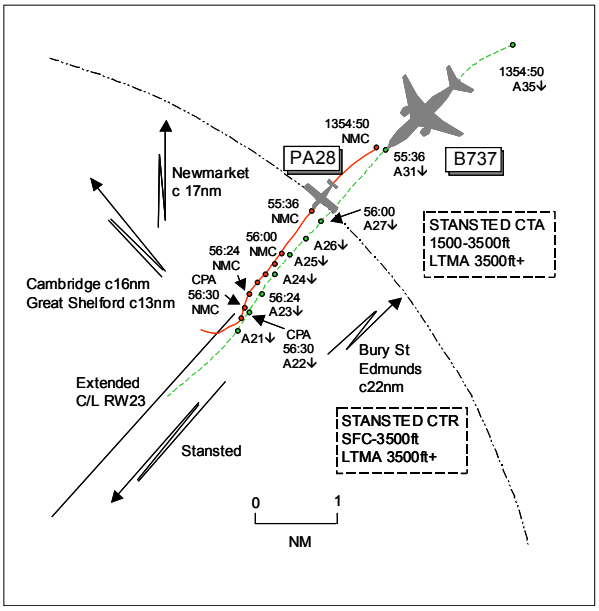
Cause: Conflict in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT No 042/06

AIRPROX REPORT NO 042/06

Date/Time:	6 Apr 1356	
Position:	5158N 00021E (6nm FIN APP RW23 Stansted - elev 348ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-800	PA28
Operator:	CAT	Civ Club
Alt/FL:	1800ft↓ (QNH 1013mb)	3300-3500ft (QNH)
Weather	VMC CLBC	VMC CLOC
Visibility:	10km	>10km
Reported Separation:	200ft V/500m H	800-1000ft V/1nm H
Recorded Separation:	0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Stansted IFR heading 225° at 160kt and in receipt of a RCS from Essex Radar on 120·62MHz squawking 6207 with Mode C. ATC reported that there was unknown traffic at range 10nm near to the ILS, at an unknown altitude, which appeared on TCAS showing NMC. When established on the LLZ a TCAS TA was received on the traffic which was seen as a beige coloured light ac with brown stripes. The light ac was just to the L of the C/L at the same altitude of 1800ft, he thought, QNH 1013mb on a parallel track. Whilst maintaining visual contact on it, they disconnected the A/P and deviated slightly to the L of the C/L to avoid the light ac whilst descending below it. Minimum separation was estimated to be 200ft vertical and 500m horizontally with Essex Radar reporting that the ac had penetrated CAS.

THE PA28 PILOT reports flying solo on a return flight from Beccles to Fowlmere VFR squawking 7000 with Mode C, he thought. The visibility was >10km in VMC and the ac was coloured yellow on the upper fuselage and blue beneath with a gold stripe; strobe lights were switched on. Initially he set course W'wards but then decided to fly to Lowestoft before routeing over Seething, Tacolneston mast, Old Buckenham, SE'ly to Diss avoiding the Honington MATZ before following the railway line until the junction was in sight ahead (2·5nm ESE Elmswell) then turning onto a track of 265°. This was directly into wind passing near to Elmswell and just S of Bury St Edmunds. He continued to track 265° at 100kt and 3500ft and called Duxford Information reporting 'S of Newmarket heading W to pass over Great Shelford for return to Fowlmere'. However, Cambridge did not appear when expected and he began to think that he might be a bit off track. About this time he noticed a large ac some distance ahead and to his L, well below his level and heading away about 30° to the L of his heading. Realising that he must have been blown to the S of his intended track by a change of wind direction (although generally W'ly, radio information to other traffic was being given as somewhat variable and 25kt on the ground), he turned R 45° to regain track, soon saw Cambridge and reported O/H Great Shelford (railway junction). He was informed of the Airprox 5 days post incident by the CFI. During a subsequent telephone conversation with RAC Mil, during which the plotted track flown by the PA28 involved in the incident was discussed, he believed that he had not routed so far S of Bury St Edmunds as he had positively identified the conspicuous sugar beet factory on its N side and passed 1-2nm to its S. Even though he could not offer absolute certainty of his track S of Bury St Edmunds until sighting Cambridge and passing Great Shelford, he could not believe he was as far off track as claimed, even with a strong and variable headwind, possibly veering.

UKAB Note (1): A Met Office synoptic weather aftercast for 1200UTC shows a low pressure centred near Iceland feeding moderate WNW flow over the Cambridge area. Stations in the area were reporting cloud between FEW and BKN cumulus base 4000-5000ft with visibilities of 30km or more. The winds likely to be experienced in the area at 1400UTC (deg true and kt) were:-

2000ft 270/25-30, 3000ft 280/30-35, 4000ft 280/30-35, 5000ft 280/30-35.

THE STANSTED INTERMEDIATE CONTROLLER reports the B737 flight was inbound to Stansted and was given a closing heading to establish on the RW LLZ outside 11nm from the LHS descending to 2000ft. A 7000 squawk was seen at 10nm final which appeared to be following the RW23 extended centreline (C/L). As a matter of courtesy, she informed the B737 crew of the position of the 7000 saying that they may receive a 'traffic' alert on TCAS but the 7000 was believed to be outside CAS; they reported 'seeing' the traffic on TCAS. The B737 crew reported established and were given descent on the ILS. A survey flight from the NW called on frequency and whilst the pilot was passing his details, she noticed that the B737 and the unknown ac squawking 7000 had both entered the CTR. The Stansted 10cm radar was u/s and the Heathrow 23 cm was exhibiting track jitter which caused her some uncertainty as to the 7000 radar return's intentions. As soon as she could, she updated the B737 flight on the unknown traffic and asked the crew if they were happy to continue their approach; they replied that they were. The crew then told her that they were visual with the traffic which was 300ft below them, she thought, and, after again asking the crew if they wished to continue, they replied 'yes'.

ATSI reports that the incident took place in Class D CAS of the Stansted CTR, 6nm NE of Stansted Airport on the FAT for RW23. The B737, operating IFR, was inbound to Stansted from Dublin and in receipt of an Approach Radar Control Service from the LTCC Stansted Intermediate controller (APR). At the time of the incident the other ac was 'unknown'. However, it was later established, with some degree of certainty, to have been a PA28 on a VFR flight en-route from Beccles to Fowlmere. Though not declared by the APR, it is assessed that both workload and traffic loadings were light.

Approaching from the W, the B737 passed overhead Stansted on a radar heading of 085° to position LH downwind for an ILS approach to RW23. The flight had been cleared to 4000ft altitude and instructed to reduce speed. At 1351:30, it was issued a L turn onto 050° for a short downwind leg before a further L turn onto 260° to report established on the LLZ. The flight was instructed to descend to 3000ft and, at 1353:40, advised by the APR *"… you may get a TCAS er traffic on a target that's underneath a ten mile final believed to be outside controlled airspace",* to which the pilot responded *"…we have him on TCAS".* At this point, the radar recording shows, the B737 was just rolling out onto 260° with the 'unknown' traffic in its 12 o'clock position at a range of 4nm on a track of approximately 250°. The 'unknown' was tracking close to the final approach centreline and within the lateral boundary of that part of the Stansted CTA where the base of CAS is 1500ft amsl. The target was relatively slow moving and transponding 7000, but with NMC height readout. The B737 flight was issued descent to 2000ft and a minute later, at 1354:50, the pilot reported established on the LLZ. This was acknowledged and further descent on the ILS approved, which the pilot read back. The B737 was now joining the FAT at 10nm from touchdown, indicating 3500ft Mode C. The 'unknown' was 2nm ahead of the B737, paralleling the FAT to the N by less than 0·25nm. It was now 1 mile from the boundary of the Stansted CTR, Class D CAS, which extends from the surface to 3500ft amsl. Above the CTR is Class A CAS of the LTMA that extends to FL245.

At 1355:05, the APR received the first call from a survey flight and the pilot was invited to pass his details. The first message, describing task requirements, was lengthy and by the end, the radar recording shows, the unknown had just entered the CTR, with the B737 1·3nm astern. Further exchanges with the survey flight took place by which time a total of almost a minute had elapsed. The 'unknown was now 0·6nm inside the CTR with the B737 in its 6:30 position at a range of 0·8nm. In the controller's written report she stated 'Whilst the survey aircraft was talking I noticed both the (B737's callsign) and the unknown ac had entered the zone'. Once completing the exchanges with the survey flight, the APR immediately transmitted (1356:00) to the B737 *"B737 c/s that traffic you have on TCAS is a mile ahead of you has entered controlled airspace are you happy to continue or do you wish to break off".* The pilot replied *"We'll continue we had have er visual contact with him."* The next transmission was 20 seconds later when the B737 pilot announced *"And we've just er passed the traffic and was like er three hundred er metres to the right",* the APR responding *"…thanks very much again are you happy to continue",* the pilot replying *"We'll continue the approach runway two three…".* The flight was then transferred to Stansted Tower without further comment by the B737 pilot. Moments later the 'unknown' traffic made a R turn and exited the CTR. The next day the B737 pilot completed an Airprox report form.

The radar recording shows that after entering the CTR the 'unknown' makes a L turn of a few degrees onto a track that slowly converges with the FAT. Meanwhile the B737 remains on the C/L until just before it passes the other ac on its port side, just to the S of the C/L, 6nm from touchdown. It is estimated that when abeam (1356:30) the two ac were 0·1nm apart and the B737 had just passed 2200ft, Mode C.

When the B737 flight was first alerted to the presence of the unknown traffic, the latter was within the boundary of the CTA (Class D) with NMC height readout displayed. The relevant MATS Part 1 guidance appears in Section 1, Chapter 5, Page 13, Paragraph 14 Unknown Aircraft, (Amendment 63 (corr) 29 October 2004 – current at the time of the incident). Sub paragraph 14.2 describes the action to be taken by controllers to avoid unknown ac in Class D of airspace. It states, *"Neither avoiding action nor traffic information shall be passed unless 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."*

At this point, the APR had no information to indicate that the unknown had climbed above the base of the CTA (1500 feet) or that it fell into any of the other categories. She was not, therefore, required to take any action. The warning provided was thus 'a courtesy'.

The Unit report states that the controller considers it not unusual for (unknown) ac to track towards the CTR boundary and then, at the last minute, turn away; adding that it happens regularly at Stansted and Luton. Nevertheless, the track adopted by the unknown on this occasion, so close to the final approach C/L, required particular vigilance to be maintained. Once the B737 had established on the C/L, options for timely and safe action, should it be needed, were constantly reducing.

The timing of the survey flight's first call was unfortunate. However, it would have been wise for the APR to suspend the conversation with this flight as soon as it was apparent the unknown had crossed the CTR boundary because, once this had occurred, a responsibility lay with the APR to issue avoiding action instructions and TI to resolve the now developing conflict in accordance with the MATS Part 1 guidance (see ref: 14.2 above).

Although only a short period of time elapsed before the APR intervened, the B737 had, nevertheless, now closed to 0·8nm behind the other ac. Asking the pilot if he was *"…happy to continue…"* was, it is understood, to establish if the pilot was visual and thereby able to effect his own separation from the traffic. The alternative, breaking-off the approach, was seen to represent 'avoiding action' according to the Unit report. These proposed solutions to resolve the conflict were an interpretation by the controller of guidance in sub paragraph 14.3 extant at the time. It states, *"A pilot who does not wish to comply with the advice on avoiding action becomes responsible for his own separation and any avoiding action which may subsequently become necessary".* This sentence is part of a note on guidance to controllers providing a RAS to traffic operating in Class F and G airspace. During an editorial review of MATS Part 1 this text became misplaced, appearing as a separate sub paragraph (14.3) in Amendment 53 dated 10th May 2002. As a consequence, its contents could be taken as applying to the whole of Paragraph 4 and therefore to all classes of airspace. This could not be correct because in CAS (D in this case) there is an overriding requirement to separate known traffic from unknown traffic. Therefore, when a conflict exists avoiding action instructions are issued and pilots must comply. The text has since been removed from paragraph 14.3 and returned to its original place as a note with effect from Amendment 69 dated 28 April 2006.

The B737 pilot reported the other ac in sight and was permitted to maintain his own separation and continue the approach. In the end it was probably the safest option, as the issue of a turn instruction would have held a greater risk as the B737 pilot could have lost sight of the other ac in a manoeuvre and therefore have been unable to react to an unpredictable turn by the latter.

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 amongst some ATCOs it was a common interpretation of MATS Part 1 at the time that when reacting to a situation involving unknown traffic, either avoiding action or TI should be passed, but not necessarily both, with the pilot having the option to continue visually. The ATSI Advisor explained that the intention of the MATS Part 1 for Class D airspace was always that both avoiding action and TI should be given. Following the MATS Part 1 amendment (69), NATS have corresponded with SRG to agree the wording of a Safety Notice to be issued to all controllers, reminding them of their responsibilities in respect of unknown traffic inside CAS. The Safety Notice is yet to be issued but agreement on appropriate wording is expected soon.

Pilot Members wondered whether aircrew knew their responsibilities: any avoiding action given by a controller was mandatory with pilots being expected to follow the given instructions unless they believed that the safety of their

ac would be jeopardised during the manoeuvre. Following an earlier 'courtesy' TI call from ATC, the B737 crew had 'seen' the traffic on TCAS and then acquired it visually when the TI was updated. Pilot Members thought that the 'offer' by ATC of *"...are you happy to continue or do you wish to break off"*, although erroneous, was a pragmatic solution and that it had been gratefully accepted by the B737 crew as they were visual with the PA28 and could continue their approach without compromising safety and with the minimum of disruption to their operation. However, ATCO Members were clear that avoiding action should have been given to the B737 as the PA28 crossed the CTR boundary as there was then no doubt that it had entered CAS as unknown traffic.

Lengthy discussion ensued as to whether the controller could have intervened any earlier to deconflict the deteriorating situation. Events unfolded during the survey flight's RT exchange, the controller's attention being undoubtedly drawn to that flight such that she would have been looking to the NW of her radar display to assimilate the ac's position during the pilot's transmission. That said, the controller noticed the PA28's CTR entry but did not interrupt the RT exchange with the survey flight. Thirty seconds elapsed after this occurred which became her first opportunity to give the B737 crew immediate avoiding action. Given the controller's interpretation of the MATS Part 1, she then 'resolved' the conflict through giving TI and the B737 crew maintaining their own visual separation. Even so, any ATC action hinged on what the 7000 squawk, the PA28, did with respect to the Stansted CTR as it approached from the NE showing NMC. As seen from the radar recording, as the 7000 squawk crossed the CTR boundary, it was clear that the PA28 pilot had made an unauthorised penetration of Class D airspace which caused the Airprox. Members agreed that even though this had been an inadvertent penetration, through a navigational error, the PA28 pilot then flew into conflict with the B737 as the latter approached from behind. That said, the B737 crew had monitored the PA28's progress; seen it visually and agreed with ATC to take their own separation against it. The B737 crew had deviated slightly to the L and descended through the PA28's level whilst maintaining visual contact. The Board agreed with the ATSI comments in that it was probably the safest course of action given the subject ac's proximity when a positive resolution by ATC was needed. Moreover, the B737 crew were always in a position to manoeuvre further to avoid, if necessary, which allowed the Board to conclude that safety had been assured during the encounter.

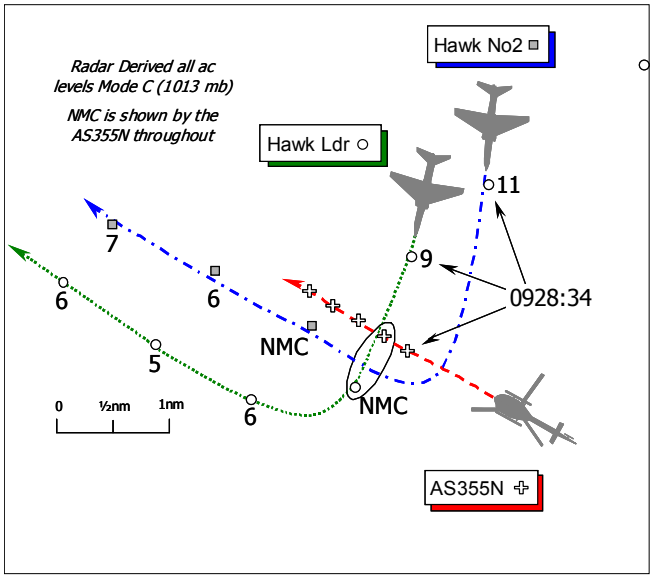
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot made an inadvertent, unauthorised penetration of Class D airspace and flew into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT NO 043/06

Date/Time:	12 Apr 0928	
Position:	5201N N 00201W (9nm NNE of Gloucestershire Airport)	
Airspace:	UKDLFS/FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk TMK1 pr	Twin Squirrel
Operator:	HQ PTC	Civ Comm
Alt/FL:	250ft (msd)	800ft (SAS 1013mb)
Weather	VMC NR	VMC CAVOK
Visibility:	>10km	+10km
Reported Separation:	~200ft V/nil H	300ft V/500m H
Recorded Separation:	Nil measurable H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T Mk1 PILOT, a QFI, reports that he was flying solo as the lead of a pair of Hawk jets on a low-level instructional sortie. Both ac have a black colour-scheme but the HISLs and nose-lights were all on. Operating VFR at 420kt, they were not under an ATS and the low-level conspicuity squawk of A7001 with Mode C was selected on both ac. Neither TCAS nor any other form of CWS is fitted.

A battle turn had been executed onto a heading of about 170°(M) with his lead Hawk as the westerly of the pair. A short while later they executed another battle turn to the R onto a new course of 320°(M) at 250ft msd, about 12nm NNE of Gloucestershire Airport. About halfway through this turn the student flying as the No2 spotted a civilian light helicopter just as his ac - the lead Hawk - flew about 200ft beneath it. The student transmitted this on the formation frequency just as he - the pilot of the lead Hawk - saw the helicopter as it occulted the sun in his canopy. Assessing the risk as *"high"*, the minimum vertical separation was about 200ft and nil horizontal and he added that no avoiding action was possible as he was already passing beneath the helicopter when it was first sighted.

THE AS355N TWIN SQUIRREL PILOT provided a brief account reporting that his helicopter has a dark blue livery and the HISLs were on whilst in transit from Blackbushe to a private HLS in the vicinity of Pershore. Squawking A7000 with Mode C on, he was flying in CAVOK conditions and having just left Brize's ZONE he was commencing an en-route descent for the HLS from 800ft with the SAS (1013mb) set. About 6nm SW of Pershore heading 320° (M) at 120kt he first spotted a black Hawk jet 1nm away after it overtook to port. No avoiding action was taken as there was no conflict, he assessed that the Hawk passed 500m away at the closest point some 300ft below his helicopter with no risk of a collision. Neither TCAS nor any other form of CWS is fitted.

THE TWIN SQUIRREL PILOT'S COMPANY comments that the Airprox occurred in Class G airspace available to all users. The Twin Squirrel pilot was operating quite legitimately in accordance with the ANO/company Operations Manual and was about to commence an approach to land at a property in the vicinity of the reported Airprox. The helicopter pilot saw the ac in question but deemed avoiding action unnecessary as the Hawks were a sufficient distance away not to cause any concern.

It was suggested that low-level confliction between helicopters and fast-jets is no nearer to resolution. The Operator opined that the formation of two Hawks would presumably have at least one trainee pilot aboard: the sense of planning to fly at 420kt at low-level through an area liberally sprinkled with general aviation airfields and gliding sites where low-level VFR traffic is likely to be dense is questioned. The company's view - in terms of risk assessment and risk management – is that it would be far safer to route low-level fast-jet traffic along published corridors to specific training areas where the threat of confliction could be contained.

UKAB Note (1): The Clee Hill radar recording shows the AS355N on a steady NW'ly course through the area but no Mode C is apparent throughout the encounter. The Hawk pair is shown approaching the vicinity from the N although at these levels and with a dearth of contacts from the presumed No 2 Hawk as the easterly of the pair, the recording does not replicate the geometry of this Airprox clearly. At 0928:34, the lead Hawk is shown at 900ft unverified Mode C – which would equate to an altitude of about 960ft Gloucestershire QNH (1015mb) - with the AS355 at 11 o'clock at a range of 0·8nm. The tracks of the lead Hawk and the helicopter cross in between sweeps suggesting that horizontal separation between these two ac was negligible, as the No2 appears to also turn R to pass astern of the lead Hawk in accordance with the reported 'Battle turn' scenario. However, neither the primary nor secondary radar response of the No2 ac is shown at this point so it is not possible to be certain. The pair then steadies on the reported NW'ly heading displaced just to port of the AS355 projected track and depart to the NW. The closest of the jets after the turn was the No2 Hawk as it passed abeam the AS355 at a track displacement of about 1/3nm, so it might be that the AS355 pilot did not see the lead Hawk of the pair at all as only one ac is mentioned in the AS3355 pilot's report.

HQ PTC comments that the Hawk pair were flying in the LFA in accordance with current regulations and practice. It was fortunate that the leader had vertical separation with the Squirrel since he did not see it until it was too late to take any avoiding action. This type of encounter where both aircraft are operating normally in the same piece of airspace is not unusual and goes to emphasise the importance of good lookout at all times.

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 authorities.

Patently each pilot involved here was operating perfectly legitimately in Class G airspace, where 'see and avoid' prevails. From the Hawk QFI's candid report it is apparent that he had not spotted the AS355N before the helicopter was underflown and the Board commended the leader for his honest and direct account. Apparently the No2 Hawk student pilot's warning came too late to enable the lead Hawk to take evasive action as the pair executed their battle turn onto their new course to the NW. Nonetheless, the Hawk pilots should have seen the AS355N earlier whilst clearing the airspace into which they were about to manoeuvre. Thus it was clear to the Board that although the Hawk pilot had spotted the helicopter above him it was too late and he was unable to avert this close encounter at such a late stage. Here then was the first part of the cause - effectively, a non-sighting by the Hawk Leader.

The Hawk pair were undoubtedly there to be seen by the AS355N pilot in the CAVOK conditions but it was evident that both jets had approached at a high closing speed and a near head on aspect to the helicopter (after their earlier battle turn), at a constant relative bearing with virtually no relative motion to draw attention to them on the AS355N's starboard beam. Perhaps not surprisingly this defeated the helicopter pilot's lookout scan - at the stage when he was just about to commence his approach to the landing site - and masked the formation's presence from him until after the lead Hawk had crossed underneath and the No2 had apparently passed astern. In one helicopter pilot Member's view, the Squirrel pilot was not keeping as good a lookout as perhaps he might, as the jets had approached from his side of the ac. The AS355N pilot had reported first sighting of a black Hawk jet at a range of 1nm. However, his perception of the geometry of the encounter was that this single Hawk ac had been about 500m away on the port beam before opening ahead and then crossing into his 12 o'clock from the left. Thus if the helicopter pilot had indeed seen the jet 1nm away, it appeared to the pilot Members that this was as the Hawks departed ahead of him which was after they had crossed respectively underneath and astern of his AS355N. Thus, the AS355N pilot had probably not detected the presence of the Hawk pair before the Airprox occurred and afterwards had only seen one of the jets. The Board therefore agreed that the other part of the cause was a probable non-sighting of the Hawk pair by the AS355N pilot.

Regarding the inherent risk, it was not feasible to determine with absolute certainty the vertical separation that pertained here because of the absence of Mode C data from the AS355N. It was not clear why this was so as the pilot had reported that the Mode C was selected on. Nevertheless, pilots should be in no doubt as to the importance of an ac's Mode C data – both for ATC and so that other ac fitted with TCAS might be afforded altitude information perhaps at a critical moment. It was in similar scenarios to this incident that the PTC TCAS trial had proved the effectiveness of the system with a suitably-equipped Tucano. Indeed, 30sec warning had been achieved during the trial, attesting to the desirability of a collision warning system to supplement lookout scan, and this fleet of training ac is now being fitted with an ACAS I device. When assessing similar events such as this the

Board has wholeheartedly endorsed the acquisition of such equipments to assist pilots and its use here might well have averted this Airprox.

There was no reason to doubt the veracity of the Hawk pilot's account when he reported he directly underflew the helicopter (the radar recording had suggested that this was the case also) with vertical separation of 200ft. It seemed the disposition of the formation had focused the attention of both the Hawk pilots at the critical moment as they effected their battle turn. Thus the Hawk pilots were unable to take effective action to forestall this encounter. Furthermore, it appears that at the time of the Airprox the helicopter pilot was unaware that there were two jets and that the lead Hawk had passed beneath him just before he started his own descent into the landing site. Therefore, it was purely fortuitous that these ac were 200ft apart at the time as none of the pilots involved in this Airprox saw the other ac in time to taken positive action - to avoid the other ac. The Board agreed unanimously that an actual risk of a collision had existed in the circumstances reported here.

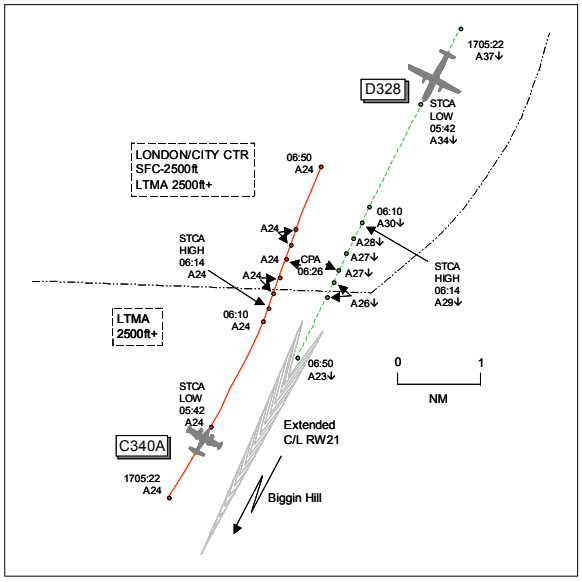
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting by the Hawk leader and a probable non-sighting by the AS355 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 045/06

Date/Time:	8 Apr 1706 (Saturday)	
Position:	5127N 00007E (7nm FIN APP RW21 Biggin Hill - elev 598ft)	
Airspace:	LTMA/City CTR	(Class: A/D)
	Reporting Ac	*Reported Ac*
Type:	Dornier 328	C340A
Operator:	CAT	Civ Pte
Alt/FL:	3000ft↓ (QNH 1007mb)	2300ft (QNH 1007mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	>10km	>40km
Reported Separation:	Nil V/400m H	Nil V/1-2nm H
Recorded Separation:	300ft V/0·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE D328 PILOT reports inbound to Biggin Hill IFR and in receipt of a RCS from Thames Radar on 132·7MHz squawking 5106 with Mode C. After being cleared to intercept the ILS LLZ RW21, Radar informed them of a contact N'bound in their 12 o'clock which was identified on TCAS range 8nm. Flying into sun heading 220° at 160kt, the traffic was seen visually at 2nm whilst they were descending on the ILS: a white coloured light low wing twin engine type at about 2000ft. A TCAS RA 'monitor vertical speed' was received and followed which required them to break-off the G/S. An RA 'climb', which ensued, was not initiated but they stopped their descent, as they were visual and tracking the opposing traffic, which had reported to Thames being visual with their ac. The traffic passed down their RHS about 400m away on a parallel track at the same level, close enough to alarm his passengers. They resumed the approach visually and he assessed the risk as moderate to high. Later, Biggin Hill ATC told him that they had cleared the twin engine ac to take-off from Biggin, as their flight established inbound, presumably to depart visually to the N.

THE C340A PILOT reports outbound from Biggin Hill VFR and in communication with Thames Radar squawking 0201, he thought, with Mode C. Prior to the incident, Biggin ATC had cleared him 'after departure turn R to leave the downwind leg VFR not above 2400ft QNH'. He departed and carried out the instructions but with a shallow RH turn, whilst completing the 'After T/O checks', which gave a wide cct pattern. When clear of the downwind leg and established on heading towards LAM at 2300ft and 155kt, he was told to call Thames Radar and immediately afterwards established 2-way RT communications. Soon afterwards, Thames asked them to turn further L to keep further away from the ILS area but no mention was made of an ac on the ILS nor were they advised of a heading to steer. They altered heading L approx 10° and at the same time saw an ac about 5nm ahead on a reciprocal track, probably on the Biggin Hill ILS and clearly not in any way in confliction with his ac as their tracks were clearly parallel and well separated horizontally, with more than adequate separation. He asked for approval to fly overhead (O/H) City Airport, a good visual landmark, but this was not answered as the controller asked them if they had visual contact with a Dornier on the Biggin Hill ILS to which they were able to reply in the 'affirmative'. They watched the Dornier pass down their RHS 1-2nm away at approx the same level, still well separated horizontally. To their surprise they heard the Dornier crew inform Thames that his TCAS had shown an alert and there then followed a discussion between the controller and the Dornier pilot as to whether the crew would be reporting the occurrence; the crew seemed unsure whether or not to file an Airprox. He assessed there to be no risk of collision.

THE THAMES RADAR CONTROLLER reports the D328 was under IFR making an ILS approach to RW21 at Biggin Hill which involved leaving Class A CAS, entering Class D then Class G. The C340A flight from Biggin Hill free-called to cross London/City Class D CTR and was cleared to cross under VFR squawking 7051. The C340A pilot was passed TI on the D328 and was asked to keep clear of the RW21 ILS. The D328 crew were passed TI

on the C340A and reported TCAS contact. The C340A was seen to track about 030° close to, and W of, the RW21 ILS and the pilot reported visual with the D328. Whilst the D328 was in Class D and the C340A was in Class G, he thought, the D328 crew reported a TCAS RA 'climb' against the C340A but also stated that they elected to ignore the RA because they had sighted the C340A and did not intend to file a report. The D328 crew were informed, via Biggin Hill ATC, that reporting action would be taken by LTCC. The C340A pilot reported good visual contact with the D328 as they passed.

UKAB Note (1): The 1650Z Biggin Hill weather passed to the D328 flight by Thames Radar METAR was 25010KT 25km SCT040 09/M05 QNH1007mb.

ATSI comments that the D328 flight established contact with the Thames Radar controller at 1703 and reported descending to 4000ft and turning onto heading 180º. The controller instructed the crew to report established on the ILS LLZ for RW21 at Biggin Hill. The crew did so at 1704:10, when at a range of 15nm, and were instructed to descend on the ILS. At 1704:25, the pilot of the C340A called, having just departed from Biggin, and requested to transit the CTR. The Thames Radar controller cleared the C340A to transit VFR not above 2400ft QNH 1008. The controller instructed the pilot of the C340A to squawk 7051, which he did, but the pilot was not told that he was identified nor was the Mode C readout verified. The controller transmitted (1705:20) *"(C340A callsign) make your flight to keep well clear of the two one ILS there's public transport Dornier ten mile final for runway two one"* and the C340A pilot replied: "*That's copied sir thank you*". The controller then passed TI to the D328 crew about the C340A advising that they might receive TCAS warnings on it.

[UKAB Note (2): The radar recording at 1705:22 shows the C340A was in the 12 o'clock position of the D328 at a range of 6·5nm with the D328 passing 3700ft and the Mode C of the C340A indicating 2400ft. The C340A was tracking approximately 030º and displaced 0·6nm to the W of, but slowly converging the final approach to RW21. Shortly thereafter a slight L turn by the C340A is evident as it closes to within 0·5nm of the RW extended C/L before slowly diverging.]

The controller updated the TI to the C340A pilot at 1706:10, when it was in the D328's 1 o'clock at 1·8nm with the C340A indicating 2400ft tracking 020° and the D328 passing 3000ft. The C340A pilot advised that he had the D328 in sight. The controller advised the crew of the D328 that the light ac had their ac in sight and instructed them to contact Biggin Approach. The two ac passed starboard-to-starboard at 1706:26 0·6nm apart with the D328 300ft above the C340A as the D328 pilot advised that they were visual with the C340A and changing frequency. Very shortly afterwards (1706:50) the crew of the D328 advised the Thames controller that they had received a TCAS RA.

When the two ac passed each other the C340A had entered the London City CTR and so changed from operating in Class G airspace to Class D. The pilot was not advised of this nor, at any stage, was a level of air traffic service requested or agreed. Nevertheless, within Class D airspace the requirement is that traffic information is passed to IFR flights on VFR flights, and vice versa. This was done several times by the controller and so complied fully with the airspace requirements.

UKAB Note (3): As the subject ac pass the D328 is still within the Class A airspace of the LTMA and subsequently descends directly into Class G airspace to the S of the London/City CTR.

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 apparent that there were 2 different viewpoints of the incident. From the D328 flightdeck, the flight had been cleared for descent on the Biggin Hill ILS which would entail the ac leaving Class A airspace and flying briefly into Class D before entering Class G. The Thames controller had foreseen a potential TCAS encounter and had forewarned the D328 crew accordingly. The D328 crew had 'identified' the other ac on their TCAS display which enabled them to visually acquire the C340A ahead. However, as anticipated, the presence of the C340A generated a TCAS RA 'monitor vertical speed' in the D328 flightdeck which necessitated a brief levelling-off, the ensuing RA 'climb' command not being actioned as the C340A was still in full visual contact and passing clear to their R. The descent on the ILS was recommenced almost immediately thereafter.

From the C340A cockpit, the pilot had been cleared to transit the London/City CTR and had then been asked to keep clear of the ILS and was told of the approaching D328. The C340A pilot had turned slightly to the L and had sighted the airliner, following further TI from the Thames controller, and judged the separation to be more than adequate with no risk of collision. Although the C340A pilot had estimated he was further away from the ILS C/L / D328 by a distance of 1-2nm, the radar recording had revealed 0·6nm at the CPA. Pilot Members thought that the C340A pilot had been unwise to fly so close and that a wider margin should have been allowed, even though the pilot himself was more than happy with the situation. One Member wondered how the C340A pilot, when flying away from Biggin Hill with the RW out of sight well behind his ac, could judge his displacement from the extended C/L and thought that he had made a heading adjustment to parallel the opposing D328. However, having been told to keep clear of the ILS C/L, the C340A pilot flew sufficiently close to the ILS to trigger a TCAS RA in the D328 and this had caused the filing of an Airprox. Both crews had seen each other's ac and had acted as they saw fit to resolve the potential confliction which left the Board in no doubt that any risk of collision had been firmly and safely removed.

PART C: ASSESSMENT OF CAUSE AND RISK

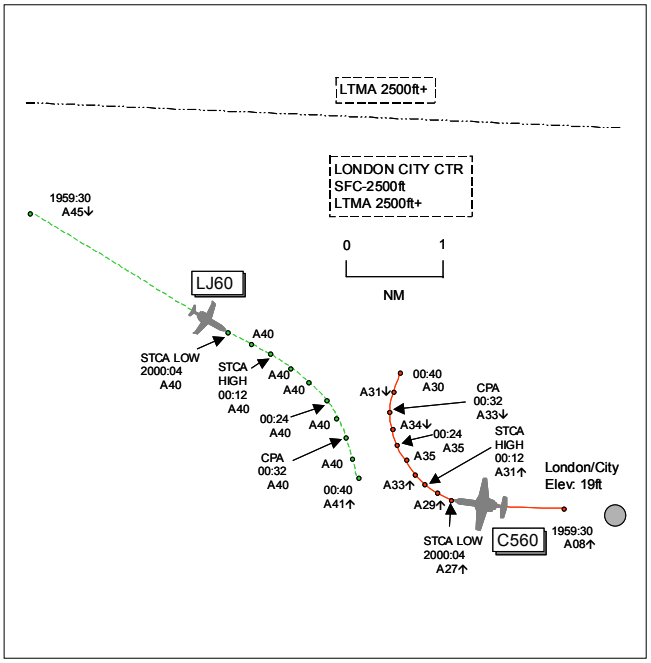
Cause: Having been advised to keep clear of the ILS C/L, the C340A pilot flew sufficiently close to the ILS to trigger a TCAS RA in the D328.

Degree of Risk C.

AIRPROX REPORT No 046/06

AIRPROX REPORT NO 046/06

Date/Time:	17 Apr 2001 Night	
Position:	5132N 00001W (3nm WNW London/City - elev 19ft)	
Airspace:	LTMA	(Class: A)
Reporter:	Thames Radar	
	First Ac	*Second Ac*
Type:	LJ60	C560
Operator:	Civ Exec	Civ Comm
Alt/FL:	↓4000ft (QNH 1013mb)	↑3000ft (QNH)
Weather	VMC NR	VMC NR
Visibility:	NR	40km
Reported Separation:	Thames Radar 500ft V/Nil H	
	NR	NR
Recorded Separation:	700ft V/0·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE THAMES RADAR CONTROLLER reports that he had taken over the sector with the C560 released on a DVR3T departure from London/City which has a step climb profile with an initial altitude of 3000ft: 3000ft was written on the fps. After departure the C560 crew called 'approaching 3000ft' but its Mode C was already indicating 3400ft, underneath a LJ60 at 4000ft. The C560 had a high ROC and the flight was instructed to maintain 3000ft but it levelled at 3500ft. He passed TI on the LJ60 at 4000ft and repeated the instruction to maintain 3000ft QNH 1013mb. The C560 crew confirmed that their ac was 'slightly above' and descended to an indicated 3000ft when he could verify the Mode C. The ac was seen to descend to 2800ft in the R turn so he again verified the altitude and reminded the crew to maintain 3000ft, informing them that he would be making a report on the apparent 'level bust'. He was later informed that the LJ60 flight had experienced a TCAS RA climb.

THE LJ60 PILOT reports heading 180° at 180kt descending to 4000ft inbound to Heathrow IFR and in receipt of an ATS from Heathrow Approach squawking an assigned code with Mode C. Overhead Canary Wharf on base leg to the ILS RW27L, a TCAS RA 'climb' was received. The guidance was followed, resulting in a +150ft deviation during which the other ac was sighted. ATC informed them that it was an ac departing London/City that had climbed higher than cleared.

THE C560 PILOT reports outbound from London/City IFR on climb-out from RW28. Turning R just before 1·5nm DME in a steep climb (ROC 4000fpm) at low speed - 130kt - to the first waypoint approaching 3000ft; A/P was off owing to low speed and T/O flaps. He became momentarily distracted by another ac on TCAS at the same altitude, he thought, about 2-3nm N of their ac flying in the opposite direction and he involuntarily overshot his cleared altitude by about 300ft. He took immediate corrective action after realising his mistake at the same time as ATC warned them but they had reached 3400ft before they descended sharply. During this manoeuvre there had been no TCAS alerts or warnings and no mention was made of an Airprox.

THE C560 CHIEF PILOT deeply regrets that the incident occurred. The Flight Training Department will be advised to take immediate action with special training to be given to avoid such actions in the future.

ATSI reports that the incident took place 3nm WNW of London City Airport in the Class A CAS of the LTMA. The C560 had recently departed from London/City Airport, en-route to Vienna, while the LJ60 was inbound to Heathrow from Dublin. Both flights were IFR and in receipt of an Approach Radar Control service from LTCC, the C560 from Thames Radar and the LJ60 from the Heathrow Final (FIN) Director.

The C560 flight had been issued with a DVR3T SID from RW28 which required the flight to route straight ahead to I-LSR D1·5, then turn R onto the LON R082. The initial SID altitude is 3000ft which has to be maintained until LON D27 after which climb is continued to 4000ft.

The C560 first appears on the radar recording, at 1959:30, climbing straight ahead from RW28 at London/City Airport and passing 800ft Mode C. The LJ60, meanwhile, is in the descent to 4000ft on radar heading towards a R base-leg to RW27L at Heathrow. At this point the subject ac are 6·3nm apart on converging tracks. Thirty four seconds later, at 2000:04, when the C560 is passing 2700ft, STCA triggers a 'low severity' warning, due almost certainly to that ac's high ROC - calculated to have been in excess of 3000fpm – against the LJ60 at 4000ft.

At 2000:12, the FIN instructed the LJ60 to turn R onto a heading of 180° for base-leg. Coincident with this, the C560 flight was making its first call to Thames Radar and at the same time STCA commenced a 'high severity' warning. In the call, the C560 pilot reported *"Radar good evening C560 c/s eh approaching three thousand feet".* However, by the end of the transmission the ac's Mode C was indicating a climb to 3300ft as the ac was just starting a turn to the R, in accordance with the DVR3T SID. The LJ60, at 4000ft, was in the C560's 12 o'clock position at a range of 1·7nm. Immediately observing the apparent level deviation by the C560, the Thames Radar controller responded with *"*C560 c/s *maintain three thousand feet squawk ident"*, which the pilot read back. By this time (2000:24) the C560's Mode C was showing a climb to 3500ft with the LJ60 now in its 11 o'clock position at a range of 0·9nm. In case there had been an altimeter setting error, the Thames Radar controller issued the C560 flight with the current QNH value, 1013mb, and sought confirmation that it was maintaining 3000ft. The pilot responded *"Yeah we are slightly above we are descending".* Thames Radar then issued TI to the C560 crew, stating *"yeah you have an aircraft above you on your left-hand side also at four thousand feet",* which the pilot acknowledged. No further action was taken by the Thames controller. Whilst useful to pass the QNH value and important to issue TI (though the latter lacked detail) it is felt the priority should have been to issue positive avoiding action instructions to the C560. It was fortunate that the LJ60 had already been instructed to turn R onto base-leg: however, the FIN repeated the instruction, increasing its urgency with *"LJ60 c/s turn right now er heading one seven zero degrees avoiding action".* In reply the pilot immediately announced *"TCAS climb TCAS climb LJ60 c/s"*. This was acknowledged, the FIN explaining the circumstance of the conflicting traffic and adding that it was returning to 3000ft.

The radar recording shows the horizontal distance between the two ac reduced further to 0·5nm, at 2000:32, as they passed abeam, port to port, each in a R turn. However, by then there was 700ft vertical separation as the C560 was descending through 3300ft with the LJ60 still showing at 4000ft.

UKAB Note: A TCAS RA climb by the LJ60 is not apparent until after the two ac have passed and are 1nm apart at 2000:40, when its Mode C indicates a climb to 4100ft with the C560 showing 3000ft.

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.

Pilot Members could not understand the C560 crew's rationale for choosing a high ROC when the SID profile requires a step climb with an initial level-off at altitude 3000ft. Careful monitoring of the ac's flightpath is required, especially when not using an A/P, as excursions/deviations can easily result when distracted. It was clear that the cause of this Airprox was that the C560 crew climbed above their cleared level and flew into conflict with the LJ60. It was noted that although the LJ60 crew reported receiving a TCAS RA 'climb', the C560 crew reported receiving no alerts/warnings (TAs/RAs). This seemed inconceivable to pilot Members as STCA warnings were generated on the radar display system. Normally complementary TAs/RAs would be received by both ac during an encounter involving two TCAS II equipped ac. Without the benefit of a post incident TCAS download from the C560, this anomaly could not be resolved.

The Thames controller had noticed the C560 crew's apparent 'level bust' and had instructed them to maintain 3000ft. Further clarification was sought of the correct altimeter setting and the crew's intention to maintain 3000ft to which the crew replied that they were slightly above and descending. TI was given on the LJ60 at 4000ft whilst the C560 crew arrested their climb and descended. The LJ60 crew were given a turn onto base-leg and this instruction was repeated with avoiding action phraseology during which they received a TCAS RA 'climb' and the

C560 was sighted. All of these elements, when combined with the geometry of the incident, were enough to allow the Board to conclude that safety had been assured during the encounter.

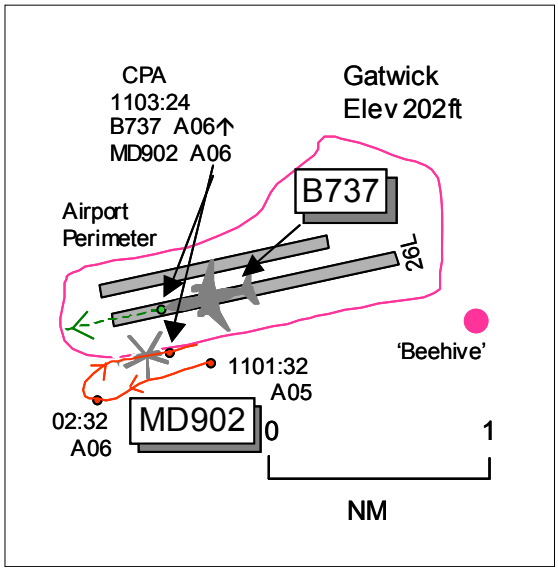
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C560 crew climbed above their cleared level and flew into conflict with the LJ60.

Degree of Risk: C.

AIRPROX REPORT NO 047/06

Date/Time:	18 Apr 1103	
Position:	5108N 00012W (0·5nm SW Gatwick - elev 202ft)	
Airspace:	ATZ/CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-400	MD902 Explorer
Operator:	CAT	Civ Comm
Alt/FL:	500ft↑ (QNH)	600ft (agl)
Weather	VMC CLOC	VMC CLBC
Visibility:	25km	>10km
Reported Separation:	Nil V/500m H	Nil V/550m H
Recorded Separation:	Nil V/0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports outbound from Gatwick and in communication with Gatwick Tower 124·22MHz squawking 1173 with Mode C. They were cleared for T/O RW26 with a helicopter hovering at 500ft just S of the RW, he thought. Take-off was commenced as they thought the helicopter was abeam the centre of the RW but found it was abeam the far end which meant that during the climb they passed very close to it (500m); TCAS generated a TA alert. Although there was only a medium risk of collision it was very distracting to the crew. He mentioned his concerns to ATC on the RT and opined that it would have been better if RW crossing traffic actually crossed over the mid-point of the RW or else stay well clear.

THE MD902 PILOT reports conducting a routine perimeter security check and in communication with Gatwick Tower; TCAS is not fitted to the ac. They were tracking slowly E'bound heading 080° at 30kt along the S side aerodrome (AD) perimeter at about 600ft agl maintaining a distance of 200-300m from the perimeter fence. The Tower controller was advising all landing and departing traffic of their presence, he thought, and all their external lighting (strobe, 2x landing and nav) was switched on. RW26L was in use so they were facing the traffic taking-off. The B737 flight was cleared for take-off having been warned of their presence, he thought, on the Southern perimeter. They watched the B737 line-up and roll before it climbed away on the RW C/L passing about 550m down their port side on a reciprocal heading, climbing through their level when more or less abeam; at the time they were 800m SE of the RW08R threshold. The B737 crew reported to ATC that they 'seemed a bit close'. The Tower controller asked if they had copied the call which he acknowledged, confirming that they were S of the aerodrome perimeter. The crew were surprised as these routine checks were carried out several times a week for a considerable number of years without any problems. He believed that there was absolutely no risk of collision. Furthermore, the B737 crew must have been able to see their helicopter before commencing their T/O roll and the helicopter's position did not change significantly during the B737's departure. He therefore wondered why the B737 crew initiated their take-off if they considered the helicopter to be in a position that was a problem.

THE MD902 CHIEF PILOT reports that this was a routine operation carried out 2-3 times a week for some years. The B737 would have had to deviate considerably from his take-off path on the RW C/L at low level before any risk of collision was present. The helicopter pilot was visual with the B737 throughout its take-off run and would have easily been able to avoid him had it deviated from the normal take-off path.

THE GATWICK AIR CONTROLLER reports that the B737 was airborne when its crew transmitted that they thought the helicopter was rather close and thought that it may have drifted. She asked the helicopter pilot if he copied that transmission and he reported that he was S of the RW.

AIRPROX REPORT No 047/06

ATSI reports that at 1057:50 the MD902 helicopter flight contacted Tower, was instructed to continue VFR and was cleared towards the Beehive. The detail was to operate a routine and very regularly conducted exercise which involved checking the airfield perimeter. The helicopter pilot stated he would like to work the southern perimeter and would call for a crossing of RW26 threshold when complete. The controller acknowledged the pilot's call with *"Roger"*. The MD902 flight was operating, in accordance with a local procedure, to remain S of the perimeter fence. No specific ATC clearance was given merely a generic *"...continue VFR and er you're clear towards the Beehive"*. As RW26 was in use the helicopter pilot planned to operate facing departing traffic. Traffic was light at the time although another helicopter had been operating a routine survey. This is not considered to have had a bearing on the situation.

Between 1058 and 1100 a change of Controller occurred. There is nothing to indicate anything other than an adequate handover took place and at 1101:30 the ADC asked the B737 crew whether they were ready for departure. On receiving an affirmative acknowledgement, line up clearance was given. It is not known at what point or time the B737 crew selected the Tower frequency since the first RT exchange is when the ADC asked the pilot if he was ready for departure. From 1058 there had been no subsequent transmission from the helicopter.

At 1104:10, just after departure, the B737 crew commented that the helicopter seemed very close to the take-off track and queried whether it was supposed to be there or had drifted into the take-off path. The controller asked the helicopter pilot whether he had copied the B737 crew's comments and received a reply that he (the helicopter) was S of the perimeter.

[UKAB Note (1): The radar recording from 1058 shows the MD902 approaching Gatwick from the ESE with about 2nm to run as the first of 3 RW26 departures, ahead of the subject B737, is seen airborne to the W of Gatwick. The MD902 fades at 1100:48 close to the Gatwick O/H just S of the RW 26 threshold in the vicinity of the Beehive tracking WSW as the 3rd departure is airborne. At 1101:32 the MD902 reappears tracking approx 255° 0·3nm SW of the midpoint RW26/08 at altitude 600ft QNH 1014mb. One minute later the MD902 is seen to commence a R turn, rolling out on heading 080° about 30sec later, close to the WSW airport boundary. The MD902 continues on a steady track G/S 45kt apparently following the perimeter fence on the airport boundary. The B737 first appears on radar at 1103:24 tracking 260° with the subject ac passing port to port at the CPA of 0·2nm both indicating an altitude of 600ft QNH 1014mb.]

[UKAB Note (2): The AIP at AD 2 EGKK-2-1 charts the Gatwick aerodrome plan and shows the airport perimeter road running roughly parallel to and S of RW26/08 displaced from the RW C/L by 300-350m in the SW quadrant of the A/D.]

When operating in Class D airspace MATS Part 1 Section 1 Chapter 2 Page 1 requires controllers to:

"Pass traffic information, as far as practicable, to IFR flights on VFR flights" and "pass traffic information to VFR flights on IFR flights and other VFR flights". Additionally the Unit MATS Part 2 requires TI to be passed on this regular activity.

Neither controller passed TI to any ac during the period the helicopter was operating on the southern perimeter and the B737 flight departed unaware of a perimeter inspection, which was following established procedures. The Unit subsequently reminded all staff of the requirement to pass TI.

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 wondered how the B737 crew became aware of the MD902 because no TI had been passed by ATC to either of the subject flights nor apparently to any of the preceding departures. Prior to lining up RW26 the B737 would have been facing in the opposite direction at the holding point, tail-on to the helicopter as it manoeuvred in the SW airport boundary area. Members surmised that the B737 crew may have seen the helicopter as it transited to the S of the RW whilst positioning SW-bound from the 'Beehive'. In the absence of TI, this may have been why the B737 crew had reported that the helicopter was holding S-side, awaiting crossing clearance. ATCO Members thought that familiarity of this activity by ATC and the MD902 crew may have led to complacency: the MD902 had

only been given a clearance limit of the 'Beehive' but the flight had continued in accordance with his requested sortie details thereafter, which action had not been challenged by the Air controller. Had TI been passed with the take-off clearance, the B737 crew would have had the option to remain on the ground if they were not happy with the helicopter's position relative to their departure track. Pilot Members sympathised with the B737 crew's predicament in that during a busy departure phase with high workload, a TCAS TA alert was received on traffic, seen to be a helicopter passing 500m to their L, the intentions of which were unknown as no TI had been passed. Indeed, Members were in no doubt that this is what led to the filing of an Airprox. That said, although no TI was passed to either crew, the MD902 pilots familiarity with the operational task and his reported good situational awareness with the traffic scenario left the Board in no doubt that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

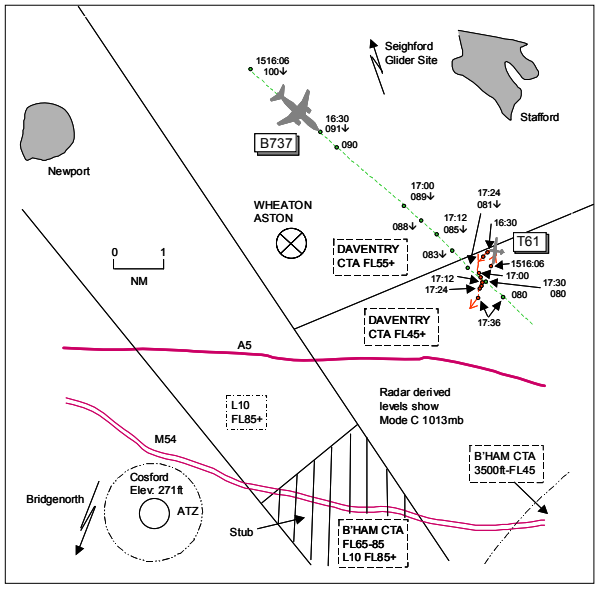
Cause: In the absence of TI, the B737 crew were unsure of the MD902 pilot's intentions.

Degree of Risk: C.

AIRPROX REPORT No 048/06

AIRPROX REPORT NO 048/06

Date/Time:	22 Apr 1517 (Saturday)	
Position:	5243N 00207W (5nm S Stafford)	
Airspace:	Daventry CTA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-300	Slingsby T61 M/Glider
Operator:	CAT	Civ Club
Alt/FL:	FL80	8000ft (RPS 1009mb)
Weather	VMC NR	VMC CAVK
Visibility:	>10km	NR
Reported Separation:	200-300ft V/100m H	Not seen
Recorded Separation:	c0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 150° at 250kt inbound to Birmingham IFR and in receipt of a RCS from Birmingham Radar on 118·05MHz, he thought, squawking an assigned code with Mode C. About 20nm S of Crewe level at FL80 on an intermediate descent, the Captain just happened to look out from his LH window and spotted a motor glider (M/Glider) in his 10 o'clock range 500m 200-300ft above flying straight and level on a crossing track. No TCAS TA or RA alerts/warnings were received. The white/blue coloured M/Glider passed virtually above and could be seen through the RH eyebrow window as it crossed just ahead. No avoiding action was taken as a collision was not likely but he assessed the risk as high. He informed Birmingham ATC of the incident and spoke to the Watch Supervisor after landing.

THE SLINGSBY T61 M/GLIDER PILOT reports departing from Cosford at 1330Z on a non-radio VFR solo flight, intending to operate to the W in the Bridgenorth area, climbing to 8000ft. The weather was CAVOK and the ac was coloured blue/white; no transponder was fitted to the ac. As it became apparent that there was a line of clouds moving slowly in from the W, he descended to 4000ft and navigated round to the S of Cosford, mindful of the Birmingham Zone and 'stub', before climbing back to 8000ft on the Barnsley RPS which he believed to be 1009mb. He then began operating to the N of Cosford and to the W of Wheaton Aston at varying altitudes between 7000 and 8000ft at 80kt before descending to approximately 4000ft to operate to the W of Seighford. He then returned to an area around Newport but because his intention was to head back to Cosford into sun, he headed towards Wheaton Aston climbing above the haze layer to 8000ft before descending below 6000ft as he crossed the A5 road before approaching the 'stub' and continuing to Cosford. He was unaware of any 'Airprox' until he was told by Cosford ATC at 1550Z when back on the ground. During the GH phase of the flight he was aware of one light ac some considerable distance to the E but at no stage was he conscious of a large passenger jet in his proximity. He was asked to contact MACC and spoke to a controller but was a little confused by the report, as there was no clear indication of where or when the Airprox occurred.

UKAB Note (1): During a subsequent telephone conversation between the UKAB Secretariat and the T61 pilot, he was apprised of the geometry, location and timing of the Airprox. He was aware of the Birmingham CTA stub to the E of Cosford base level FL65 and the Daventry CTA base level FL45 and FL55. He had planned to operate at all times clear of CAS and thought that he was flying at 8000ft under the airway L10 to the W of Wheaton Aston (about the time of the Airprox) shortly before returning to Cosford.

THE BIRMINGHAM RADAR 2 CONTROLLER reports mentoring a trainee when the B737 flight came on his frequency 131·32MHz on handover from RAD1 on 118·05MHz. The B737 was passing through FL84 cleared to FL80 and was given an instruction to turn and descend for the ILS RW15 whilst approaching from the NW. The pilot responded by reporting a M/Glider had just passed 300-400ft above crossing L to R (later confirming it as

predominately blue and white in colour on a heading of about 200°). MACC and RAD1 were informed to pass information to an E145 flight approximately 8nm behind also inbound. The E145 crew reported visual with the M/ glider which was tracked as a primary only return routeing SW which disappeared 4nm S of Cosford. This was later identified as the subject Slingsby T61.

UKAB Note (2): Met office archive data shows the Barnsley RPS for 1300-1400Z was 1012mb, 1400-1500Z was 1011mb and 1500-1600Z was 1010mb. A synoptic weather aftercast shows the general situation at 1200Z as high pressure covering the extreme S of the British Isles and low pressure near Iceland feeding a light to moderate SW'ly flow over the Cosford area. The chart for 1500Z shows surface winds to be light to moderate S to SW'ly, surface visibilities around 9km in haze with no significant cloud in the Cosford area.

ATSI comments that analysis of the Debden radar recording, the only recorded radar indicating any consistent primary radar returns, shows at 1516:06 a primary only return (believed to be the T61) tracking NNE'ly in the B737's 11 o'clock at 6·3nm as it is passing FL100 and is 27·6nm NW of Birmingham.

The B737 flight, enroute from Belfast to Birmingham, was transferred from Manchester ACC to the Birmingham APR RAD1 at 1516:30 when 26·9nm NW of Birmingham. The APR RAD1 descended the B737 to FL80 and transferred the flight to the Birmingham APR RAD2 at 1517:00.

[UKAB Note (3): Between 1516:06 and 1517:00 the primary return is seen to turn L from its NNE'ly track onto SW before steadying on SSE.]

At 1517:12 the primary return is tracking 200° in the B737's 12 o'clock at 1·4nm. At 1517:24, as the B737 crew established contact with Birmingham APR RAD2 and were given a radar heading of 170° and further descent to FL60, the radar shows the B737 was passing FL81 with the primary return in the B737's 1230 position at 0·5nm. Just after 1517:30 the B737 crew replied *"right one seven zero and er for information we've just had a motor glider fly about er three or four hundred feet above us from left to right*". The report is acknowledged by the Birmingham APR RAD2.

[UKAB Note (4): The CPA is believed to occur at 1517:30 but only the B737 is displayed passing through the trail history of the T61 to its NE. Both ac are displayed on the next radar sweep 6sec later, the T61 is in the B737's 4 o'clock at 0·4nm. Taking into account the T61's speed immediately prior to and post incident, it is estimated that minimum separation was about 0·2nm with the T61 to the SW of the B737.]

Although a primary radar return was observed on the Birmingham radar MATS Part 1 Section1, Chapter 5, Page 13, Paragraph 14.2 states the actions to be taken by controllers to avoid unknown ac when operating in Class A or D airspace: *"If radar derived, or other information, indicates that an aircraft is lost, has experienced radio failure or is making an unauthorised penetration of the airspace – avoiding action shall be given and traffic information shall be passed."*

At the time of this Airprox there was no radar derived (e.g. SSR) or other information to indicate that unauthorised penetration of the airspace had occurred and accordingly the Birmingham APR RAD2 was entitled to ignore the primary radar return. No ATC errors disclosed.

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 noted that this was an unusual flight for a Motor Glider to perform - high altitude GH - and that the incident occurred towards the end of a long sortie. Having planned to operate up to 8000ft to the W and SW of Cosford, near Bridgenorth, with few airspace constraints (CAS base level FL145), the pilot had elected to move to the N and NE of Cosford owing to approaching cloud. Although he had reported being cognisant of the airspace structure in the revised area of operation, careful attention should have been paid to establishing his exact position whilst carrying out GH to ensure that his ac was clear of CAS at all times, particularly where promulgated base levels were below his operating level. It was clear to Members that this was not done and that the T61 pilot operated within Class A airspace and flew into conflict with the B737 which he did not see. This had caused the Airprox.

Members agreed that ATC had acted appropriately and could not have been expected to take any action when the T61 primary-only return was seen within the confines of the Daventry CTA. As it was unknown traffic to Birmingham ATC, the controller had quite rightly assumed it to be flying below CAS. The T61 pilot had ample opportunity to see the B737 approaching from the NW during his manoeuvring but had turned almost tail-on to the airliner, onto a crossing flight path which eventually led to the B737 passing behind, unnoticed. The B737 crew were undoubtedly surprised to see the M/Glider, albeit late, at close range (500m) and 200-300ft above in Class A CAS but fortunately in enough time to assess that an actual risk of collision was unlikely. However, without the benefit of any other safety nets (STCA, TCAS), the Board agreed that the subject ac had passed in sufficiently close proximity, unsighted by the T61 pilot whilst manoeuvring within CAS unknown to ATC, to conclude that safety had not been assured during the encounter.

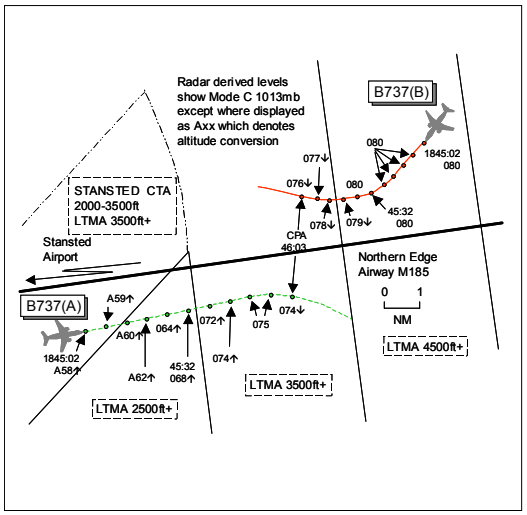
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Slingsby T61 M/Glider pilot operated within Class A airspace without clearance and flew into conflict with the B737 which he did not see.

Degree of Risk: B.

AIRPROX REPORT NO 049/06

Date/Time:	25 Apr 1846	
Position:	5154N 00040E (16nm E Stansted)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-800(A)	B737-700(B)
Operator:	CAT	CAT
Alt/FL:	FL074↑	NR
Weather	VMC CLAC	NR
Visibility:	15km	NR
Reported Separation:		
	200ft V/2000m H	NR
Recorded Separation:		
	200ft V/2·9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737(A) PILOT reports at 305kt outbound from Stansted IFR and in communication with London on 121·22Mhz squawking 1142 with Mode C. The visibility was 15km flying 3500ft above cloud in VMC on radar heading 080° climbing to FL110 when a TCAS TA was received. The PF selected v/s to a reduced ROC but when passing about FL074 they were told by ATC to stop climb at FL070. This was actioned and the other ac was 'seen' on TCAS to pass 2-3km clear to their L and 200ft above. He assessed the risk as low.

THE B737(B) PILOT reports, almost 1 month after the incident, that he did not receive a 'proximate' traffic indication or warnings on TCAS at the time. No further information was proffered.

THE B737(B) OPERATOR'S FLIGHT SAFETY DEPARTMENT reports that post-flight analysis of the flight data confirmed that TCAS had not activated and that the system worked well when checked by the Technical Department.

THE LTCC STANSTED INT DIR (ESSEX RADAR) CONTROLLER reports that B737(B) was inbound to Stansted and was placed on a heading of 230° prior to reaching ABBOT for traffic sequencing. After running the ac SW, she turned the flight onto 275/285° to remain within the RMA and descended it to 6000ft. A few minutes later she turned the flight onto N to fit it into the sequence.

THE LTCC NE DEPS CONTROLLER reports the B737(A) flight called on a CLN departure and was climbed appropriately against other traffic. The ac was 2nm inside his airspace when he noticed B737(B) on a heading with Stansted APC towards B737(A). He turned B737(A) onto heading 120° and stopped its climb. At all times B737(B) remained inside the Stansted RMA whilst his ac, B737(A) remained inside the confines of M185 by 2nm.

ATSI reports that at the time of the Airprox, B737(B), inbound to RW23 at Stansted, was under the control of ESSEX Radar (Stansted Intermediate Director) and B737(A), outbound from Stansted, was working the NE DEPS SC. Both ac were operating in the respective airspace of each controller, which is defined as the northern edge of Airway M185 and the southern edge of the Stansted Radar Manoeuvring Area (RMA). The Essex Controller was operating with a Support (SPT) Controller and described the workload as high whilst the NE DEPS SC believed that his workload was moderate.

B737(B) flight established communication with Essex Radar at 1840, reporting descending to FL90 and was instructed to continue towards ABBOT, with speed 220kt. Approximately 1min later, the flight was instructed to turn L heading 230°, to position in traffic. The radar shows it about 35nm NE of Stansted Airport. B737(A) is also displayed on the radar, having just departed RW23. The Essex Radar Controller mentioned that the SPT Controller commented about this ac to her at the time, although, due to other traffic, she was not able to monitor its further progress.

AIRPROX REPORT No 049/06

On its initial call to NE DEPS, B737(A) flight reported climbing to 4000ft on a Clacton 8R SID. The SID routeing, from RW23, is to: *"Climb straight ahead. At I-SX d1.0 turn left onto CLN VOR R269 by XIGAR (CLNd33) to CLN VOR"*. The pilot was instructed to maintain 4000ft and was informed that there was *"no speed restriction"*. This was not in accordance with a trial of speed restrictions in force at the time (see ATSI last para below). Approximately 1min afterwards, the flight was placed on radar heading 070° and, at 1843:10, was instructed to climb to 6000ft.

B737(B) flight was instructed, at 1843:40, to descend to FL80 and at 1845 instructed to turn R heading 275°. This was followed by an instruction to descend to 6000ft. Meanwhile the NE DEPS SC had cleared B737(A) flight to climb to FL110 and to turn R heading 080°. The radar timed at 1845:20, i.e. after these instructions had been issued, shows the subject ac 8·4nm apart, on potentially conflicting flight paths. B737(A) is tracking E, passing 6200ft and B737(B) is at FL80, on a SW'ly track.

Just prior to STCA activating, which occurred at 1845:36 with a low level alert, the NE DEPS SC noticed B737(B) tracking towards B737(A). He immediately instructed the B737(A) flight to stop its climb at FL70 as B737(B) was indicating FL80 at the time. (Its Mode S was not displaying its Selected Flight Level). Before receiving a response from the pilot of B737(A), the SC added *"turn right immediately heading one two zero degrees"*. STCA activated as the turn instruction was being issued when the ac were 5·6nm apart. At this point, B737(A) was passing FL72, with Indicated Airspeed (IAS) 299kt and B737(B) was still maintaining FL80. The former was approximately 1nm S of the sector division and the latter about 1·6nm N. The Essex Radar Controller, aware of the incident as STCA activated, instructed B737(B) to turn further R heading 285°. Neither controller used the term 'avoiding action'. The tracks of the two ac began to diverge as the horizontal separation decreased. B737(A) arrested its climb at FL75 and the minimum separation occurred (1846:02) as it was descending through FL74, 2·9nm S of B737(B) which had commenced its descent and was passing FL76.

The LTCC MATS Part 2 does not indicate which sector is responsible for ensuring separation in the area where this Airprox occurred, E of Stansted. The only proviso is for Stansted traffic to remain within the Stansted RMA. Since the incident, discussions have occurred within LTCC to resolve the relevant responsibilities. At present, no conclusions have been reached, although the provision of a buffer zone between the NE DEPS Sector and Stansted Approach has been discounted. At other sectors at LTCC, when an ac is taken off its SID, the SC is then responsible for providing separation from inbound ac. It is understood that this procedure is being discussed for this situation.

LTCC TOI 28/06, effective 8 April 2006 (also promulgated by AIC), introduces a trial whereby controllers shall not routinely cancel the departure speed restriction so as *'to establish the implications and effects of a widespread application of the 250kt departure speed restriction'*. The TOI states that *'Aircraft departing on SIDs from Heathrow, Gatwick, Stansted, Luton, London City and Northolt are required to observe an IAS limit of 250Kts below FL100. TC Controllers shall not cancel this speed restriction unless there are overriding safety reasons for doing so, or the pilot reports that they are unable to comply with the speed restriction due to the ac configuration'*.

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 familiar with TC operations were aware of the constraints in the area, the airspace being somewhat confined in size leading to choke points. However, this traffic situation is a common occurrence in a known confliction area requiring tactical resolution by ATC. Both ac were vectored by the respective controllers, quite legitimately, close to the dividing line between the Sectors. Normal 'modus operandi', when a radar controller is vectoring ac inside CAS which adjoins uncontrolled airspace, is to keep ac under his/her control at least 2nm within the boundary. In the absence of formal procedures for specifying responsibilities for the provision of separation pertinent to the relevant Sectors in this Airprox, the onus was on both controllers to take due regard of other traffic which may conflict when operating close to the edge of the dividing line between Sectors. This led Members to agree that both the Essex Radar and NE DEPS SC did not ensure that standard separation was maintained which had caused the Airprox.

That said, both controllers saw the deteriorating situation ahead of STCA activating. The NE DEPS SC gave the B737(A) flight a R turn and stopped its climb, albeit after the ac had climbed through the given stop-off level, whilst

the Essex Radar controller gave a complementary R turn to the B737(B) flight. The B737(A) crew had already received a 'heads-up' TCAS TA alert and reduced their ROC, before actioning the ATC instructions, and had watched B737(B) pass, on the TCAS display, clear to their L and 200ft above. Pilots Members could not resolve the apparent TCAS anomaly, as a complementary alert/warning should have been received simultaneously by the B737(B) flight. Although the cancellation of speed control with B737(A) may have increased its radius of turn during the turn manoeuvre, the controllers' actions were thought to be timely in the circumstances, resulting in only a marginal loss of separation. All of these elements, when combined, were enough to persuade the Board that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

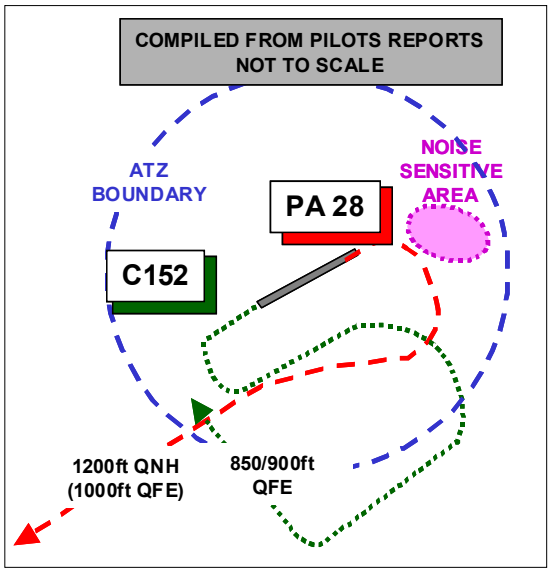
Cause: The LTCC Essex Radar and NE DEPS SC did not ensure that standard separation was maintained.

Degree of Risk: C.

AIRPROX REPORT No 051/06

AIRPROX REPORT NO 051/06

Date/Time:	29 Apr 1017 (Saturday)	
Position:	5153N 00040E (Right base RW06 Earls Colne - elev 225ft)	
Airspace:	Earls Colne ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C152	PA28T
Operator:	Civ Club	Civ Pte
Alt/FL:	900ft (QFE 1014mb)	1200ft (QNH 1022mb)
Weather	VMC CAVOK	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:	0 V/<100m H	Not Seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 152 PILOT reports that he was conducting a circuit training flight for a PPL holder whose licence had expired and that they were passed the RW as 24 LH and the wind was light and variable northerly. They taxied to the RW24 holding position where they completed their checks. They were No.1 to depart and a Cessna 172, on a local flight to the S, was No.2. Around this time, another club ac requested a change to RW06 but before any change was notified they took off and levelled cross wind at 1000ft. The Cessna 172 took off behind them and cleared the circuit.

Earls Colne Radio transmitted the RW change which he acknowledged, stating that he would position and rejoin long right base to RW06 from his current position of downwind RW24. For noise abatement he turned right onto 150° and then right again onto 240°, going E and S around Coggeshall. He was then 1000ft QFE wide downwind for RW06 but wide (outside the ATZ about 3nm) and made a radio call as follows '(callsign) wide downwind for 06'. At that point another ac requested joining instructions and was given RW06, RH circuit and the QFE which was read back correctly. By this time they had turned right base for RW06 heading 330° and he then called '(call sign) long right base for 06' (he made that call for info and to ensure that the other ac knew his position). The other ac then called that they would join right base RW06 No.2.

During this time there was other radio traffic for ac departing RW06 and a further ac taking off. His attention was focused on getting his student into the right position for landing and on the position of the joining ac. The student commenced the reconfiguration for landing as they were coming to the finals turn at 850/900ft, still heading 330° at about 75kt, when they both observed a blue/white T-tail ac in their 2 o'clock, heading about 250° at the same height and very close and fast. He took control, applied full power and broke hard right as the other ac passed directly in front "very very close". He had no time to analyse, just to react.

He advised Earls Colne Radio of the incident, stating that he would file an Airprox and that the other ac was a PA28.

They attempted to continue the detail but went round on the first and second approaches, landing on the third as both of them were very shaken by the incident. After landing he spoke to the pilot of an ac behind them in the circuit who had observed the incident while base leg as No.2 and the captain commented that they had been lucky not to hit the other ac. Later in the day at the request of the club operator he discussed the incident with the other pilot who stated he had never been in that position and that neither he nor his passenger had seen any other ac.

THE PA28T PILOT reports that he and another PPL holder were about to fly from Earls Colne - where his ac was based - to Compton Abbas and he had planned the route the previous night. The weather was good with a cloud base of about 2,500ft; the visibility was greater than 10km and the wind was northerly which was across the RW. He called Earls Colne Radio for the airfield information which was initially given was RW24, LH circuit and QNH of 1022.

Shortly after this there was a discussion over the R/T regarding a change in the RW direction because a C172 was departing with 4 POB and the wind had veered and was slightly favouring 06: presumably the ac needed a headwind component. It was concluded that 06 would be preferable and someone then came on the R/T asking "does that apply to all of us" and Earls Colne Radio then gave a general broadcast changing the RW to 06 with immediate effect.

He taxied to the holding point for RW06 and announced that he was ready for departure as he wished to take off before the C172 as his ac was much faster and there were only 2 aboard. Having announced that he was ready for departure he was told to line up at his discretion and passed the wind so he lined up, took off promptly and announced his departure on the RT. Not far from the far end of RW06 there is a noise sensitive area that necessitates a right turn as soon as sufficient height is gained so he turned as soon as safe. He provided a copy of his map showing his intended route inbound to LAM on the 056 radial (on a heading of 236°). On the climb out he heard no further R/T transmissions and he kept his right turn going although at a reduced rate and climbed to 1200ft [QNH]. Just as he was levelling off and lowering his port wing he heard discussion on the R/T to the effect that somebody had been 'too close for comfort'. Neither he nor his passenger had heard any R/T transmissions nor seen any other ac (other than the C172 taking off) so they assumed that the R/T transmission was in connection with someone else and continued their flight.

On his return to Earls Colne later the same day he was approached by another pilot who had been airborne at the time of the RW change. The other pilot had had to alter course very considerably to avoid him and considered that there had been an Airprox.

He did not know why neither he nor his passenger saw the other ac on his left but he thought that he had still been in the right turn at that time and the ac may have been obscured below his port wing. He was also surprised that the other pilot did not see him until very late bearing in mind that he has HISLs on both wings and red anti collision beacons on top and bottom of the fuselage. He is fully aware that Earls Colne is a training environment where one has to be fully alert at all times.

UKAB Note (1): Earls Colne is a licensed airfield with a 2nm ATZ and an A/G service.

UKAB Note (2): The Earls Colne movement log shows the C152 getting airborne at 1010, presumably as the pilot reported on RW24. The PA28 took off on RW06 (reported) at 1015. The time of the RW change is not recorded but would appear to be after 1010 and before 1015.

UKAB Note (3): The Stansted radar was not available and the recording of the Debden Radar inconclusive, not showing the incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted only of reports from the pilots of both ac.

An experienced GA Member observed that this was a serious incident and that at airfields where there is no positive control pilots must be punctilious in observing the correct procedures. He considered that on the change of RW the only safe method of joining the new circuit would have been to conduct a full overhead join and descent into the circuit. Members were also surprised that the PA28 pilot apparently did not manoeuvre his ac to aid his sighting while in the prolonged, shallow bank angle, turn in the circuit area: he seemed to be in a bit of a rush to get away.

RW changes are inevitable at large and small airfields and although operators generally try to conduct them when it has a minimum effect on traffic, this is not always possible. At uncontrolled airfields in particular, it is vital that pilots are aware that there is the potential for confusion - as witnessed by the 'does that apply to all of us' call - and are ultra cautious.

AIRPROX REPORT No 051/06

When flying in the area of the many uncontrolled airfields in the UK, it is of the utmost importance to conduct a punctilious lookout as this is often the only method of collision avoidance. Although there was no hard evidence, the Board was unanimous that this had been a very close encounter and opined that the separation may have been less than the 100m reported by the Cessna 152 pilot. Since neither pilot had seen the other ac in time to take effective avoiding action, there most likely had been an actual collision risk.

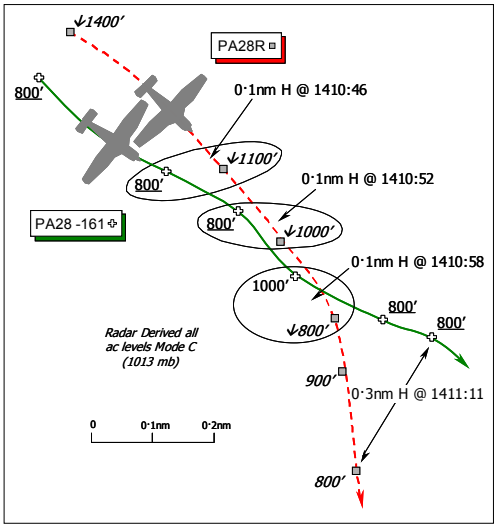
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the PA28 pilot and late sighting by the C152 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 052/06

Date/Time:	29 Apr 1410 (Saturday)	
Position:	5042N 00104W (Bembridge A/d Cct - elev 53ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28-161	PA28R
Operator:	Civ Club	Civ Club
Alt/FL:	1000ft (QFE 1021mb)	1000ft (QFE 1021mb)
Weather	VMC N/K	NK NR
Visibility:	+10km	NR
Reported Separation:	25-35ft V/nil H	Not seen
Recorded Separation:	200ft V @ 0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28-161 PILOT, a flying Instructor conducting a currency checkout on a qualified pilot (PPL) who was the PF, reports the ac has a yellow/brown/red colour-scheme and the HISLs were on whilst flying in the cct to RW30 at Bembridge Aerodrome. They were in communication with Bembridge RADIO A/G Station on 123·25MHz and a squawk of A7000 was selected with Mode C. She stressed that due to local noise restrictions Bembridge request that DOWNWIND and BASE LEGS are flown over the water on this Cct and they were flying in VMC some 1500ft clear below and 10nm horizontally clear of cloud with an in-flight visibility of 10km+.

Heading 120° at 100kt whilst late DOWNWIND RHD for RW30, flying at 1000ft Bembridge QFE (1021mb) and just before commencing the R turn onto BASE-LEG, the PA28 instructor observed another ac. This was a white/red PA28R - identifiable from the registration – that passed directly overhead their own ac some 25-35ft above whilst descending and overtaking them with a "high" risk of a collision. To remain clear of the PA28R she asked the PF to continue downwind in the Cct "to give them some leeway" before they themselves turned in onto BASE-LEG for a 'touch and go' after the PA28R landed, adding that with the arrival of the subject PA28R from somewhere to the W or N there were 3 ac in the Cct.

An Airprox was declared on 123·25 to Bembridge RADIO who were asked if it was possible for someone to speak to the PA28R pilot to ascertain if he had ever seen her ac, but were told they would find it difficult to locate the PA28R pilot as reporting to the Tower was not obligatory.

She added that the surface wind was 020/07kt with +10km Visibility and a cloud base of around 2500ft.

THE PA28R PILOT reports he was inbound to Bembridge under VFR at 1000ft Bembridge QFE (1021mb), whilst in communication with Bembridge RADIO A/G Station on 123·25MHz. A squawk of A7000 was selected, he thought, with Mode C. His ac has a burgundy/gold/white colour-scheme.He was not aware of any Airprox taking place and was confused as to why a qualified instructor would have not approached him to discuss a "near-miss". The first he was aware of this Airprox report was when his group received a telephone call some 6 days after the occurrence. To the best of his recollection no near miss occurred.

UKAB Note (1): The UK AIP at AD 2-EGHJ-1-1 (4 Aug 05) notifies the Bembridge ATZ as a radius of 2nm centred on RW12/30, extending from the surface to 2000ft above the aerodrome elevation of 53ft amsl and active on weekdays only at specified times. An A/G Service C/S BEMBRIDGE RADIO is available at these specified times and also by arrangement.

It is noted that the aerodrome also operates outside of notified licensed hours. However, the ATZ was not notified as active on this Saturday afternoon.

UKAB Note (2): The Pease Pottage Radar recording shows the PA28R – squawking A7362 with Mode C - approaching the vicinity from the NW and passing due N of Bembridge aerodrome at 1410:08, descending through 2000ft Mode C (1013mb). The PA28R appears to join the DOWNWIND leg of the Cct direct and is shown descending through 1400ft Mode C at 1410:34. This is the point that the PA28-161 is first shown on the recording at 800ft Mode C (1013mb), squawking A7000, whilst established DOWNWIND. The PA28R overhauls the PA28-161 to port as it descends through 1100ft Mode C at 1410:46, some 300ft above the PA28-161, and about 0·1nm away – 200yd. Horizontal separation of 0·1nm is maintained over the next sweep as the CPA is achieved at 1410:52, at a position 1·8nm NE of Bembridge, with some 200ft of vertical separation evident after the PA28R has overtaken the PA28-161 to port and is shown in the latter's 12 o'clock. At the large scale viewed, the subsequent apparent R then L turn shown by the PA-161 thereafter may be the result of track jitter as the pilot does not report taking any avoiding action turns. Moreover, the 1000ft Mode C indication of the PA28-161 on the next sweep at 1410:58, suggesting the latter was now some 200ft above the PA28R may be an anomalous response and is generally inconsistent with preceding and successive returns in level flight. However, the respective tracks cross in between sweeps as the PA28R indicates 800ft Mode C, still in the order of 200yd away. The PA28-161 maintains that indicated level thereafter and the two ac are shown indicating 800ft Mode C, at a range of 0·3nm as the PA28R turns in towards the aerodrome as horizontal separation increases.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

From the reporting pilot's perspective there was probably little that either she or the pilot undergoing the currency check could have done to forestall this encounter as the PA28R had overtaken from astern, to port and above, although an indication that the PA28R was joining the Cct might have been apparent from any RT transmissions by the latter's pilot. Notwithstanding that the provisions of Rule 39 to the 'Rules of the Air' did not strictly apply outside the period that the ATZ was established, the importance of appropriate Cct joining calls to alert pilots to the presence of other ac should not be underestimated. Routinely, A/G Stations do not have the facility of recorded RT so it was unclear what transmissions were made to alert pilots operating in the Cct here.

It seemed to the Members from the PA28R pilot's account that he had not seen the PA28-161 that was already established downwind in the aerodrome Cct when the former joined the Bembridge aerodrome Cct from the N, DOWNWIND R for RW30. The PA28R pilot did not positively state in his report that he had seen the PA28-161, only that he had no recollection that a "near miss" had occurred when he joined. However, it seemed inconceivable that he would have flown so close to the PA28-161 if he had known it was there. Consequently, the Board agreed that non-sighting of the PA28-161 by the PA28R pilot was fundamental to the cause. The radar recording had shown that the PA28R had descended from above the PA28-161 and overtaken the latter to port and descending whilst downwind, before turning across ahead of the PA28-161, in towards BASE LEG. The highly experienced GA pilot Member commented that difficulties of integrating into the visual aerodrome Cct would not occur if pilots made more use of the standard 'overhead' join – especially at aerodromes where no 'Air Traffic Control' Unit was established. The 'overhead' join enables pilots to sight other Cct traffic in good time before descending down to join them at Cct height and its use here might well have prevented this close quarter's situation. Consequently, the Board agreed unanimously that this Airprox had resulted because the PA28R pilot did not safely integrate into the Bembridge aerodrome circuit and flew into conflict with the PA28-161 which he did not see.

The PA28R pilot overtook the PA28-161 some 200yd away and descended in front of it whilst unaware of its presence. It was fortuitous that in the order of 200ft of vertical separation existed at the time as the pilots in the PA28-161 were not well placed to avoid the other ac themselves and effectively took no action until after the event. Consequently, the Members agreed by an overwhelming majority that an actual risk of collision had existed in the circumstances reported here.

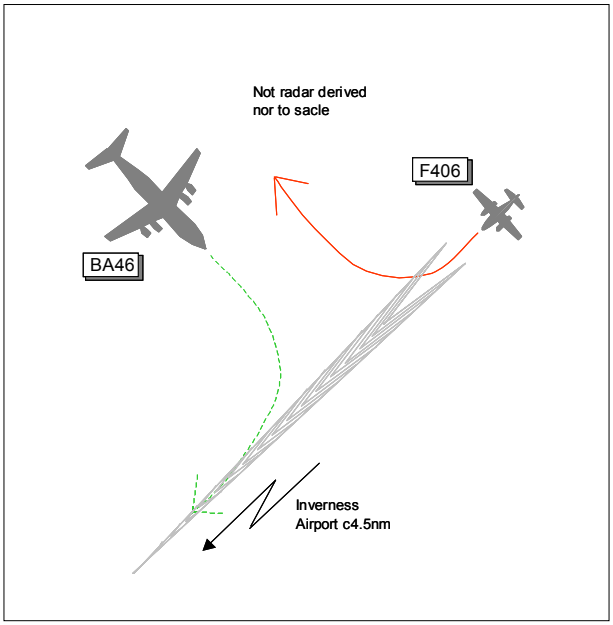
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28R pilot did not safely integrate into the Bembridge aerodrome circuit and flew into conflict with the PA28-161 which he did not see.

Degree of Risk: A.

AIRPROX REPORT NO 053/06

Date/Time:	4 May 1014	
Position	5736N 00358W (4·5nm NE Inverness - elev 31ft)	
Airspace:	SFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BA46	F406
Operator:	CAT	Civ Trg
Alt/FL:	2000ft↓ (QNH)	2000ft (QNH 1015mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	40km	NR
Reported Separation:	300ft V/1nm H	Not seen
Recorded Separation:	TCAS data 580ft V/ 1·04nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BA46 PILOT reports inbound to Inverness IFR and cleared by Kinloss, he thought, for the procedure to RW23. After transfer to Inverness Tower and on reaching 7nm, he called requesting a visual approach which was approved via the O/H to join downwind RH for RW23. They were No2 to an ac on finals with which they had visual contact. ATC called 'visual' with their ac and asked them to call ready for base. As they commenced a turn onto base, unable to call ATC owing to busy RT, another pilot was heard to call 'base turn complete': simultaneously an ac appeared on TCAS. This was the first time they knew about any other traffic, he thought, either IFR or VFR. This other flight was instructed to orbit on final approach. They continued their turn onto base at 160kt as to reposition downwind would have conflicted with the other traffic on finals turning R. By now a TCAS TA 'traffic' alert had been received and, on descending through 1500ft, the traffic was seen on TCAS to pass down their LHS at 1-1·5nm range and 300ft above but increasing. A successful landing was subsequently executed. Neither the L nor RHS pilots saw the other ac but a Training Captain seated in the jump seat saw a F406 through the LH flight deck window, whilst they were on base leg. The F406 was heading towards the RW, slightly to the R of the C/L, approximately 240-270°, climbing.

THE BA46 FLIGHT SAFETY DEPT provided a TCAS data download for examination. The data reveals the BA46 TCAS equipment generated a 'proximate' traffic indication when the BA46 was descending through 1712ft QNH with the F406 on a relative bearing (RB) of 330° range 2·33nm at 2112ft altitude. A TA alert is generated 10sec later when the F406 is RB 307° range 1·67nm, now level at 2096ft with the BA46 descending through 1648ft QNH. The CPA occurs a further 16sec later when the F406 is RB 246° range 1·04nm, maintaining level at 2064ft with the BA46 showing 1484ft QNH. The TA alert ceases 4sec after CPA with the horizontal separation increasing as the ac diverge.

THE F406 PILOT reports on a local examination flight from Inverness, VFR and in communication with Tower on 122·6MHz squawking an assigned code with Mode C. Whilst established inbound RW23 at 2000ft QNH and about 7d and configuring the ac for descent at 140kt, ATC requested them to orbit and to become No2 to a BA46. He, the Licensing Skills Test (LST) examiner, removed the I/F screens and reconfigured the ac and commenced the orbit. He could not see the BA46 so asked ATC for its position. After completing 270° of the orbit he saw the BA46 on short finals and continued the examination exercise by repositioning the ac onto finals. He had anticipated the BA46 following the normal IAP however the ac appeared to have cut inside disrupting his approach. He opined that positioning onto finals in front of another ac should only be considered when it could be done without disrupting the other ac's approach.

AIRPROX REPORT No 053/06

THE INVERNESS ADC/APP reports the F406 was VFR following the VOR/DME approach procedure to RW23. The BA46 was inbound IFR from the SW and its crew requested a visual approach RH from 6nm S which was approved. The flight was asked to report downwind RH and ready for base leg. Whilst checking the position of the F406 to establish which ac would be No1, he noticed the BA46 turning R base. The F406 flight was asked to orbit to reposition No2 but the crew opted to route clear to the N and was given an updated position report on the BA46. However, the F406 flight was reported to have flown close to the BA46 by its Captain who later telephoned to advise that he would be filing an Airprox.

ATSI reports that the controller had been in position as the ADC/APP for 45min when the Airprox occurred. He described his workload as moderate. The 0950 Inverness weather was: Surface wind 140°/10kt, Visibility 40km and Cloud few at 3200ft. Unofficial comments by ATC were that, although the visibility was reported as 40km, it was quite hazy, so ac were hard to see. Inverness is not equipped with radar.

The F406 was conducting a training flight from Inverness. At 1007, the pilot reported approaching the Inverness (INS) VOR at 3000ft, requesting to *"...go outbound for the VOR maintaining VFR"*. He was cleared for the VOR/DME approach VFR, to report outbound. The pilot reported outbound at 1008 and was instructed to report base turn complete.

At 1009, the BA46 flight, inbound IFR to Inverness, established communication with Approach Control. The pilot reported passing FL77 descending to FL70. The flight was instructed to descend to 5000ft and shortly afterwards, in accordance with standard procedures, to 3500ft after passing 10nm DME and was *"...cleared VOR DME to ILS approach runway two three from the overhead report beacon outbound"*. The controller assessed that by the time the BA46 entered the procedure, the F406 would be well ahead. When the BA46 was approximately 6nm from INS, the crew requested to *"...take visual approach via the overhead to join right base for two three"*. The flight was cleared for a visual approach to RW23, via the overhead, to report downwind R and informed *"...traffic's a Cessna Twin Caravan its ????? approach ????? but VFR shortly be turning inbound runway two three"*. (Two or three words unintelligible). The crew replied *"copy the traffic er report right base for two three..."*. The incorrect cct report position was not challenged. The controller commented that he had not yet decided the approach order of the subject ac but he intended to monitor the situation. At this time, the F406 reported *"...just making the base turn"*.

At 1013, the BA46, at the controller's request, reported his passing altitude as 2500ft. This was to establish a cleared altitude for the next arrival. The controller replied *"BA46 c/s roger I see you downwind report ready for right base"*. The BA46 crew responded *"report ready for right base BA46 c/s"*. The controller explained that both he and his Assistant were trying to sight the F406 but even with the use of binoculars this was not achieved. The controller commented that he could not remember the exact timing but believed that after/as the F406 pilot reported base turn complete at 7nm (shortly after the previous BA46 readback), he noticed that the BA46 had turned onto base leg. This, thereby, negated any plan of continuing the BA46 downwind to position behind the F406. Accordingly, he transmitted to the F406 flight at 1014 *"F406 c/s roger er be possible if you could take an orbit ????? then position number two to the One Four Six he's late downwind right just ready for right base now"*. The pilot responded *"F406 c/s roger we'll break off towards the ?????"*. The controller said that, at the time, from the pilot's comments, he understood that the ac would be breaking off towards the N, which would allow for subsequent repositioning. Although he still had not sighted the F406, he assessed that this action would resolve the situation and instructed the BA46 to report final number one.

When asked, the pilot of the F406 said that he was not visual with the BA46 but shortly afterwards, the crew of the BA46 reported *"...visual with the er Caravan"* and was cleared to land RW23. The F406's pilot, still not having sighted the BA46, requested its range. By now the controller judged that the BA46 was on about a 4 mile final, the pilot actually reporting shortly afterwards at 3nm DME. It was only when the F406 was repositioning for the procedure that the pilot sighted the BA46 ahead. No comments were made on the frequency by the crew of the BA46 about the proximity of the F406. Subsequently, he filed an Airprox report stating that the two ac were about 1-1·5nm apart horizontally and 300ft vertically. He had received a TCAS TA alert.

The incident occurred within Class G airspace. There was no requirement for the Inverness ADC/APP to separate the two ac as the F406 was operating VFR. The MATS Part 1, Section 2, Chapter 1, Page 1, states that *'Aerodrome control is responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between aircraft flying in, and in the vicinity of, the aerodrome traffic zone'*. On this occasion, the controller passed TI to the crew of the

BA46 when he cleared him for a visual approach. TI was also issued to the pilot of the F406, when the controller realised that the BA46 had turned onto base leg ahead of it. It would appear, from their subsequent reports, that both pilots did not appreciate the relative position of the other ac. The pilot of the BA46 acknowledged the TI about the F406 and in his written report stated that when cleared for a visual approach he understood he was number two in traffic. He had established visual contact with an ac on final approach (the F406 was the only ac ahead of the BA46 at the time). Later, as he turned onto base leg, he observed an ac on TCAS, the presence of which, he commented, he had not been informed. With hindsight, it is probable that if the TI had been updated as the BA46 proceeded downwind, it would not have turned onto base leg. Although advised that the BA46 was late downwind, the F406's pilot reported that he did not sight the BA46 when instructed to orbit by ATC as he had *"anticipated the 146 following the normal I/P pattern, however he had cut inside disrupting the approach"*.

UKAB Note (1): The UK AIP at AD 2-EGPE-8-13 shows the Inverness VOR/DME IAP for RW23. The outbound track from the INS VOR (on the aerodrome) is R026° ac Cat C, or R041° ac Cat A or B, descending to 2000ft altitude followed by a R turn at 9·5DME inbound to establish on FAT 231°; descent to be commenced at 6·5DME. The FAT is offset 4° N of RW23 C/L.

UKAB Note (2): The Airprox occurred outside of 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, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The ATSI Advisor informed Members that although the BA46 crew reported being No 2 to an ac on finals which they saw, the only other ac in the area was the subject F406. Contrary to the BA46 crew's recollections, TI on the F406 was passed to them when they were cleared for a visual approach via the O/H, to report downwind RH which they acknowledged erroneously as report R base. No traffic sequence or order was stated by the ADC/APP to the BA46 crew and at this time the F406 flight was commencing its base turn. The ADC/APP had initially planned that the BA46, in following the full IAP for RW23, would be No 2 to the F406 but he had then modified his plan. However, the ADC/APP was awaiting further position reports to establish a traffic sequence. When the ADC/APP saw the BA46 downwind, the crew were asked to *"...report ready for right base"* which was correctly acknowledged. The ADC/APP was still trying to assess the relative position of the F406, both visually and from position reports, as there was no ATM to see their actual positions. However, the BA46 crew had then turned onto base leg without clearance and flew into conflict with the F406 on final approach which had caused the Airprox.

The overall situation was probably not helped because the BA46 crew had flown so far downwind, closer to the approaching F406, itself following the IAP. Routeing through the Inverness O/H had undoubtedly placed the BA46 in a poor position to start a visual cct, making a true downwind position - abeam the upwind end of, and adequately displaced from, the RW - unachievable. Thereafter the BA46 crew were always trying to manoeuvre to a position that was far enough displaced from the RW extended C/L to allow them to turn their ac directly back onto final approach which had probably led to their extended track.

The ADC/APP had seen the BA46 turning R from downwind and had immediately told the F406 crew to orbit and position No 2 to it. The F406 crew had elected to orbit R and this was carried out level at 2000ft but they had only seen the BA46 after completing 270° of the turn back towards final approach. Whilst turning onto base leg and as the F406 appeared on their TCAS display, the BA46 crew heard the F406 crew report *"base turn complete"*. The TCAS data download had revealed that when a 'proximate traffic' alert was received during the turn, the BA46 was already 300ft below and separated by 2·3nm from the F406. Whilst continuing their descent, with 400ft vertical separation, a TA alert was received and the F406 was seen, both on TCAS and by the 'jump seat' Capt, to manoeuvre, eventually passing abeam and flying in the opposite direction an estimated 1nm clear to their L and 300ft above. TCAS data revealed nearly 600ft vertical separation at the CPA. In the end, as the geometry of the encounter had unfolded, the flight path flown by the BA46 crew had taken the flight ahead of and below the 'sighted' F406 which was maintaining level flight and turning off the FAT. All of these factors, when combined were enough to persuade the Board that safety had been assured during the encounter.

AIRPROX REPORT No 053/06

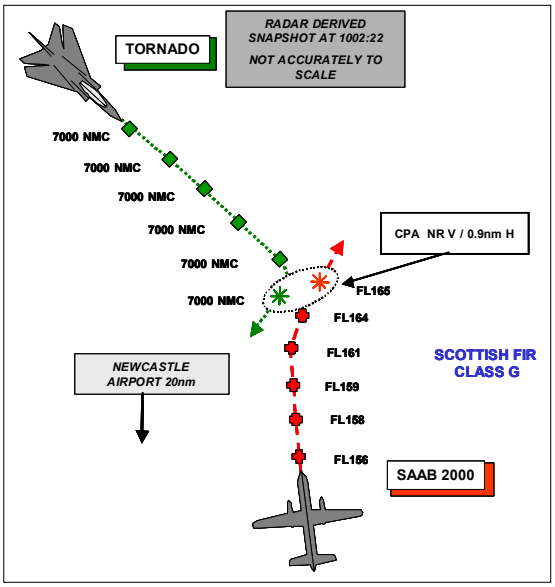
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The BA46 crew turned onto base leg without clearance and flew into conflict with the F406 on final approach.

Degree of Risk: C.

AIRPROX REPORT NO 054/06

Date/Time:	3 May 1002	
Position	5532N 00157W (24nm SE St. Abbs Hd)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado F3	Saab 2000
Operator:	HQ STC	CAT
Alt/FL:	16000ft	FL160↑
	(RPS 1002 mb)	(SPS)
Weather	VMC CAVOK	VMC NR
Visibility:	40km	~30km
Reported Separation:		
	0ftV/1nm H	~0.5nm
Recorded Separation:		
	NR V/0.9nm H (See UKAB Note (1) below)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO F3 PILOT reports flying as an interceptor for a formation of another 2 Tornado F3s in the Class G airspace of the Scottish Borders. He was not in contact with any agency but was squawking 7000 with Mode C [see ATSI report] and his HISLs and Nav lights were switched on. While heading 170° [see radar picture] at 400kt and as he was debriefing and recording with his navigator the details of a previous intercept, he saw an ac in his right 1 o'clock just over 1nm away in a right hand turn at the same level. He broke right to increase sight-line rate and passed down the left side of the other ac, assessing that the risk of collision would be high if he had not manoeuvred. The other ac, which he thought might be a Saab 340, appeared to continue its right-hand turn, rolling out on an Easterly heading.

THE SAAB 2000 PILOT reports flying a scheduled passenger flight in a TCAS equipped ac on an IFR route direct from Newcastle to Aberdeen; he was squawking with Mode C and was in receipt of a RAS from Newcastle. When he was about 20nm N of Newcastle, heading about 030° at 300kt and passing FL160, he was passed TI by Newcastle on a contact. He reacted to the instructions given by Newcastle and saw the ac on TCAS at a distance of 1nm but did not get a TA, assessing the risk as being medium.

THE TORNADO F3 PILOT'S UNIT comments that this Airprox occurred in Class G airspace whilst the Tornado F3 was carrying out autonomous air defence training exercises in an OTA with no suitable ATC or GCI service available. The civilian ac was not operating in controlled airspace nor was it on a defined route but was transiting through an area frequently used for military flying and high-energy manoeuvres. It was fortunate that the Tornado pilot's good lookout, even during a period between intercepts with the additional workload of inter-cockpit debriefing taking place, led to him visually acquiring the other ac in time to take avoiding action and to prevent a collision. It is clear from his report that without the avoiding action on his behalf, the chances of a collision were high. As it was, he believes that he maintained a separation of 1nm.

UKAB Note (1): Assuming the Tornado was at 16000ft on a QNH of 1002 as reported, the vertical separation at the CPA would have been about 200ft.

THE CONTROLLER reported that he was not aware of the incident until almost 2 weeks later. [The remainder of his report was given after listening to the RT tape and was verified by the ATSI report below].

ATSI reports that the Saab had departed Newcastle bound for Aberdeen on a direct track through the FIR(s) climbing to FL225 and the event occurred 20nm N of Newcastle; as the ac left Newcastle CAS, APR1 placed the ac on a RAS. The traffic loading at the time of the event was light to moderate with both civil and military transits

and outbounds and APR1 (the controller involved in the event) can be heard passing frequent and relevant TI to several ac including the subject Saab.

Analysis of the Great Dun Fell Radar shows the subject Tornado manoeuvring to the NW of Newcastle [Squawking 7000 NMC] at a point where the terrain would have screened it from both the Newcastle primary radar and MSSR [Monopulse SSR] [and the Great Dun Fell (GDF)] had it been at low level. However, since, at no time prior to or during the event, is there any Mode C data displayed by the Tornado [verified on the GDF recording] it is not possible to determine its level from the radar data. Although any ac at 16000ft should have been visible on the Newcastle primary radar, neither the APR1 nor the APR2, who was sitting alongside APR1 and monitoring the traffic situation, could recollect seeing the subject Tornado until the time APR1 called the traffic to the Saab when it was 8nm away. [The radar recording shows the distance to be at 9.4nm]. At 1001:30 APR1 advised the Saab of traffic in his *"10 o'clock at 8 miles with no height information"* and that it appeared it would *"pass behind".* The Unit investigation found that this was the first time the Tornado was seen by either Controller.

In a continuous transmission APR1 instructed the Saab pilot to turn right onto a heading of 050° to avoid the Tornado that still displayed no Mode C information, but he did not use the words 'Avoiding Action'; this transmission ended at 1001:52 as the Saab was passing FL155. At that point the Tornado was in its 10 o'clock at 6.1nm. The Saab can then be seen in the right turn at 1002:15, passing FL164, with the Tornado in its 9.30 at 1.3nm. On the next sweep the Tornado can also be seen in a right turn as it passed to the W of the SAAB by 0.9nm at 1002:23; this was the CPA. The Saab was passing FL165 at that point and was subsequently transferred to Scottish Mil. The Saab pilot did not report receiving any TCAS alerts.

UKAB Note (2): The Saab pilot reported on the RT to Newcastle "*Yeah it's a Tornado in sight C/S "* at 1002:50, just before the controller called that he was clear of the traffic.

HQ STC comments that the time interval since this occurrence has not allowed any verification of the ac Mode 'C' status. However, there is no reason for the F3 purposely not to be squawking. Although late, the F3 pilot saw and avoided the Saab.

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 commended the Tornado pilot for an open and honest report.

The Board noted that both ac had been operating legitimately in Class G airspace where 'see and avoid' was the prime means of collision avoidance. The Saab captain elected to seek the assistance of a radar unit to help him in this responsibility, the Tornado captain did not.

Specialist Members considered the role that Newcastle APR had played in this incident. The controller involved has subsequently left the unit therefore it was not possible for ATSI to gather any additional information. The ATSI Advisor informed the Board that although there have been incidents involving Newcastle there was little commonality and no inherent problems had been revealed by his department's investigations.

Members were not able to ascertain why the controller(s) had not assimilated the Tornado until relatively late (6.1nm). Although the Tornado was not squawking Mode C (possibly due to a switching error), in the absence of altitude information or other information to the contrary the controller should have assumed that it could be at the same level as the Jetstream and therefore in confliction. In the event however, although not achieving the separation desired while providing a RAS and not using the term 'Avoiding Action', Newcastle APR did provide the Saab pilot with a turn away from the approaching Tornado which helped to resolve the confliction of flight paths and therefore increase the separation.

The Tornado pilot also, probably due to his preoccupation with other tactical duties, had reacted later than optimum at 1nm separation. A Member enquired why the Tornado crew had not picked up the Saab on their AI radar but it was explained that the crew most likely had been largely occupied by recording the details of the previous intercept

on paper and tape. The Board noted that when the Tornado pilot did react, his response was positive, in the correct sense and was largely responsible for generating the horizontal separation of just under 1nm.

In considering the risk the Board noted that the Saab did not get any TCAS warnings (had one occurred it would have been a TA only due to NMC from the Tornado) and that the Tornado pilot had seen the Saab throughout. Members therefore concluded that there had not been any risk that the ac would have collided.

PART C: ASSESSMENT OF CAUSE AND RISK

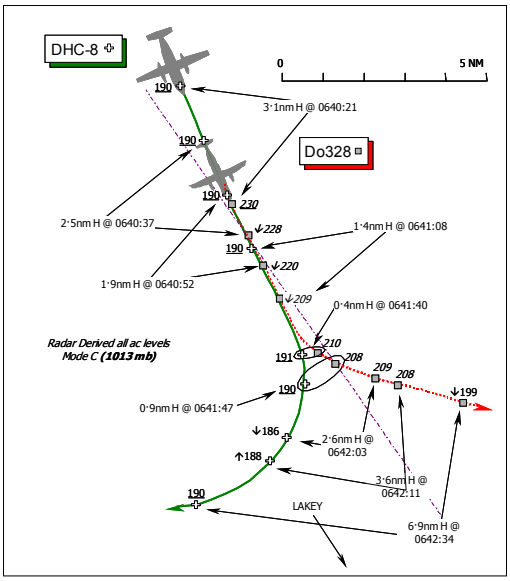
Cause: Conflict in Class G Airspace resolved by the Tornado pilot and Newcastle APR.

Degree of Risk: C.

AIRPROX REPORT No 055/06

AIRPROX REPORT NO 055/06

Date/Time:	4 May 0641	
Position:	5424N 00307W (18nm SSE of DEAN CROSS)	
Airspace:	Airway N615	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	DHC-8-402	Do328-100
Operator:	CAT	CAT
Alt/FL:	FL190	FL230
Weather	VMC NK	VMC NK
Visibility:	>50km	35km
Reported Separation:	<1000ft V	NR
Recorded Separation:	1900ft V @ 0·4nm Min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE De HAVILLAND DHC-8-402 PILOT (DHC-8) reports that he was on an IFR transit from Glasgow to Birmingham in a level cruise at FL190 in VMC and in receipt of a RCS from MANCHESTER CONTROL on 125·95MHz (NORTH UPPER SECTOR). TCAS is fitted and the HISLs were on.

Southbound at 365kt in the vicinity of LAKEY, a TCAS TA was enunciated on traffic some 2900ft above them and ahead, upon which they were closing. The ac Captain and PNF was off the MANCHESTER frequency at the time obtaining a weather report and the 1st Officer, who was the PF, spotted the other ac visually – a white high-wing twin – about 2nm away and he – the PNF - became visual shortly afterwards. Clearly in a rapid descent, the other ac was "growing in size" whereupon the TA "vanished" and no further TA or RA was noted. The other ac was now virtually directly above his ac and filling the top left-hand quadrant of the left windscreen when ATC issued an avoiding action turn initially onto 200° and a descent was initiated concurrently by the 1st Officer who had lost sight of the other ac and believed that it was going to collide with them. With a further avoiding action R turn instruction from MANCHESTER onto 270°, he - the PNF - lost sight of the other ac after turning onto W. Estimating the minimum separation to be 1000ft vertically or less, he assessed the risk as *"high".*

He did not feel it necessary to make an Airprox report on RT at the time in view of the involvement of ATC who were fully aware of the situation.

THE Do328-100 PILOT reports that he was in transit southbound to London City Airport from Edinburgh and was flying in a level cruise at FL230 at 230kt whilst under a RCS from MACC SECTOR 29 on 118·775MHz.

Flying under IFR in VMC some 10,000ft clear above cloud with an in-flight visibility of 35km, some 10nm N of LAKEY an emergency descent was initiated because of suspected cabin decompression. During the MAYDAY RT call to MANCHESTER CONTROL, TCAS enunciated an RA to which they responded. Vertical speed was reduced, in conjunction with MANCHESTER CONTROL's instruction to level at FL200 and ATC instructed them to turn L to avoid another ac below them - the DHC-8 - that was not seen.

THE MACC SECTOR 29 RADAR CONTROLLER (S29 RADAR) reports that the Do328 crew checked-in on the frequency at FL230 during a busy period. The flight was in a level cruise through his sector routeing along N615 and therefore required little attention. He heard the Do328 C/S on the RT and then a garbled message finishing with "pressurisation problem". He looked at the ac's return on his radar display and noted it had already begun descending – the flight indicating about FL217 on Mode C. He instructed the Do328 crew to maintain FL200 on reaching and also instructed them to turn L because of traffic directly below them at FL190 – the DHC-8. He shouted across the Control Room to inform the NORTH UPPER SECTOR Controller of the situation but he did not

use the intercom - or the priority phone line - as he felt he needed to take immediate action due to the proximity of the DHC-8 at FL190 about 1 mile astern of the Do328. Further clearance for the Do328 to descend at the crew's discretion was issued when there were no further ac to affect the descent. On advice from the MACC Watch Manager he instructed the Do328 crew to squawk A7700 whereupon the Do328 pilot informed him he wanted to 'downgrade' his emergency to a PAN. But he – S29 RADAR - had not realised that the Do328 pilot had informed him 'officially' that it was a 'MAYDAY'. The ac stopped descent at FL140 and was subsequently transferred to the NORTH LOWER Sector. Prescribed separation was not eroded.

THE MACC NORTH UPPER SECTOR RADAR CONTROLLER (N UPPER RADAR) reports that at 0642, he observed the Do328 descending in S29's airspace directly above the DHC-8. S29 RADAR than shouted across the room that his traffic had an emergency and was descending to low level. S29 RADAR stated that his traffic was turning E, so he – N UPPER RADAR – issued an avoiding action turn to the W to the DHC-8 crew. Prescribed separation was not lost.

ATSI reports that at the time of the Airprox the Do328 was in communication with the MACC S29 RADAR controller and the DHC-8 was in contact with the MACC NORTH UPPER RADAR controller. The Do328 crew reported on frequency at 0638:40, maintaining FL230 and routeing southbound direct to LAKEY. At this time, the DHC-8 was in the 6 o'clock position at a range of 4·8nm from the Do328, maintaining FL190. The S29 controller was expecting little from the crew of the Do328 as it was at its assigned cruising level and simply transiting through his sector. At 0640:37, the radar recording shows the Do328's Mode C indicating FL228 and that the DHC-8 was, at that time, 2·5nm behind. S29 RADAR then instructed another ac to climb to FL270 and the crew read this back. Although, following analysis, the RTF transcript shows that the Do328 crew prefixed their next transmission with 'MAYDAY' this is not clear from the voice recording as the transmission crossed with that of the other flight. At 0640:52, the Do328 was now descending through FL220, 1·9nm ahead of the DHC-8. The Do328 crew advised the controller just moments before 0641:00, "…*MAYDAY MAYDAY this is* [Do328 C/S] *we are having cabin decompression requesting*" before the transmission stopped. The controller replied: "[Do328 C/S] *that's copied if you can do a left turn there is traffic beneath you stop the descent flight level 200*" but there was no response from the Do328 crew. The S29 controller shouted to the N UPPER RADAR controller requesting that he turn the DHC-8 R onto a westerly course, which was transmitted to the DHC-8 crew at 0641:10. The S29 controller then transmitted: "[Do328 C/S] *I say again maintain flight level 200 on reaching if you can turn left immediately I will give you further descent in approximately 2 or 3 miles*". The crew replied: "*That's maintain 200 on reaching turn left and wilco* [Do328 C/S]".

[UKAB Note (1): The Great Dun Fell Radar recording reveals that at 0641:08, the Do328 was passing FL209, 1·4nm ahead of the DHC-8 that was still maintaining FL190. The Mode C of the Do328 then indicates FL210 when it was 1·1nm ahead of the DHC-8 before showing a slight climb to FL212 when, at 0641:26, it is 0·7nm ahead of the DHC-8. The effect of the turn instructions then becomes apparent, with the DHC-8 turning R and the Do328 turning L. At 0641:40, the Do328 is indicating FL210, some 1900ft above the DHC-8 that was in its 4 o'clock at a minimum horizontal separation of 0·4nm indicating FL191 Mode C. The two ac pass each other at 0641:47, separated by 0·9nm horizontally at a minimum vertical separation of 1800ft. The DHC-8 crew's descent is then apparent to a minimum level of FL186 at 0642:03. Meanwhile, at 0642:00, S29 RADAR controller transmitted: "[Do328 C/S] *you can descend now at your discretion*".]

The effect of the turn instructions passed by the two controllers was that horizontal separation was in place before the Do328 descended through the level of the DHC-8. Thus standard separation was maintained throughout the encounter.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was plain from the S29 Controller's report that he had not initially detected the 'Emergency Call' proword of MAYDAY – prudently used by the Do328 crew to highlight their predicament to ATC - because the ATSI report had shown that unfortunately the emergency transmission crossed with that of the other flight. CAT pilot Members stressed the importance of not employing undue haste in these difficult situations if at all possible, ensuring that the message is conveyed across to ATC appropriately. (Ideally the emergency transmission should include the distress 'Emergency Call' proword of MAYDAY used three times at the start of the message followed by the ac

callsign). Nevertheless, it was clear that the controllers concerned immediately appreciated the situation and reacted expeditiously to prevent the situation from deteriorating further by applying co-ordinated avoiding action turns and thereby re-establishing horizontal separation between the two ac as quickly as possible. The Board commended both controllers for their astute handling of the situation once the problem was recognised. A controller Member observed that although it might have seemed a somewhat crude method of communication when S29 shouted across the Control Room to inform his colleague on the NORTH UPPER SECTOR, it was obviously effective and also apparently drew the immediate assistance of the Watch Manager. The issue of using the emergency squawk of A7700 – as occurred here - was discussed. The military area controller Member stressed the importance of its use so as to pinpoint to controllers at Distress & Diversion Cell at LATCC (Mil) and controllers at other ATCRUs the location of the emergency ac, thereby enabling controllers to steer their ac clear of the emergency ac and facilitate the resolution of the emergency situation. Controllers should be in no doubt as to its usefulness where appropriate.

For their part the reporting DHC-8 crew were evidently concerned for their ac's safety when they spotted the Do328 descending towards them. However, it was clear that their estimate of the minimum separation was significantly less than was actually maintained by the swift avoiding action instructions issued and their own prompt compliance. As it was, unbeknownst to the DHC-8 crew at the time, significant vertical separation was comfortably maintained until horizontal separation was established – indeed the minimum evinced by the radar recording was 1900ft at the closest point but this was as they executed their R turn onto W and thus as the Do328 disappeared from their field of view. This perhaps understandably heightened their concern as they lost situational awareness in the absence of any TCAS derived information about the Do328 in this tense situation, although as it descended towards them the radar recording reflected that the Do328's Mode C was clearly displayed. Standard separation was maintained and it was evident that the Do328 crew were also able to arrest their decent as necessary to accomplish this. As the conflict was quickly resolved, the Board concluded that this Airprox had resulted because the emergency descent of the Do328 had caused the DHC-8 crew concern, but in the circumstances related here there was no risk of a collision whatsoever.

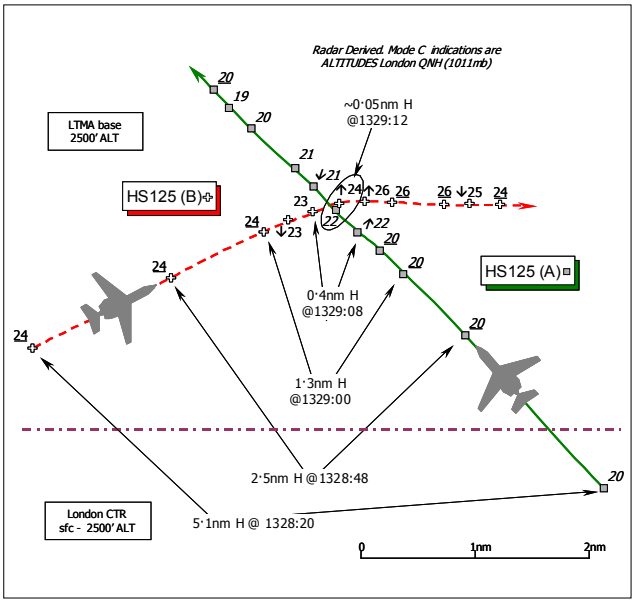
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The emergency descent of the Do328 caused the DHC-8 crew concern.

Degree of Risk: C.

AIRPROX REPORT NO 056/06

Date/Time:	8 May 1329	
Position:	5137N 00035W (3nm WNW CHILTERN NDB)	
Airspace:	London FIR/LTMA	(Class: G/A)
	Reporting Ac	*Reporting Ac*
Type:	HS125-700	HS 125-800B
Operator:	HQ STC	Civ Comm
Alt/FL:	2000ft	2400ft
	QNH (1011mb)	QNH (1011mb)
Weather	IMC CLOC	VMC CLBL
Visibility:	3-5km	10km+
Reported Separation:		
	200ft V/½nm H	200ft V/nil H
Recorded Separation:		
	100ft Min V @ 0·4nm H	
	200ft V @ ~100yd [0·05nm] Min H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF HS125 (A) provided a laudably frank account reporting that he was outbound from Northolt under IFR on a training flight for a practise diversion to Lyneham. Flying in IMC in between cloud layers some 3½km clear of cloud with an in-flight visibility of 3-5km in haze, he was in receipt of a RIS from Northolt APPROACH (APP) on VHF - 130·25MHz. The assigned squawk was selected: TCAS and Mode S are fitted.

Flying in level cruise at an altitude of 2000ft QNH (1011mb), whilst heading 310° at 230kt, ATC called traffic information about another ac in their 11o'clock position more than 5nm away "co-ordinated" under their control 400ft above them. The other ac - HS125 (B) – was spotted visually 5nm away and the traffic was displayed on TCAS. Whilst the ac Captain – the PNF - was temporarily "off headset" it appeared to the PF that the other ac had turned towards them whereupon TCAS enunciated a TA. The PF "took the Autopilot out" and commenced a 45° AOB L turn to avoid the other ac visually. During the turn his ac [HS125 (A)] climbed about 100ft, resulting in a TCAS DESCEND RA. The RA was followed - by descending the ac - and HS125 (B) was seen to initiate a climb. A climb RA was reported but not the descent. Minimum horizontal separation was about ½nm as the other ac passed about 200ft above his jet with a "*medium*" risk of a collision.

THE PILOT OF HS125 (B) reports he was flying under IFR on a "Radar to Radar" flight inbound to Northolt from Farnborough at 210kt. He was in receipt of a RAS, he thought, from Northolt DIRECTOR (DIR) and the assigned squawk was selected: TCAS and Mode S are fitted. The ac's HISLs were on.

Flying in VMC about 4km clear of cloud, in between layers, with an in-flight visibility of 10km+ he had requested a RADAR to ILS at Northolt who had advised of a departing ac which would be maintaining 2000ft (QNH) below them. This ac – HS125 (A) – was initially observed on the TCAS display some 7nm away and 300ft below their altitude but the vertical separation then increased to 400ft. The other ac was acquired visually at a range of 4nm and they were turned onto a downwind heading of 090° (M) towards the other jet. About 7nm NW of Northolt whilst maintaining level flight at 2400ft (QNH) on autopilot, TCAS enunciated an RA - MONITOR VERTICAL SPEED - as the other ac appeared at the same time to climb whereupon TCAS enunciated an RA "CLIMB CLIMB". The autopilot was disengaged, power applied and his ac's nose "pulled up hard" to comply with the RA. Ascending to a maximum of about 2800ft, he thought, [actually 2600ft altitude Mode C] ATC was advised of the TCAS CLIMB. As soon as they received CLEAR OF CONFLICT they descended back to their assigned altitude of 2400ft, informing ATC accordingly. He assessed the risk as "*very high*" and estimated the other jet passed about 200ft below his ac.

UKAB Note (3): The pilot included the 1250 UTC Northolt Weather as: Surface Wind: Calm; Visibility 25km nil Wx; Cloud: FEW @ 1600ft; SCT @ 4000ft; BKN @ 7000ft; QNH1011mb. RW25RH CC: BLUE.

THE NORTHOLT APPROACH CONTROLLER (APP) reports that HS125 (A) was outbound on a 'R' non-airways departure. When identified, the crew of HS125 (A) were asked their intentions and type of service required outside CAS, which was a RIS. Northolt DIR was working RIS traffic - HS125 (B) - inbound to Northolt from Farnborough, tracking through the Booker/White Waltham gap. As both ac were converging, DIR asked APP to restrict HS125 (A) to not above 2000ft QNH and that his traffic - HS125 (B) - would maintain 2400ft QNH. As HS125 (A) climbed out he instructed the crew to maintain 2000ft and passed traffic information about HS125 (B) at L 10 o'clock – 6nm tracking E, advising that it was under the control of this unit [Northolt DIR] maintaining 2400ft. The pilot of HS125 (A) reported that he had the traffic on TCAS and he was aware that the crew of HS125 (B) had HS125 (A) visual. As HS125 (A) passed directly beneath HS125 (B) the former's pilot advised of a "TCAS RA climbing" [sic]. Once HS125 (A) was clear of HS125 (B) he enquired if the crew was happy to climb further to 2400ft and then handed the flight to Benson ZONE for further transit.

THE NORTHOLT DIRECTOR (DIR) reports that HS125 (B) was handed over by Farnborough RADAR under a RIS and when the crew contacted him on 130·35MHz the ac was identified on radar and placed under RIS. HS125 (B)'s crew had requested an ILS Approach so the ac was vectored through the Booker/White Waltham gap onto a heading of 070° to track to the N of the Chiltern NDB. APPROACH was controlling HS125 (A) climbing out of Northolt on a 'R' non-airways departure. As the two ac were tracking towards each other, he asked APPROACH to restrict HS125 (A)'s climb to 2000ft QNH and advised HS125 (B) would remain at 2400ft below the London TMA - both ac were receiving a RIS. Traffic information was passed to the crew of HS125 (B) as HS125 (A) climbed out, about 7nm away. When the two ac were approximately 3nm apart traffic information was passed again to the crew of HS125 (B), who reported visual with HS125 (A). Consequently, he instructed the crew of HS125 (B) "with that traffic in sight to turn right heading 090°" which was acknowledged. Just as the two ac passed with 400ft vertical separation but no horizontal separation, APPROACH informed him that HS125 (A) was taking a TCAS RA and climbing [sic]. The pilot of HS125 (B) simultaneously reported he was climbing due to a TCAS RA. HS125 (B) climbed to 2600ft on Mode 'C' before returning to 2400ft about 2nm to the E of where the incident occurred, his approach then continuing without further incident.

THE NORTHOLT ATC SUPERVISOR (SUP) reports that the pilot of HS125 (A) contacted him after landing and reported that he had in fact received a TCAS DESCEND RA instruction and not a TCAS CLIMB as initially reported on RT.

HS125 (A) PILOT'S UNIT comments that this is an honest report detailing a pilot handling mistake made by the PF during a period of high workload in busy airspace. The Airprox occurred when the ac Captain – PNF - had restricted his ability to monitor and react to the actions taken by his co-pilot when, from the PF's visual perspective, HS125 (B) appeared to have turned towards them.

The Captain assessed the risk as medium which the Unit believe is appropriate as the crews were visual and appropriate action was taken by HS125 (B), the climb by HS125 (A) being corrected quickly. This incident serves to highlight again the importance of maintaining appropriate flight deck supervision, airmanship and awareness at all stages of flight, especially in known areas of high density traffic or during periods of high cockpit workload. In addition, the need to plan ahead to have the appropriate paperwork to hand needs careful consideration of what you do and when. The airspace in SE England is particularly busy and restrictive in places and can be a challenging environment in which to fly. However, this is a known factor and should be planned for accordingly, while resisting the tendency to become complacent due to perceived familiarity.

The details of this incident have been discussed widely at Squadron level and lessons have been learnt.

MIL ATC OPS reports that Northolt APP was controlling HS125 (A) departing Northolt, under a RIS (previously a RCS but changed to RIS at 1328:32), climbing to 2000ft London QNH (1011mb) the Minimum Safety Altitude. Simultaneously Northolt DIR was working HS125 (B) inbound to Northolt from the W under a RIS (applied at 1324:18) at 2400ft London QNH (1011mb). At 1327:43, DIR passed traffic information to HS125 (B), *"..traffic right 1 o'clock 6 miles under control of this unit just climbing to 2000ft."* HS125 (B) crew acknowledged the traffic information. APP passed traffic information to the crew of HS125 (A) at 1328:07, *"..maintain 2000ft traffic left 10 o'clock 6 miles tracking east under control of this unit, level 2400 feet.*" The crew of HS125 (A) acknowledged the traffic information. DIR passed further traffic information to HS125 (B) at 1328:22, *"…previously reported traffic*

right 2 o'clock 4 miles, right - left, under control of this unit at 2000ft" which the crew acknowledged. Subsequently at 1328:48, the crew of HS125 (B) reported visual with HS125 (A) and so DIR instructed HS125 (B) *"..with that traffic in sight, turn right heading 090°."* The crew of HS125 (B) acknowledged the turn. At 1329:01 the pilot of HS125 (A) informed APP *".. we are indicating TCAS, taking a climb"* which was acknowledged by APP. At 1329:09, HS125 (B)'s crew stated to DIR "*And* [HS125 (B) C/S] *responding to TCAS and climbing clear of traffic and just leaving 2400ft* [pause] *and* [HS125 (B) C/S] *maintaining 2400ft again."* DIR replied *"..roger and the other traffic now to the northwest 2000 feet."* Thereafter, HS125 (B) continued for an ILS approach. At 1329:15 the crew of HS125 (A) stated *"..unfortunately that was an Airprox with a TCAS CLIMB [sic]."* Later, at 1330:09, APP instructed HS125 (A) to climb to 2400ft and squawk A3602 [for Benson], whereupon the crew of HS125 (A) replied, *"3602...and just for my information did the other guy obviously aware of this did he indicate TCAS climb or descent?"* After an initial *"standby",* APP stated to HS125 (A) at 1331:00, *"because you had a TCAS climb [sic] the traffic working DIRECTOR'S frequency also had a TCAS climb."* APP requested that the pilot contact ATC on landing and the crew of HS125 (A) changed frequency to Benson ZONE.

Analysis of the Heathrow Radar shows HS125 (A) departing Northolt to the NW and HS125 (B) entering the area from the W. At 1327:29, HS125 (A) is 170° Chiltern NDB 4·6nm, tracking 330° climbing through 1100ft London QNH (1011mb). Whereas HS125 (B) is 260° Chiltern NDB 8·9nm and tracking 070° indicating 2400ft London QNH (1011mb), some 10·5nm away. At 1328:20, HS125 (A) is indicating 2000ft QNH as HS125 (B) is maintaining 2400ft and a track of 070° at L 10 o'clock, 5·1nm from HS125 (A). Both ac maintain heading and level until 1329:04, when HS125 (B) indicates a descent of 100ft to 2300ft and commences a gentle R turn in HS125 (A)'s L 11 o'clock - 0·8nm. At 1329:08, HS125 (A) indicated a climb of 200ft to 2200ft [UKAB Note: this was not the result of a CLIMB RA], whilst HS125 (B) continues in the R turn and is now L 11o'clock - 0·4nm from HS125 (A). At 1329:12, HS125 (B) indicated a climb of 100ft to 2400ft, with HS125 (B) still turning and now R 3 o'clock <0·1nm [contacts merged - in the order of 100yd] from HS125 (A), [which had turned slightly L astern of HS125 (B)]. By 1329:16, HS125 (B) had climbed 200ft to 2600ft. Still turning, HS125 (B) is now R 5 o'clock 0·5nm from HS125 (A), which now indicates a descent to 2100ft [UKAB Note: in response to a DESCEND RA]. HS125 (B) steadies on a heading of 090° and HS125 (A) maintains its previous track of 330°. HS125 (B) is now R 5 o'clock 0·9nm from HS125 (A) as the ac continue to diverge and HS 125 (A) reaches 2000ft QNH at 1329:28, as HS125 (B) returns to 2400ft at 1329:36.

Both DIR and APP provided a RIS and fulfilled their responsibilities regarding the passing of accurate and timely traffic information which the DIR updated when necessary. Whilst not required under RIS, DIR initiated a verbal agreement [person-to-person off microphone and thus not recorded] with APP to keep HS125 (B) at 2400ft QNH and restrict HS125 (A) to not above 2000ft QNH. From the radar replay it appears that when HS125 (B) initiated the R turn onto 090°, the ac descended 100ft. The [erroneous] TCAS climb call from HS125 (A) was 3sec before the descent of HS125 (B) is displayed on radar [possibly Mode C lag]. On the next radar sweep, HS125 (A) has climbed 100ft and 1sec later HS125 (B) calls TCAS climbing; 3sec later this climb shows on radar and HS125 (A) has also begun to descend [UKAB Note: in conformity with the DESCEND RA reported in the pilot of HS125 (A)'s written Airprox & TCAS encounter reports. This sequence of events would suggest that the inadvertent climb by HS125 (A), just as HS125 (B) also descended 100ft whilst turning, triggered the subsequent complementary RAs.].

HQ STC comments that the height digressions by both ac may have combined to generate this TCAS event. However, even had the ac been level at their assigned altitudes, HS125 (B)'s turn, to directly overfly HS125 (A) would probably have achieved the same result.

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.

Helpfully, all concerned here had provided comprehensive reports and it was evident to the Board that there were a number of salutary lessons contained within this Airprox. The Board was briefed on the difficulties which confront Northolt ATC who are unable to route their traffic through the relative sanctuary of CAS and were restricted to a maximum altitude of 2400ft beneath the 2500ft base of the Class A LTMA with their instrument patterns. Thus with the Northolt Minimum Safety Altitude (MSA) set at 2000ft there were few levels available when vectoring OAT inbound to the aerodrome in this Class G airspace. Here, the pilot of HS125 (B) reported he was receiving a RAS from DIR. Clearly this was not the case - the comprehensive Mil ATC Ops report had made plain it was actually

a RIS where the pilot is solely responsible for maintaining his own separation from other traffic. Some controller Members observed that the pilot of HS125 (B) appeared to have misunderstood the nature of the ATS he was receiving from DIR: if this was so then he may not have appreciated that under the RIS the responsibility for separation against other traffic lay fairly and squarely with the crew concerned. It should be emphasised that pilots operating outside CAS should be in no doubt that if they expect ATC to provide radar separation then they must request a RAS – if it is available. Here, both APP and DIR were evidently endeavouring to provide an efficient service, having gone one step further and co-ordinated 400ft of vertical separation between these ac (the most that could be effected here and less than generally provided). Then, having correctly established that each was visual with the other's ac, DIR instructed the pilot of HS125 (B), *"..with that traffic in sight, turn right heading 090°"* expecting the crew of HS125 (B) to maintain their own visual separation against HS125 (A) as necessary. Whilst the ac's descent could not have been foreseen, this was clearly a trap for the unwary. But a military controller Member was also critical of the turn instruction being issued at this point and opined that if this instruction had been delayed so that HS125 (B) did not directly overfly HS125 (A) then that would have been preferable. The Board was briefed that these were fairly standard departure and arrival patterns and that in this confined airspace there was limited room for manoeuvre. Consequently, controllers could only expect that pilots would use their best judgement and afford their own visual separation where it was appropriate – as here.

The debate then moved to the handling of these executive jets in the narrow confines of the 'Open FIR' beneath the LTMA by the pilots concerned. After DIR had passed the vectoring instruction to the crew of HS125 (B), the radar recording revealed that HS125 (B) had descended about 100ft in the turn. The PF of HS125 (A) was indeed correct when he perceived that HS125 (B) had turned towards his ac. Nevertheless, the PF of HS125 (A) clearly exacerbated the situation and contributed himself to the ensuing TCAS event when he climbed his ac about 200ft as he turned to avoid HS125 (B) visually. With the benefit of hindsight, CAT pilot Members were critical of the crew of HS125 (B)'s airmanship for initiating the R turn when they did, which was considered unwise at these close quarters. It would have been preferable not to have directly overflown HS125 (A), a CAT pilot Member observed, which should have been afforded a wider berth. At these low altitudes the TCAS 'safety-net' was looking for about 300ft of Mode C separation between these two ac before triggering corrective advisories. A CAT pilot Member stressed that the respective descent and climb reduced the Mode C vertical separation to 100ft at a range of 0·4nm resulting in the subsequent complementary RAs to climb and descend respectively – thus it seemed that TCAS had worked as would be expected at these close quarters. However, the transmissions from the crew of HS125 (A) indicating that they had received a TCAS climb at the time were most confusing and seemed inexplicable; the Board could only surmise that confusion arose between the ac Captain who was off-headset at the time and the PF, but it was a fairly significant mistake to make and the Unit's comments on the supervisory aspects of flight deck management on the HS125 (A) seemed well founded. Clearly from the pilot of HS125 (A)'s comments, the PF had been concerned enough at the proximity of HS125 (B) to turn himself but the excursion of 200ft above his assigned altitude, evinced by the radar recording, also proved significant at these close quarters, inducing the complementary RA. Although the pilot of HS125 (A) had estimated the horizontal separation to be ½nm the radar recording had also shown that the contacts had merged with the ac a mere 100yd apart. To some CAT pilot Members this Airprox seemed to illustrate a lack of appreciation by all concerned over what can ensue when fast TCAS-equipped jets get to such close quarters inadvertently. A controller Member questioned the wisdom of operating at these speeds in what is known to be an area of high traffic density and another controller Member explained that this company has elected to change its routeing to Northolt and now routinely flies a route into Northolt via CAS. The Board was reminded of a previous Airprox involving military ac inbound to Northolt in Class G airspace as a result which a RAS is now requested as the norm by pilots from the Unit concerned. In the Board's view, this seemed to be a sensible alternative to flying in the busy Class G airspace relying solely on 'see & avoid', backed up by TCAS.

It was also apparent that the Station was taking a proactive stance over operations in its local area. Members were told that Northolt is shortly to host an Air Safety day. Business jet operators and GA pilots who regularly operate into Northolt have been invited where, amongst other topics, it is planned to provide a briefing on the difficulties of operating in this airspace and what can be done to minimise them. The Board considered this a very positive step and commended the Station's constructive efforts in this respect; the more that can be done to inform pilots and controllers about each other's problems the better for all concerned.

This was a wide-ranging debate, but in finalising their assessment of the cause Members were cognisant of the inherent responsibility of the pilots involved to avoid each other's ac under the form of ATS that actually pertained. Therefore, the Board concluded that this Airprox had resulted for the reason that whilst in receipt of a RIS, neither crew avoided the other's ac by a sufficient margin.

Turning to the associated risk in this situation, the radar recording clearly revealed 100ft minimum vertical separation at a range of 0·4nm as the ac headed toward one another. This was increased to only 200ft at the point of minimum horizontal separation of 100yd or so on the next sweep 4 sec later. This was just as the PF of HS125 (A) arrested his inadvertent climb and then descended back to his assigned altitude and in conformity with the actual DESCEND RA – not the climb erroneously reported on RT which heightened the confusion at the time. The PF of HS125 (A) had also turned to avoid HS125 (B) visually, the avoiding action turn being just detectable on the radar recording. As it was, HS125 (A) just passed astern of HS125 (B), whose crew had fortunately complied promptly with the reported CLIMB RA. Although this resulted in a 100ft excursion into the base of the Class A LTMA, in the Board's view this and more importantly the visual contact by both pilots with each other's ac effectively removed any actual risk of a collision. But there was certainly not much time for the pilots to assimilate what was happening when HS125 (B) unexpectedly descended and the other climbed at the same time whilst turning away at very close quarters. Therefore, in the circumstances reported here, the Board concluded unanimously that the safety of these two ac had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

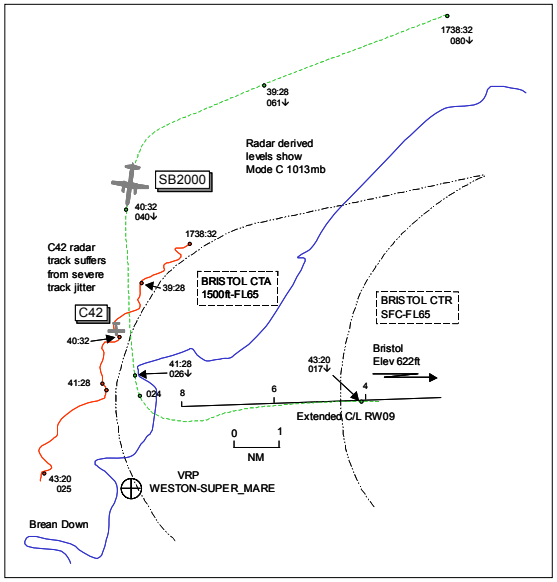
Cause: Whilst in receipt of a RIS, neither crew avoided the other's ac by a sufficient margin.

Degree of Risk: B.

AIRPROX REPORT No 057/06

AIRPROX REPORT NO 057/06

Date/Time:	11 May 1741	
Position:	5123N 00258W (10nm W Bristol - elev 622ft)	
Airspace:	CTA/FIR	(Class: D/G)
	Reporting Ac	*Reported Ac*
Type:	SB2000	Ikarus C42
Operator:	CAT	Civ Pte
Alt/FL:	↓2500ft (QNH 1017mb)	2800ft (QNH 1017mb)
Weather	VMC CLOC	VMC CLOC
Visibility:	NR	10nm
Reported Separation:	200ft V/1·2nm H	Not seen
Recorded Separation:	0·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SB2000 PILOT reports heading 180° at 190kt inbound to Bristol and in communication with Bristol Radar on 136·07MHz squawking an assigned code with Mode C. About 8nm W of Bristol airport they were cleared for the approach to RW09 and during the L turn, levelling at 2500ft, a TCAS TA alert was received. The traffic was seen on TCAS to be 1·2nm to the W and 200ft above and flying in the opposite direction, he thought, and although the flight conditions were VMC, they did not have visual contact with the other ac. He assessed the risk as medium.

THE IKARUS C42 PILOT provided a very full report including a copy of the planned route shown on a 1:500000 chart. He reports heading 200° at 75kt enroute from Wolverhampton to Dunkeswell with another PPL and in communication with Bristol on 125·65MHz squawking 7000 with Mode C. The visibility was 10nm in VMC and the ac was coloured red/white with a tail strobe light switched on. They departed Wolverhampton at 1742 local time on a course of 200°T direct to Brean Down, a peninsula just SW of Weston-Super-Mare (W-S-M). This track routed the flight directly between Cardiff and Bristol CAS, remaining clear of both. A reciprocal route had been flown earlier in the day so it was familiar. Initially they worked London Information but near Monmouth they changed frequency to Bristol Filton and were provided with a FIS. After passing abeam the 'old' Severn Bridge', as requested by ATC, they were asked to change frequency to Bristol Radar. They established contact, giving their c/s, at a position W abeam the 'new' Severn Bridge and were immediately asked by ATC to 'standby'. Bristol ATC was extremely busy and the lady controller was, for the next 6-8min, fully occupied. They continued on track at 2800ft QNH 1017mb and about 14min after their initial call, a male controller called them and asked if they were trying to pass a message. By now they were approaching the estuary of the River Parrett. He replied that they had but it was a long time ago, they knew that ATC were busy and now they were to the S of Bristol. The controller asked if they had seen another ac in the vicinity, to which they replied 'negative'. The controller asked what height they were at and they answered '2800ft QNH 1017'. ATC then transmitted 'we think (hesitantly) that you may have infringed our airspace'. They replied 'no, that is not correct we have been tracking between you and Cardiff'. They continued on course to Dunkeswell and subsequently changed frequency to Dunkeswell where they landed at 1915 local time. At the time of the reported Airprox they were 1·5-2nm off shore and 11nm W of Bristol airport. They were 'on track' according to the GPS and, more importantly, were visual with Brean Down during the channel crossing and therefore certain of their track. The reported position of the Airprox would have put the other ac over land and within the CTA.

UKAB Note (1): The plotted track supplied by the C42 pilot shows the intended route passing about 8nm W of the Severn Bridges before coasting out on the W side of the Severn Estuary by Upfield Farm airstrip. The track passes about 0·5nm to the W of the Bristol CTA, over 1nm offshore, before passing over the Western extremity of Brean Down peninsula to the SW of W-S-M. The plotted track then alters course about 15° L directly towards Cannington, passing E of Danger Area D119 and coasting in over 1nm W of the mouth of the River Parrett.

THE BRISTOL APR2 reports that at time 1743 a primary-only contact was observed passing 8·5nm W of the BRI and at that time was believed to be below CAS. This contact passed N to S behind a Saab 2000 and continued on a S'ly track. Approximately 2min later the primary contact acquired a secondary label (7000) with Mode C indicating 2800ft. DF indications showed this to be a C42 flight which had previously called the radar frequency prior to handover of the radar position from the off-going radar controller. The C42 flight confirmed its details and, when asked, reported that it had passed W of Bristol CTA at 2800ft. The C42 flight was provided with a FIS and continued to its destination of Dunkeswell. A subsequent report from the Saab 2000 crew, via the ADC, stated that they received a TCAS alert whilst passing 8nm from touchdown on an ac that was 200ft above them.

The Bristol METAR was EGGD 1750Z 16011KT 9999 SCT043TCU 17/10 Q1017=

ATSI reports that this Airprox occurred between a Saab 2000 inbound to Bristol, IFR from the E through the airways system, and an Ikarus C42 operating VFR and routing in the FIR to the W of Bristol. The event occurred during a phase of heavy traffic and following a period of thunderstorm activity which was continuing to the S and SW of the airfield.

The Unit Investigation report states that only 1 radar console was manned due to staff sickness with both 136·07MHz and 125·65MHz frequencies cross-coupled. The Controller (APR1) described her workload as extremely busy due to thunderstorm activity in the vicinity of the airfield and the attendant need for ac to avoid storm cells. She had concluded 2hr in position and had completed a 'running' handover to a relieving controller (APR2). The handover did not allude to the position of the Ikarus as she had not established this. A fps for the Ikarus had been written out by the ATSA when the flight first called and was in the RH bay of the strip board but was not observed by APR2 nor mentioned by APR1 during the handover. No airborne TCAS report was made by the crew of the Saab 2000 but the event was reported to the ADC after landing and the ac was parked on stand. The pilot reports the TCAS TA being received when 8nm W of Bristol on the extended C/L at 2500ft altitude. The performance of the primary radar was affected by the thunderstorm activity and Bristol's 10 cm primary radar was both heavily affected by weather clutter and performance limited by the weather suppression applied to the radar. There is therefore no reason to doubt the Unit Investigation report which states the Ikarus was not seen on the Bristol radar.

The Saab 2000 flight, which was vectored outside CAS during the radar sequence, is not advised of this nor of the type of radar service he was receiving. However since the Ikarus was not 'known' to either APR this is not considered a factor in this event and has been addressed by the Unit. The RT recording substantiates that APR1 was busy as a result of both weather avoidance and traffic loading.

Radar analysis of the Clee Hill Radar, from which Bristol take their SSR feed, shows, at 1726:01, a contact on a 7000 code at FL029 (3020ft QNH 1017mb) bearing 343° from Bristol at 17·3nm. This is consistent with the C42 Ikarus pilot's report of position at the time an abortive attempt to establish contact with Bristol was made (1726:30). The Ikarus pilot was told to *"standby"* by the Bristol APR1. This radar contact maintains a SW'ly track and SSR data is lost at 17:34:01. There are then subsequent brief and intermittent SSR returns until at 1736:02 the SSR data is lost with the contact indicating FL030 at 313° 9·2nm from Bristol. Neither Controller apparently noticed the momentary SSR labels on the display from the Ikarus. The handover between APR1 and APR2 is completed shortly after 1738:30. The next SSR contact on the C42 is at 1743:20, after the Airprox, when its contact is 264° at 11·6nm and is indicating FL025 (2620ft QNH). At this time the Saab 2000 is inside the Bristol CTR. Primary radar returns from Clee Hill, which Bristol do not have access to, indicates severe track jitter for several miles of the route taken by the Ikarus, but at no time can it be seen to penetrate the Bristol CTA. The APR2 states he did not see any SSR returns from the Ikarus until the ac was S of the Bristol CTA. Even if the Saab 2000 flight had announced a TA to the APR2 the Ikarus would not have been visible on the radar display. From the radar analysis the minimum horizontal separation is at 1741:28 when the Saab passes 0·7nm ENE of the Ikarus as it (the Saab) turns towards the ILS. It is not possible to determine the altitude of the Ikarus at this point.

[UKAB Note (2): The next radar sweep 8sec later (1742:36) shows the Saab 2000 levelling at FL024 (2520ft QNH 1017mb) and commencing a L turn towards the ILS LLZ which is the time reported by the Saab crew when a TCAS TA alert was received.]

There are ATC several factors that had a bearing on this event ranging from weather clutter, radar suppression, staffing levels, fps management and detailing of radar service provided. It is ATSI's view that no single factor caused the event and in the absence of a primary radar return from and knowledge of the presence of the Ikarus,

it is difficult to see what could have been done by either APR1 or APR2. The unit have widely published this event and have made several proactive suggestions to LCEs and Unit management in an effort to prevent a similar occurrence.

UKAB Note (3): The RT transcript reveals the APR2 calling the C42 Ikarus pilot after 1748:30 to establish the flights details.

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 Airprox working group, recently established at Bristol, has produced a series of actions including the production of a guide giving Airprox prevention measures. Subsequent to this Airprox, the CAS around Bristol changed (on 31st August 2006) which means that during vectoring, inbound traffic should not normally need to route outside CAS thereby reducing the chance of a repetition of this sort of incident. It was clear that the C42 pilot did not enter Bristol CAS but unfortunate that the ac's squawk was not showing on the radar display, as this would have made the C42 conspicuous to Bristol ATC in the absence of a primary radar return. Although the SB2000 is seen continuously on Clee Hill SSR, the C42's squawk is only shown intermittently after the pilot made his initial call. Seven minutes before the Airprox occurred, the C42's squawk completely disappears, whilst the ac is transiting through the same area that the approaching SB2000 then passes through, itself displaying solid SSR returns. This led Members to wonder if the C42's transponder had been functioning correctly or if there had been some other reason why the C42's responses were not received/displayed (aerial shielding or SSR radar coverage perhaps). Furthermore, the SB2000 crew did not receive any TCAS alerts or warnings prior to their first TA alert after they had passed abeam the C42 which again suggests an intermittent fault with the C42's SSR.

Although the C42 pilot had called Bristol in good time for a service he had been told to 'standby', only establishing 2-way contact after the Airprox. The ATSI Advisor informed Members that the RT recording reveals almost continuous exchanges between ATC and flight crews during the period leading up to the Airprox, a very busy traffic loading which included avoiding action being given to another flight on other unknown traffic. Owing to high workload, the APR1 did not have the time later to interrogate the C42 pilot and, for whatever reason, the C42's 'presence' on frequency was not passed on to the APR2 at the ensuing handover, the fps being unnoticed by both controllers. These oversights were unfortunate as had the C42's flight details been passed, the ac's position would have been established; the flight would have become known traffic and the potential confliction would have been revealed even though the ac was not displayed on radar. On a separate point, ATCO Members thought that although ATC was undoubtedly busy, the level of ATS should still have established with the SB2000 crew and any limitations stated - weather clutter, radar suppression etc - so that the crew were aware of their responsibilities with respect to the airspace in which they were flying and for any additional CRM measures needed (increased look-out/scanning etc) whilst under a limited radar service. Members agreed that the SB2000 was vectored into conflict with the undisplayed Ikarus C42 whose position had not been established by the Bristol APRs during a period of high workload which had caused the Airprox. In making its assessment, Members fully appreciated the challenging situation faced 'on the day' by the Bristol APRs: the Board was therefore pleased to learn from the ATS Advisor that it was considered that overall the APRs had coped well during a lengthy, complex traffic situation.

One ATCO Member opined that in circumstances where staff shortages are known in good time, implementing flow restrictions was one option that should be used to reduce traffic loading on ATC but this does take time to become effective for inbound traffic.

Turning to risk, the non-sighting by the Ikarus C42 pilot was understandable as the SB2000 approached from his rear quarter before turning L away when abeam. The SB2000 crew received a brief TCAS TA alert whilst levelling at 2500ft and turning L onto the LLZ. The crew did not visually acquire the C42, only seeing it on TCAS about 200ft above and just over 1nm to the W. The SB2000 crew did not report any proximate traffic indications prior to the TA, either because the TCAS equipment was not detecting SSR responses from the C42; the traffic situation was outside the parameters for target generation or the 'target' went unnoticed by the crew. It was not possible to resolve this aspect of the Airprox. The radar recording reveals that as the SB2000 steadied on its S'ly track on L base, the C42 had already crossed well ahead of its projected flight path. Shortly thereafter the SB2000 descends to and levels at 2500ft and starts to turn, when the reported TA was received, at the CPA. However, this is only

after the 2 acs' tracks had been diverging slowly for some time after the subject ac's tracks had initially crossed, with separation increasing. This element was enough to persuade the Board that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

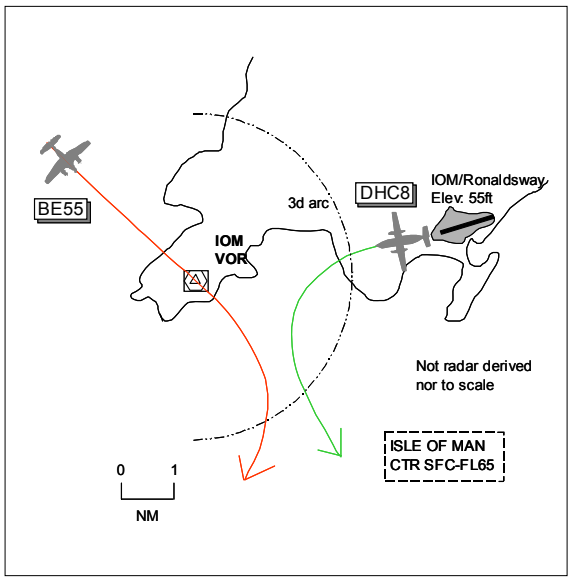
Cause:The SB2000 was vectored into conflict with the undisplayed Ikarus C42 whose position had not been established by the Bristol APRs during a period of high workload.

Degree of Risk: C.

AIRPROX REPORT No 060/06

AIRPROX REPORT NO 060/06

Date/Time:	19 May 1628	
Position:	5403N 00444W (2nm SE IOM VOR)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	DHC8	BE55
Operator:	CAT	Civ Pte
Alt/FL:	2800ft↑	3500ft
	(QNH 996mb)	(QNH 995mb)
Weather	VMC CLOC	VMC CLBC
Visibility:	10km	>10km
Reported Separation:		
	Nil V/800m H	500ft V/1nm H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports outbound from IOM Ronaldsway IFR and in receipt of a 'full IFR' service from Ronaldsway Tower squawking 5156 with Mode C. Whilst backtracking RW26, a departure clearance was issued as 'after take-off RW26 standard noise left turn heading 155° climb FL070 squawk 5156'. Before being given take-off clearance, ATC then told the crew about a VFR transit ac, the subject BE55, at 3200ft approaching the IOM VOR. At this stage they believed that as take-off clearance had been issued the BE55 was sufficiently far out not to cause any problems. However, as they turned L at 3d from IOM climbing at 195kt and through 2800ft QNH 996mb, a TCAS RA was received. The FO saw the BE55 in his 2 o'clock <1nm away and above. The RA guidance was followed and as they climbed through its level the BE55 passed 800m away in their 3 o'clock before 'clear of conflict' was received. ATC was informed of the TCAS manoeuvre and he assessed the risk as medium.

THE BE55 PILOT reports heading 139° at 170kt en route for Oxford and in receipt of a FIS from IOM Approach on 120·85MHz squawking an assigned code with Mode C. In good VMC conditions cruising at 3500ft, she thought, Belfast QNH 995mb IOM zone transit had been approved via the IOM VOR. About 2nm from IOM, ATC told her about traffic to the L departing Ronaldsway. Visual contact was made at range 2·5nm and it was ascertained that the traffic was low and in a climbing turn to the E. Shortly afterwards she was requested to take a S'ly heading, which she complied with, whilst the DHC8 was seen continuing the climbing L turn. She was then requested to turn R onto 270°, which she did, and both ac diverged. At the CPA the DHC8 was seen to pass about 1nm away and 500ft above with a low risk of collision. Own navigation en route was then given. She did not hear any avoiding action being given to the DHC8 flight.

THE IOM RONALDSWAY RADAR CONTROLLER reports the BE55 was transiting VFR at 3200ft QNH through the Zone from NW to SE tracking 135° via the IOM VOR (5nm W of IOM Ronaldsway). TI was passed to the pilot about the impending departure of the DHC8 and this TI was re-iterated shortly after the DHC8 was airborne at which point the BE55 pilot reported visual. Shortly afterwards the BE55 was seen to have not altered course so he issued the pilot a heading of 180° but when it became clear that this turn was insufficient he turned the BE55 further R. In due course the BE55 flight was instructed to resume its own navigation. Minimum separation seen was <0·5nm horizontally with nil vertical.

THE IOM RONALDSWAY ADC reports the DHC8 was coordinated with Approach who told him to pass TI to the crew on a VFR transit, the BE55, which was 12nm NW of Ronaldsway. The TI was passed and acknowledged by the DHC8 crew and take-off clearance was then given. After watching the DHC8's departure, he turned his attention to a ground movement problem. On looking back at the ATM he noticed the BE55 had just passed the IOM as the DHC8 was 2nm W of the airport. He updated the TI to the DHC8 crew who were now in a standard L turn and then called the Radar controller who told him that the BE55 pilot had the DHC8 in sight; the DHC8 crew

were informed of this fact. The DHC8 crew later advised that they had received an RA on TCAS and that they would be filing a report.

ATSI comments that the BE55 flight established communication with IOM Approach at 1621, requesting a Zone transit. The pilot reported maintaining 3200ft, 18nm from the IOM, en route from Newtownards to Oxford, via the IOM VOR, on a VFR flight. The flight was identified 20nm NW of the airport and cleared to transit VFR.

Meanwhile the DHC8 was taxying to RW26 for departure. The pilot was issued with a clearance to Birmingham via Airway L10, to climb to FL070 with a L turn after noise abatement [see UKAB Note (1)], heading 155°. The flight was coordinated with the APR who requested that the pilot be informed of an overflying VFR ac (the subject BE55). Consequently, at 1625, the pilot of the DHC8, as he was lined up on the RW, was advised *"DHC8 c/s traffic information for you a Beech Fiftyfive presently at ten miles to the northwest of the field routeing towards the India Oscar Mike three thousand two hundred feet VFR"*. The pilot acknowledged the transmission and at 1626 was cleared for take-off RW26. At the same time, the pilot of the BE55 was informed *"BE55 c/s traffic information there's a Dash Eight Delta just getting airborne off runway two six to go towards the southeast"*. Approximately 1min later, the TI was updated as *"BE55 c/s that previously mentioned traffic is east of you now by about three climbing through two thousand"*. The pilot reported the traffic in sight. However, because the BE55 did not turn, the APR asked its pilot to take up a S'ly heading to keep clear of the traffic. As he did not consider that this resolved the potential confliction, the pilot was instructed to turn R heading 270°.

The ADC reported that after the DHC8 departed he had turned his attention to the traffic situation on the airport. Subsequently, he observed the DHC8 on the ATM when it was approximately 2nm W, turning L, with the overflying traffic having just passed the IOM VOR. He informed the pilot accordingly *"DHC8 c/s that traffic's just passed the India Oscar Mike this time in your right one o'clock"* and that its pilot was visual with his ac. The DHC8 pilot commented that he was visual as well, adding that he had received a TCAS RA.

The Airprox occurred within Class D airspace of the IOM CTR. The relevant MATS Part 1 procedures, as stated in Section 1, Chapter 2, Page 1, for the minimum services to be provided by ATC in Class D airspace are: *'pass traffic information to IFR flights on VFR flights and give traffic avoidance if requested; pass traffic information to VFR flights on IFR flights and other VFR flights'*. On this occasion, both the ADC and the APR issued appropriate and timely TI to both flights and continued to update the information, allowing the pilots to acquire visual contact. Additionally, the APR, although not required under the procedures, issued turns to the BE55 to deconflict the subject ac.

UKAB Note (1): The UK AIP at AD 2-EGNS-1-9 Isle of Man Para 2.21 Noise Abatement Procedures states:-

b. All propeller driven aircraft must climb straight ahead to 500ft and must have passed the airport boundary before commencing any turn, and

d. All departing aircraft from Runway 26 shall track the extended centreline until range of 3nm or less from IOM DME before commencing any turn. Aircraft unable to receive DME shall climb straight ahead for 2 minutes from commencement of their take off run before commencing any turn. This procedure may only be departed from when authorised by ATC.

Any of these procedures may be departed from to the extent necessary for the avoidance of immediate danger.

UKAB Note (2): The Airprox occurred outside of 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, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

From the DHC8 crew's report it appears that they were expecting separation to be afforded between their IFR flight, under a 'full IFR' service from ATC, and the VFR BE55. As stated in the ATSI report, only TI needed to be - and indeed was - passed by ATC to both crews within the Class D IOM CTR; no separation is required to be provided between IFR and VFR flights. Additionally, the DHC8 crew did have the option to ask for traffic avoidance on the BE55 from ATC but this was not requested. Thereafter, there was equal responsibility on both crews to see

and avoid each other's ac, affording their own safe separation. However, having been given TI, the BE55 and DHC8 crews did not fulfil their obligations under the respective flight rules and flew into conflict which caused the Airprox.

The APR passed TI twice on the DHC8 to the BE55 pilot who saw the other ac to the E, below and climbing. As the APR was expecting the BE55 to execute a turn but none was seen, he gave its pilot heading instructions to the R, away from the turning DHC8. The DHC8 crew was given TI by the ADC on the BE55 prior to departure and then take-off clearance was issued. The crew believed that the issuance of the take-off clearance meant the BE55's projected flight path was not in confliction. Once airborne, updated TI enabled the DHC8 crew to visually acquire the BE55 in their 1 o'clock and above. Simultaneously, a TCAS RA was received and the guidance was followed whilst the DHC8 crew climbed through the BE55's level whilst turning L. Although this had the potential for being a more serious incident, the combined actions taken by all parties and the visual sightings by both crews were enough to persuade the Board that safety had been assured during the encounter.

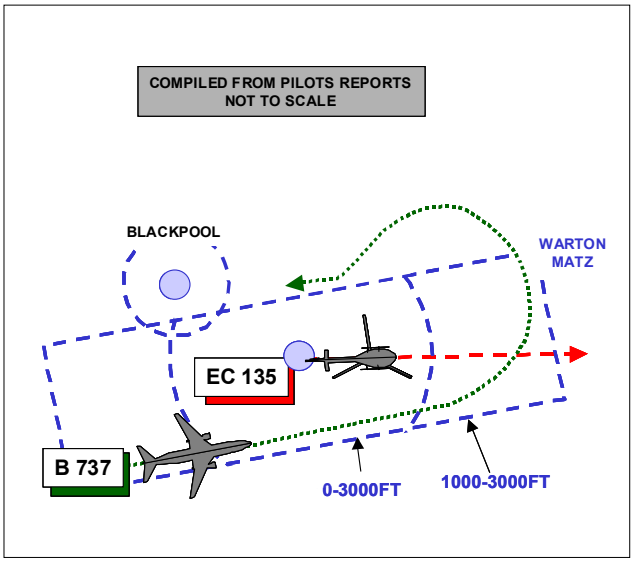
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Having been given TI, the BE55 and DHC8 crews did not fulfil their obligations under the respective flight rules in Class D airspace.

Degree of Risk: C.

AIRPROX REPORT NO 062/06

Date/Time:	23 May 0911	
Position:	5346N 00240W (9nm ESE of Blackpool - elev 34ft)	
Airspace:	Warton MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737	EC135
Operator:	CAT	Civ Police
Alt/FL:	2000ft (QNH)	1000ft ↑ (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	35km	>20nm
Reported Separation:	600ft V/2nm H	800ft V/1nm H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying a scheduled passenger flight inbound for an instrument approach to RW28 at Blackpool. He was heading 310° at 220kt and at 2000ft with all lights switched on when he received a TCAS warning "Traffic" then "Monitor Vertical Speed". The traffic appeared to be 600ft below their level at a distance of 2½ nm. He reported the traffic to ATC who advised that the traffic was 1000ft below. He took no avoiding action and did not assess the risk.

THE EC135 PILOT reports getting airborne from Warton in a blue and yellow ac with all lights switched on. He was in receipt of a FIS from Warton TWR/APR and was heading 090° at 120kt having been cleared eastbound initially not above 1000ft on the Warton QNH due traffic inbound to Blackpool. On changing to Warton APR he was advised that the traffic was E of him. Their TCAS was set as a default to 10nm so it was another 2-3nm before he acquired the traffic on TCAS. With about 1nm to run before the MATZ Boundary he saw a Boeing 737 approx 3nm away bearing 120° in a left turn. As he exited the MATZ and with the B737 in his 3 o'clock and 1000ft above, he considered separation to be more than adequate so initiated a climb. Shortly afterwards they had a TCAS TA (there is no RA facility on his system) so he converted the climb into a descent. He was somewhat surprised at the TA because his judgement was that the B737 was already passing beyond the 3 o'clock but with hindsight he should have waited for about a further 15sec before initiating his climb even with the other ac in sight. All figures are his best recollection, as he was not informed of the other ac's RA until returning from his task. A contributing factor might have been that the specialist police task that he was conducting required a climb as soon as he was clear of the 737. He assessed the risk of collision as being low.

ATSI reports that at 0902, the Blackpool APR Controller telephoned Warton to request a left-hand circuit on RW28 for an inbound B737; this was agreed. [In accordance with the LoA]. At 0903, the Warton ADC informed his APR colleague about the EC135's departure and this was co-ordinated, via the river, not above 1000ft, and to contact the radar frequency.

The B737 pilot established communication with Blackpool APR at 0904. The ac was identified and the pilot informed that he would be provided with a Limited RAS outside CAS but no mention was made as to why it was necessary to limit the service. [It was subsequently discovered that the SSR was not available]. The flight was vectored left-hand downwind for RW28 descending initially to 2500ft. At 0907, Warton APR informed the Blackpool APR about the EC135 routeing towards Preston, not above 1000ft, and the latter informed the B737 pilot about the helicopter departing from Warton, stating it would be *"not above one thousand feet and that's just left of your half past eleven this time range of five miles"*.

About 1min later, the EC135 pilot made an initial call to Warton Radar, reporting routeing towards Burnley, not above 1000ft. The altitude restriction was confirmed and the pilot was warned about *"jet on finals to Blackpool just behind you and limited radar information".* A further minute later, the B737 pilot was instructed by Blackpool to descend to 2000ft and the TI was updated *"previously mentioned helicopter traffic that's not above a thousand is two miles northeast of you and continuing low level"*. Shortly afterwards the B737 pilot reported *"traffic at two miles five hundred feet below us"* and this was confirmed as the helicopter not (as the Blackpool APR believed) above 1000ft, although the B737 pilot responded that it was 500ft below. Blackpool checked the helicopter's altitude with the Warton APR who again reported it not above 1000ft. This information was passed to the B737 pilot who at that point reported a TCAS RA. Once the EC135 was clear of the B737, Warton cleared it not above 1500ft.

The EC135 pilot stated in his report that he had climbed previously above 1000ft but this climb, above his cleared altitude, was not noted by the Warton APR on the radar display.

No report was received from Warton ATC as they were initially unaware that an Airprox had been filed. It was agreed with Warton that a late report would not be beneficial.

UKAB Note (1): The St Annes radar is not recorded so the Great Dun Fell radar recording was used. The B737 paints throughout but the EC135 disappears one minute before the incident so the actual Airprox is not recorded. At the time of the incident the B737 was 7nm E of Warton inside the MATZ (base 1000ft, top 3000ft) in a wide left turn and was indicating FL021 (2040 ft QNH) level. From its pilot's report the EC135 was cleared and initially flying at 1000ft, the base level of the MATZ, but he climbed into it. Since the EC135 does not paint at the time of the incident, there is no confirmation but it would seem that the incident occurred as the B737 was about to level off and the EC135 had just commenced a climb. This would explain the 'monitor vertical speed' preventive RA command (i.e. no change in vertical speed required); this is however, dependent on the version of TCAS fitted.

UKAB Note (2): The METAR for 0850 UTC for Blackpool was:

0850Z 23/05/06 EGNH 230850Z 24014KT 9999 FEW030 10/02 Q1011=

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.

The NATS Advisor undertook to report back to the Board on the lack of availability of recordings of the St Annes radar.

There was considerable discussion as to the EC135 pilot's responsibility while operating in a MATZ. Because the helicopter was Warton-based, Members unanimously agreed that MATZ procedures applied to its pilot. While the regulation of flying for civil ac within the Warton MATZ may not be clear, it was also unanimously agreed that the helicopter pilot should either have remained at his co-ordinated level or requested a change.

Since the SSR was not available, the Warton controller(s) would not have been aware of the helicopter's change of altitude. Although there was no obligation for him to do so, one Member suggested that it might have been appropriate for the Warton controller to ask the EC135 pilot to confirm his altitude before merely reiterating the cleared altitude when it was questioned by Blackpool APR. In this case however, the B737 pilot had the EC135 on TCAS and reacted correctly to the passive RA. The EC135 pilot was, and remained, visual with the B737, thereby preventing any risk of collision.

Although not necessarily pertinent to this particular Airprox, one Member expressed the view that there is a possible lack of co-ordinated regulatory authority or standardisation for police helicopters. This was based on a small number of recent Airprox involving police ac; another expert Member cited other examples. The Chairman undertook to determine the position and report back to the Board.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The EC135 pilot climbed above his co-ordinated altitude and into conflict with the B737.

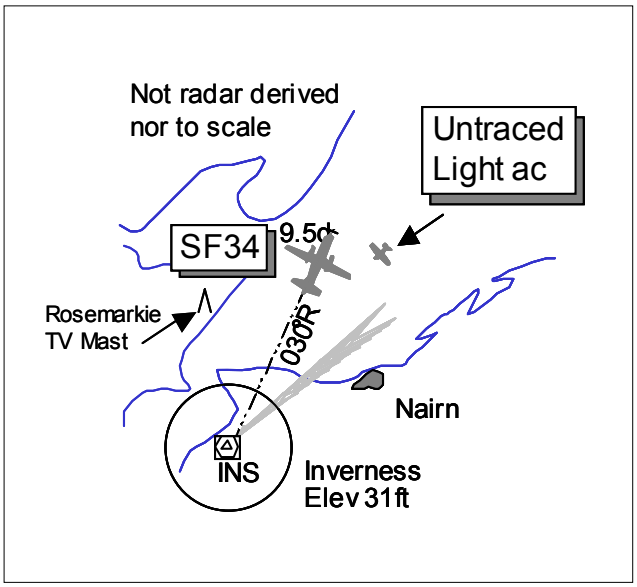
Degree of Risk: C.

Post Meeting Note: The Chairman conferred with the Board Member who has specialist knowledge of police helicopter operations and subsequently with the CAA's Flight Operations Inspectorate (Helicopters) section. It is clear that there is a robust system in place, applying to all police air operators in the UK, for safety regulation and standardisation. The Home Office and British Helicopter Advisory Board play their part in such activities as do the police operators themselves.

AIRPROX REPORT No 063/06

AIRPROX REPORT NO 063/06

Date/Time:	25 May 1415	
Position:	5714N 00355W (9·5nm NNE Inverness - elev 31ft)	
Airspace:	SFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	SF34	Untraced light ac
Operator:	CAT	NK
Alt/FL:	2000ft	NK
	(QNH 1012mb)	(NK)
Weather	VMC CLOC	NK NR
Visibility:	15km	
Reported Separation:	300-400ft V/<1nm H NK	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SF34 PILOT reports heading 025° at 190kt and 2000ft QNH 1012mb, inbound to Inverness and in receipt of a procedural Approach control service from Inverness on 122·6MHz squawking 7416 with Mode C. Prior to the Airprox, two TCAS contacts were noted, one in the 11 o'clock position and the other in the 1 o'clock; both at about 10nm range and 400-500ft above. The contact in the 1 o'clock position immediately disappeared from TCAS and the 11 o'clock contact moved to the 10 o'clock position and was no longer a relative threat. The instrument approach was then continued, as it was believed that neither TCAS contact continued to pose a threat. The next indication of conflict, at 9·5d, was a direct RA 'maintain v/s' which was followed precisely. The conflicting traffic was identified visually and the TCAS RA guidance was followed until the ac was clear of conflict. It was seen as a grey-coloured high wing trainer type which passed down their RHS in the opposite direction with a slight convergence, in level flight 300-400ft above and within 1nm. ATC were informed immediately of the Airprox. Earlier, ATC had told them of VFR traffic routeing back to the airport which they believed would be remaining well clear of the IAP to the N via Rosemarkie Mast and whose predicted position more accurately matched that of the initial TCAS contact in the 11 o'clock position.

RAC MIL reports that despite extensive tracing action the identity of the conflicting traffic could not be determined. Procedural enquiries to nearby airfield and airstrips proved fruitless. Lossiemouth tracing action proffered a C152 but this training flight was speaking to Inverness on a navex at 3000ft routeing to/from Nairn (6nm ENE INS), turning O/H the INS VOR before turning to track the 094° RAD out to the E. The instructor reported receiving TI on the SF34 but did not see the airliner and TI was given to the SF34 crew.

UKAB Note (1): The Inverness RT transcript just before 1408 reveals the ADC/APP giving TI to the SF34 flight on a C152 at 3000ft VFR that would shortly be turning O/H the INS VOR. Just over 1min later the SF34 reports 5d to run to the INS and is given descent to 3500ft. This would indicate that the C152 was well clear of the RW23 final approach area when the Airprox was filed by the SF34 crew 9·5nm NE of the INS VOR so this C152 flight was eliminated from the investigation.

THE INVERNESS APP/ADC reports that the SF34 went outbound for the VOR/ILS procedure for RW23 and at 1416 the crew reported an Airprox. The only traffic in the vicinity was a C172 returning from the NE routeing to Rosemarkie TV Mast for rejoin. TI had been passed to both flights. After landing the SF34 crew telephoned ATC and described the unknown ac as a high wing single engine type, grey in colour, which passed 400-500ft above. The unknown ac had appeared on TCAS but disappeared for a short while before reappearing whilst the C172 was already displayed on TCAS. On receipt of this further information, he informed ScACC Supervisor and Lossie Radar for tracing action.

The Inverness METAR shows EGPE 1352Z 28014KT 9999 SHRA SCT018CB BKN033 10/05 Q1012 and 1420Z 26009KT 220V290 9999 SHRA SCT017CB BKN035 11/07 Q1012=

ATSI comments that Inverness is not equipped with radar and the unknown ac was not in contact with Inverness ATC. No ATC causal factors were disclosed.

UKAB Note (2): The UK AIP at AD2 EGPE-8-11 and 8-13 promulgates the ILS/DME/VOR RW23 and the VOR/DME procedures. The outbound radials from the INS VOR are 030° and 026° respectively with the inbound turn commenced at 9·5d towards the LLZ or FAT as appropriate.

UKAB Note (3): The Inverness RT transcript at 1410:00 reveals a C172 flight calling 15nm NE and requesting a straight-in approach. ATC inform the pilot that owing to traffic (an inbound ahead of the SF34) he is to route via Rosemarkie to expect a R base join for RW23. This is followed shortly afterwards at 1411:00 with ATC transmitting *"... there's further traffic you may see is a Saab three forty just about to establish outbound in the two three procedure"* to which the C712 pilot replies *"Okay we'll keep a lookout for him thank you"*. At 1412:30 the SF34 crew reports established outbound for the VOR/DME procedure for RW23 and ATC clear the SF34 flight for descent with the procedure and to report LLZ established - as the ILS was serviceable following a flight check - which is correctly read back. ATC then transmit *"all correct there's Cessna one seven two traffic routeing from the northeast towards Rosemarkie for rejoins in case you get him in sight"* to which the SF34 crew reply *"and that's understood SF34 c/s"*. Just over 1min later the C172 pilot reports *"...traffic in sight"* to which ATC replies *"...thanks report Rosemarkie for right base"*. Under 1min later at 1415:00 the SF34 crew transmit *" er Inverness SF34 c/s we've just had a Airprox with erm light high wing single aircraft erm about nine point five d india november sierra on the zero three zero radial and er we're just establishing now on the localiser erm runway two three shortly"*. ATC reply *"SF34 c/s roger that's the Cessna one seven two I did advise you about earlier I believe"* to which the ASF34 crew reply *"er negative there was another ai (part word) another aircraft in the air SF34 c/s"*. ATC asked the SF34 crew to report LLZ established which is acknowledged after which the C172 pilot reports *"and er C172 c/s it certainly wasn't an Airprox with us"*. After the SF34 flight reports established, ATC clear it for descent on the ILS and transmits *"SF34 c/s I've just spoken to er Lossie Radar and they advised the Cessna one seven two is about three miles from you"*. The SF34 crew reply *"that's understood it was not er him that aircraft there was another aircraft in the air SF34 c/s"*.

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

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the SF34 pilot, transcripts of the relevant RT frequencies, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

This incident highlights the need for vigilance by aircrew of an IFR ac flying an instrument approach to an aerodrome in Class G, where 'see and avoid' prevails. The SF34 flight was in receipt of a procedural Approach control service from Inverness and was given accurate and timely TI on the traffic known to be in potential confliction, the C172. However, unbeknown to the APP/ADC, there was another ac, not working him, flying in the area. With the benefit of TCAS, the SF34 crew had noticed 2 contacts on the TCAS display about 10nm ahead, the track of one in the 11 o'clock was assimilated to be the given C172. The other unknown target in the 1 o'clock disappeared but, whilst continuing the IAP, it reappeared on TCAS generating an RA 'monitor v/s'. Whilst following the RA guidance, the other ac was visually acquired as a grey coloured light ac which was seen to pass 300-400ft above and within 1nm but clear on the RHS. The Board applauded the SF34 crew's display of airmanship, cockpit CRM and situational awareness. The crew's actions had been effective in resolving this conflict in Class G airspace with an untraced light ac and left the Board in no doubt that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

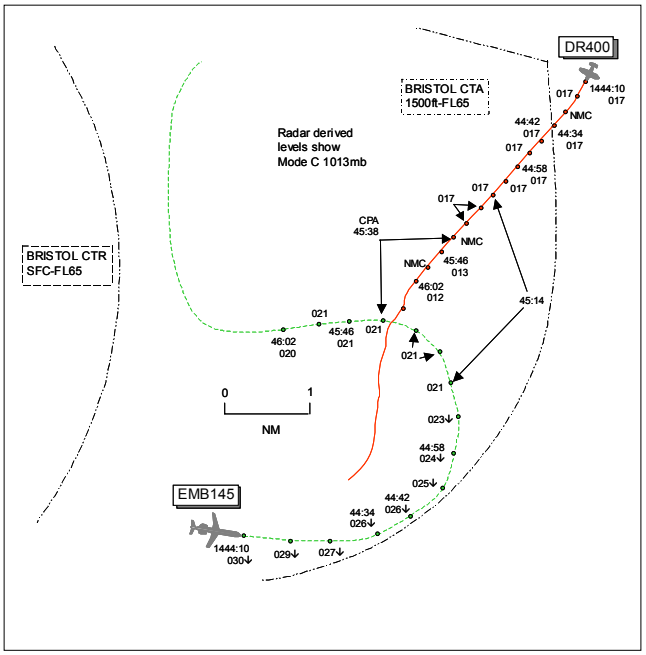
Cause: Conflict in Class G with an untraced ac resolved by the SF34 crew.

Degree of Risk: C.

AIRPROX REPORT No 064/06

AIRPROX REPORT NO 064/06

Date/Time:	1 Jun 1446	
Position:	5123N 00230W (8nm E Bristol - elev 622ft)	
Airspace:	CTA	(Class: D)
Reporter:	Bristol APR	
	First Ac	*Second Ac*
Type:	EMB145	DR400
Operator:	CAT	Civ Pte
Alt/FL:	2500ft (QNH 1028mb)	1600ft (QNH)
Weather	VMC NR	VMC CLBC
Visibility:	10km	9km
Reported Separation:		
APR	500ft V/2nm H	
	NR	800ft V/3nm H
Recorded Separation:		
	1·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APR reports that the EMB145 was being vectored inside Bristol CAS for an ILS to RW27. When it was established on L base at 2500ft altitude, an unknown contact squawking 7000 with a Mode C readout of 2000ft altitude was observed to enter Bristol CAS from a position 10nm ENE Bristol on a SSW'ly track. The EMB145 was given an avoiding action turn onto heading 270° and the 2 ac were separated by 500ft vertically and 2nm horizontally. The EMB145 was subsequently vectored for an approach from the N. The unknown ac continued on its SSW'ly track and descended to an indicated altitude of 1600ft as it crossed the extended C/L at range 8nm. Once it was S of Bristol CAS, the unknown ac was seen to climb to an indicated altitude of 2200ft and it was tracked on radar until it faded 25nm SW of Bristol.

The Bristol METAR shows EGGD 1450Z 25012KT CAVOK 17/11 Q1028=

THE EMB145 PILOT reports inbound to Bristol IFR. On L base at 2500ft QNH 1028mb and 180kt for a radar vectored ILS approach to RW27, a light ac infringed CAS at 2000ft. Avoiding vectors were issued and the flight was vectored around for an uneventful ILS to RW27. No TCAS messages were received throughout the incident.

THE DR400 PILOT reports flying solo from Sibson to Exeter VFR delivering the ac for maintenance. He was informed about the Airprox some 2 weeks post incident by RAC Mil. Prior to this flight he had been deliberately flying longer trips. As this was the longest flight he had ever flown, he decided to break the flight into 2 legs via Kemble to avoid fatigue. At the time of the Airprox he believed he was in communication with Kemble squawking 7000 with Mode C. The visibility was 9km flying 2000ft below cloud in VMC and the ac was coloured white/red with strobe and nav lights switched on. After departing Kemble at 1515 local time, he routed W of restricted area R105 only realising later that this relates to helicopters and microlights. Having planned to route via Bath he heard that there was gliding and parachuting close to his proposed track so he decided to fly beneath the Bristol CTA at 1300ft QNH. Shortly after crossing the CTA boundary heading 180° at 95kt he experienced sudden severe turbulence and, as a consequence, he gained 300ft, he thought. Despite wearing seatbelts with a shoulder harness his head hit the roof of the cockpit sustaining a head injury (photo of head wound supplied). In a slightly dazed state it took him some time to realise that his height had increased and that he had infringed Bristol airspace. It was at this point he noticed an airliner about 3nm ahead on a W'ly heading and 800ft above so he descended quickly to 1300ft and the airliner passed well above whilst continuing on its heading. He thought there was no risk of collision. Later he realised that he should have been speaking to Bristol and gave sincere apologies for not doing so. The rest of the flight was uneventful, landing at Exeter at 1625 local time. Upon arrival his friends commented on his head injury, not realising himself the severity of the impact until seeing the photo. Some

valuable lessons have been learnt following the incident – the importance of being in communication at all times and the need to observe and maintain height particularly when transiting close to Class D airspace.

UKAB Note (1): During a subsequent telephone conversation with the UKAB Secretariat, the anomaly between the DR400's indicated level and the reported cruising altitude was discussed. The Clee Hill radar recording clearly shows the DR400's Mode C steady at FL013 as the flight approaches the CTA from the NE. When about 3nm NNW of Bath with about 2·5nm to run to the CTA boundary, the Mode C rapidly changes, increasing 400ft in 2 radar sweeps (16sec) which is maintained until the Airprox occurs. The DR400 pilot recalled that this position was almost certainly where the turbulence was encountered (near the Southern end of a finger of high ground) but was uncertain as to why his displayed level (actual altitude), prior to the level deviation owing to turbulence and post Airprox, was much higher, as he was flying at 1300ft indicated on the altimeter. He had not obtained or set a regional QNH but then could not remember setting the Kemble aerodrome elevation on the altimeter (QNH pressure setting on subscale) and concluded that he had left QFE set on the subscale on his departure from Kemble. The Kemble aerodrome elevation is 433ft which is equivalent to 14mb, a subscale setting of about 1015mb (actual QNH 1029mb –14mb). The Mode C readout of FL013 equates to 1360ft on a subscale setting of Kemble QFE 1015mb but an actual altitude of 1800ft QNH.

ATSI reports that the EMB145 was being vectored inside Bristol CAS for an ILS approach to RW27 descending to altitude 2500ft. The Bristol APR was vectoring a sequence of ac onto the ILS for RW27 and had told the EMB145 that the radar cct would take the ac into a LH orbit for RW27. Correct radar service was applied throughout the vectoring and the EMB145 was told that the vectors would keep the ac inside CAS and clear of a couple of unknowns. At 1443:33 an unknown ac, the DR400, squawking A7000, is NE of the EMB145 by 8nm indicating FL017. At this point the DR400 is outside the Bristol CTA, base 1500ft, but on a track that would cause it to penetrate CAS.

At 1444:31 the APR transmitted *"EMB145 c/s continue the left turn heading three six zero degrees descend to altitude two thousand five hundred feet"*. The pilot acknowledged with the correct read back. Meanwhile at 1444:34 the DR400 entered the Bristol CTA still squawking A7000 indicating FL017; the DR400 is 5·7nm NE of the EMB145. The Bristol QNH was 1029mb, prior to 1450Z, which would give an altitude of, approximately, plus 500ft on all the FLs which are used in the report to reflect the actual radar recording.

At 1444:43 the APR transmitted *"EMB145 c/s to keep you inside controlled airspace there is unknown traffic north by er four miles indicating two thousand feet er I may have to turn you again ???? ????(one or two unintelligible words) he's about to penetrate controlled airspace"*. The pilot responded *"roger er traffic on TCAS EMB145 c/s"*. At 1445:00 the APR transmitted *"EMB145 c/s avoiding action turn left heading two seven zero degrees"*. The pilot responded with a correct read back. By now the DR400, tracking SW'ly, is 3·5nm in the EMB145's 1 o'clock at FL017 and has already penetrated the CTA. As the avoiding action is being given by the APR the EMB145 is indicating FL024. Shortly after this the radar recording at 1445:14 shows the DR400 is in the EMB145's 1 o'clock at 2·3nm, the EMB145 is indicating FL021 and the DR400 FL017.

The closest point of approach occurs at 1445:38 when the EMB145 is firmly established on the 270° heading following the avoiding action turn. The EMB145 is indicating FL021 but there is no height information from the DR400 which is in the EMB145's 4 o'clock at 1·3nm. At 1445:40 the APR transmitted *"EMB145 c/s apologies for this the unknown traffic now four o'clock range of one mile ???? ???? (one or two unintelligible words) two thousand feet unauthorised entry infringed controlled airspace I'm going to have to take you around again and around him"*. The pilot replied "Roger EMB145 c/s".

[UKAB Note (2): After the CPA, as the horizontal separation increases, the next radar sweep at 1445:46 reveals the DR400 at FL013 (c1800ft QNH 1029mb). After showing NMC 8 sec later, the radar sweep at 1446:02 shows the DR400 indicating FL012 (c1700ft QNH) which is maintained until the DR400 is seen to cross the boundary of the Bristol CTA at 1448:19.]

The EMB145 was repositioned into a RH cct and landed without further incident.

When providing a radar service in Class D Airspace MATS Part1, Section 1 Chapter 5 Page 13, Para. 14. states:

If radar derived, or other information, indicates that an aircraft is lost, has experienced radio failure or is making an unauthorised penetration of the airspace – avoiding action shall be given and traffic information shall be passed.

AIRPROX REPORT No 064/06

On seeing the CAS infringement and resulting loss in required separation, the APR gave immediate avoiding action by turning the EMB145 away from the unknown target. No ATC causal factors were disclosed.

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 could add little to the incident investigation reports. The DR400 pilot had not assimilated his true altitude prior to attempting to fly under the CTA and the situation was exacerbated further when sudden turbulence caused his ac to climb about 300ft which went unnoticed for some time by the pilot owing to his dazed state. The Bristol APR had continued to vector the EMB145 in the radar pattern towards the ILS LLZ cognisant of the DR400 approaching the CTA from the NE at a level that could potentially penetrate CAS. The DR400 pilot then entered the Bristol CTA without clearance resulting in a conflict with the EMB145 which had caused the Airprox. On seeing the DR400 crossing the CTA boundary, the APR had taken action immediately and given the EMB145 crew TI and then an avoiding action L turn onto 270° which had quickly resolved the confliction. The EMB145 crew had reported seeing the DR400 on TCAS, following the ATC instructions to maintain 2500ft altitude, the radar recording showing separation of 1·3nm at the CPA. At about the same time, the DR400 pilot had noticed his level excursion and immediately commenced descent to vacate CAS simultaneously with seeing the EMB145 as it crossed his ac's nose, he thought 3nm ahead and 800ft above. The recorded radar shows the DR400's descent in accordance with its pilot's reported actions, the ac levelling at FL012 (c1700ft QNH). The good situational awareness and prompt actions of the APR when combined with the EMB145 and DR400 crews' subsequent 'sightings' and actions allowed the Board to conclude that any risk of collision had been quickly and effectively removed.

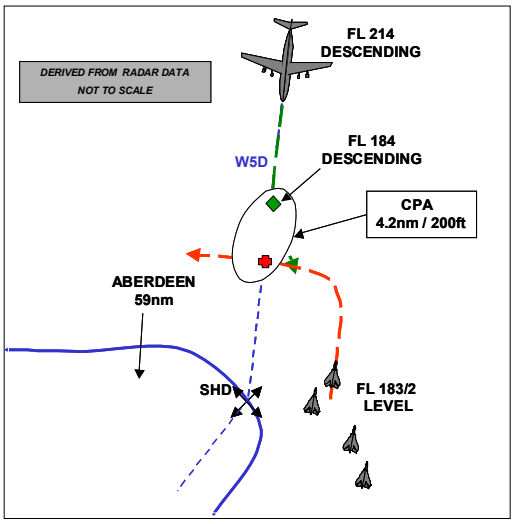
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The DR400 pilot entered the Bristol CTA without clearance resulting in a conflict with the EMB145 which was resolved by the Bristol APR.

Degree of Risk: C.

AIRPROX REPORT NO 065/06

Date/Time:	6 Jun 1307	
Position:	5814N 00142W (59nm NNE ADN)	
Airspace:	ADR W5D	(Class: F)
	Reporting Ac	*Reported Ac*
Type:	BA146-200	Tornado GR4
Operator:	Civ Comm	HQ STC
Alt/FL:	FL180↓	NR
		(QNH)
Weather	VMC NR	VMC CAVOK
Visibility:	NR	20km
Reported Separation:		
	NR	NR
Recorded Separation:		
	200ft V/4.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BA146-200 PILOT provided a brief report stating that he was flying a passenger flight inbound to Aberdeen at FL180 in ADR W5D at 280kt when traffic, not working ScACC, appeared on their TCAS 1000ft below. Two pairs of military ac were then identified visually and confirmed by TCAS at a range of 5nm. TCAS then warned *'TRAFFIC TRAFFIC'* so, due to speed of closure and their being at the same level, he disconnected the autopilot and visually manoeuvred to the E until clear of the conflict.

THE TORNADO GR4 PILOT also provided a brief report stating that at the time they were in a holding prior to the 'push' on an exercise sortie from RAF Leuchars and in receipt of a FIS from an AWACS. They were not aware of any incident until contacted over a week later. [UKAB Note (1): he was leader of 4 ship]

UKAB Note (2): The exercise was the subject of an ACN and NOTAM H1310/06 as follows:

EGGN H1310/06

(H1310/06 NOTAMN

A)EGTT EGPX B)0606041215 C)0606161515

D)1215-1515 EXC SAT AND SUN

E)AUS 06-06-0203/1450/AS3

CQWI AIR EXER. MEDIUM SCALE AIR EXER WITH UP TO 30 FAST JET ACFT

OPERATING IN MIXED FORMATIONS. ACFT MAY BE UNABLE TO COMPLY WITH

RULES OF THE AIR. INCREASED LOW AND MEDIUM LEVEL ACTIVITY SHOULD BE

EXPECTED OVER THE NORTH SEA AND OVERLAND NE ENGLAND AND SCOTLAND.

ACFT WILL REMAIN CLEAR OF REGULATED AIRSPACE. MILITARY ACFT MAY BE

SUBJECT TO LOW FLYING RESTRICTIONS.

ACN 2006-06-0203 DATED 10 MAY 06 REFERS.

AIRPROX REPORT No 065/06

CONTACT 01522 726230 OR 95771-6230 UNTIL 31 MAY THEN 07799 130464.

F)SFC G)FL240)

MIL ATC OPS based their report on the AWACS Staneval report which stated that the AWACS Weapons Controller was controlling a formation of 4 x GR4s under a FIS applied at 1247:36 and meanwhile a BAe146 was under the control of ScACC Southbound in W5D. The GR4s were transiting W towards W5D at an indicated level of FL184. TI was passed at 1305:33 *"GR4 Formation C/S, stranger traffic BRA* [Bearing and Range] *350, 17, track south, flight level two zero zero."* The GR4 leader acknowledged the TI and reported "*contact"* at 1305:42. ; the TI was updated at 1306:30 *"GR4 Formation C/S…er…previous traffic north, range 6, track south, FL200. Further stranger traffic, BRA 290, 10, track east, FL225."* and the formation leader acknowledged stating,*"GR4 Formation C/S, radar contact."* There was no further RT regarding the incident.

Analysis of the Aberdeen Radar at 1304:22 shows the BAe146 in a descent through FL214, tracking S on W5D, 60nm N of SHD with the GR4s in its 11 o'clock, 30nm indicating FL185, on a reciprocal track 7nm E of W5D. At 1305:45 the GR4s are seen to commence a L turn and at that point they were in the BAe146's L 11 o'clock at 8nm; at 1306:03 it indicates FL194 descending and the GR4s level at FL183. STCA activated at 1306:11 with the GR4s, indicating FL183, in the BAe146's 11 o'clock, 7nm as it showed FL192 descending. The ac continue to converge and at 1306:27 the GR4s were in the BAe146's 11 o'clock at 4nm indicating FL183 with the BAe146 indicating FL191 still descending and 4sec later the BAe146 commenced a L turn. The CPA was 4.2nm and 200ft at 1307:04 when the BAe146 was indicating FL186 and the GR4s were in its 12 o'clock at FL184; after that the ac diverged, the GR4s tracking 265° and the BAe146 170°.

UKAB Note (3): An independent analysis of the Aberdeen Radar was conducted by the UKAB which verified the above including the CPA.

By passing and updating TI the AWACS controller fully discharged his duty to inform crews of the proximity of other ac in accordance with his responsibilities under a FIS and this enabled them to acquire the BAe146 both on radar and visually and to take separation appropriate to the airspace classification.

ATSI reports that a BAe146 was routeing from Scatsta, S along ADR W5D bound for Aberdeen. The crew contacted the ScACC Moray sector at 1252:30, and reported passing FL180 for FL220 [still in the climb] and gave a position as '*…just south of Sumburgh*'. At the time, a single controller undertaking both the Planning and Tactical roles manned the sector. He described his traffic loading as 'light to moderate'. As is common on this sector, the traffic comprised of high-level ac in receipt of a RCS together with traffic on ADRs under a RAS and ac within Class G airspace in receipt of a RIS. The sector is large, measuring some 250 x 200nm and, as is typical, the radar was selected to a range of 120nm. A second display is located adjacent to the first and this is set to a smaller range permitting a closer picture of any selected area.

The controller instructed the BAe146 crew to squawk Ident, which the crew acknowledged. However, the controller did not then inform the crew they were identified nor passed their position as is required by MATS Part 1 (Section 1, Chapter 5, page 9, Table 5) but simply told them they were under a RAS. A military exercise, promulgated by NOTAM, was taking place at the time and the controller could see ac displaying squawks from the group 4701 – 4777. These are promulgated as 'Special Events' and the Mode A is unvalidated as well as the Mode C being unverified: thus the controller has no indication as to which ATS agency will be communicating with such ac. Given the foregoing, the wisdom of operating such a sector in these conditions in a bandboxed mode must be questioned.

At 1303:00, the controller requested that, due to military traffic, the BAe146 descend to FL210. This was acknowledged and the crew advised that they could accept further descent. The controller then instructed them to descend to FL180. At this time there was traffic to the E of the ADR, tracking northbound, with their labels garbling. At 1306:00, the controller transmitted "*(BAe146 callsign) there is traffic it's in your eleven o'clock the range looks like nine miles it's indicating one eight three it's not working us it looks to be turning west*". The crew replied that they were visual with a pair of Tornados at the same level. The controller responded by transmitting "*Okay I'll leave you for any avoiding action then 'cos you'll have a much faster update than me*". The crew then advised that it was, in fact, two pairs (of Tornados) and then advised that they would be filing an Airprox. The unit analysis of the incident reports that the closest of the jets was 3.5nm and 400ft from the BAe146 as they tracked from L to R in front of the BAe146 that was following the centreline of the ADR.

MATS Part 1 (Section 1, Chapter 5, page 3, para 1.4.1 e) requires controllers providing a RAS to pass avoiding action instructions to ac in order to seek to achieve separation of not less than 5nm or 3000ft and to continue passing information on the conflicting traffic until the confliction was resolved. Although the BAe146 crew had reported visual with the conflicting traffic they did not opt to provide their own separation and the controller did not limit the service in any way. The unit investigation reveals that his rationale was that the radar information was updated once every 6 sec and so a visual contact would provide better information. However, as the BAe146 had been placed under a 'full' RAS there was, accordingly, a requirement placed on the controller to provide avoiding action, which was not done.

HQ STC comments that the GR4 leader obtained 'tally' on the BAe146 and deemed it not to be a factor. Notwithstanding the status of the SSR information available to the ScACC controller, had he levelled or turned the BAe146 the TCAS alert may not have been generated.

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 considered this a challenging incident to analyse with, on the one hand, no evidence of any compromise of safety and, on the other, some significant ATC shortcomings.

Members noted that the AWACS had provided accurate and timely TI to the Tornado crews who had seen and avoided the BAe146 by a considerable margin thus ensuring there was no collision risk nor safety compromise. The BAe 146 crew's detection of, and appropriate reaction to, the Tornados (assisted by the TCAS TA) further reinforced the margin of safety.

An experienced controller Member questioned the use of the term 'Regulated Airspace' in the NOTAM. The DAP Adviser explained to the Board the significance of the terminology as used in ACNs and NOTAMS and that the Off-Route Airspace section had, in conjunction with AUS, recently [following informal consultation with the UKAB as result of another Airprox] looked to see if there was a clearer form of wording. It had been concluded that there was not but she stated that they would co-operate fully with any recommendation from the Board on the topic; none was immediately forthcoming.

The same controller Member opined that, contrary to the ATSI report, the bandboxing of the Hebrides and Moray sectors (Planner and Tactical) had not been a factor. However, this view was not supported by any other controller Members. The NATS Adviser said that the unit report had been completed only a few days before the Board Meeting, but stated that workload had not been an issue and that other controllers were available if required. There was, however, a view amongst Members that the controller had actually been busy at the time and should have considered limiting the RAS even if he opted not to request any further assistance.

Most controller Members agreed with the ATSI report in that the ScACC controller had not applied a RAS to the BAe146 in accordance with the requirements of MATS Part 1. Further, if it were to be effective, the first call by the ScACC controller should either have been made earlier than 9nm or, if the conflict was not identified until then as was probably the case, then that call should have been an 'avoiding action' turn (or possibly 'stop descent'). In the event although the TI had been accurate it had led to the BAe146 pilot taking his own rather unorthodox avoidance, presumably because none was given.

Noting the pilots' reports and the recorded separation, the Board concluded that safety was not compromised and that this was a 'sighting report'.

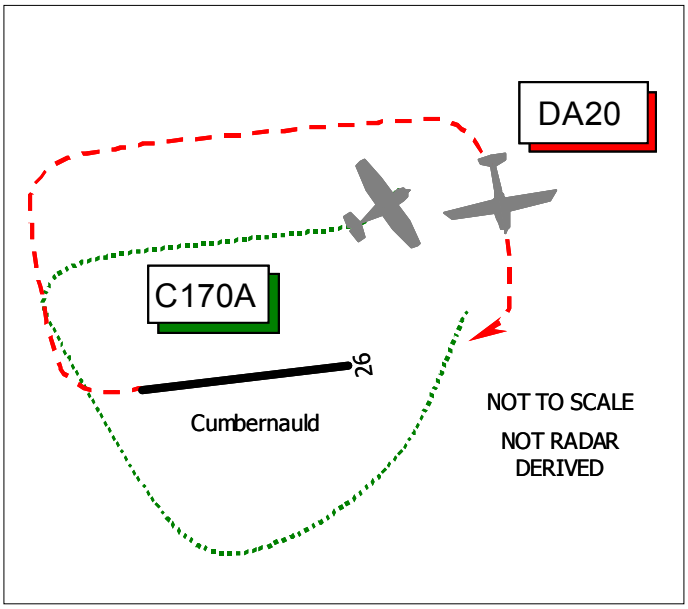
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report.

Degree of Risk: C.

AIRPROX REPORT NO 066/06

Date/Time:	3 Jun 1411 (Saturday)	
Position	5559N 00358W (RW26RH Cct Cumbernauld Aerodrome - elev 350ft)	
Airspace:	Cumbernauld ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Cessna 170A	Diamond DA20
Operator:	Civ Pte	Civ Trg
Alt/FL:	1000ft (QFE 1017mb)	900ft (QFE 1017mb)
Weather	VMC NK	VMC NK
Visibility:	10+km	30km
Reported Separation:	Nil V/300m H	100ft V/500m H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 170A PILOT reports that he was inbound to Cumbernauld from Strathallan in VMC some 1500ft clear below cloud with an in-flight visibility of 10km+. RT communication was established with Cumbernauld RADIO on 120·6MHz in the vicinity of Stirling, some 8nm from Cumbernauld aerodrome. Flying inbound at 2000ft, he made standard RT calls and executed a standard 'overhead' cct join for RW26RHC [right-hand circuit] at 90kt as the aerodrome cct was busy. Approaching the end of the right-hand DOWNWIND leg heading 080°M at 1000ft Cumbernauld QFE (1017mb), he heard a transmission "aircraft downwind position, have you seen us?" At a position about 1nm NNE of the RW26 threshold he then noticed a white Diamond DA20 ac crossing ahead from L – R about 300m away. To avoid the DA20 he executed a descending L turn until there was no risk of a conflict which in his view was a departure from the 'Rules of the Air', hence his Airprox report. He assumed [erroneously] that the Diamond DA20 had either joined the RW26RHC cct on a R BASE-LEG join or flown a very large cct. Minimum horizontal separation was 300m and he assessed the risk as "low". No report was made on RT but a report was made 'face-to-face' with the A/G Station operator and Aerodrome Operator after landing. He added that he was completing pre-landing checks and cited this as a factor.

THE DIAMOND DA20 PILOT reports that he was conducting a 1-hour cct training detail at Cumbernauld in his white/blue ac and he was established in the cct pattern for RW26RHC. HISLs and landing lights were selected on and he was flying some 2-3000ft clear of cloud with an in-flight visibility of 30km whilst operating on the Cumbernauld RADIO A/G Station frequency of 120·6MHz.

The Cessna 170A was joining the cct from the N and in the absence of the A/G Operator answering the C170A pilot's initial RT call he – the DA20 pilot - had passed the C170A pilot the airfield information for RW26, who subsequently advised that he would make a standard 'overhead' cct join.

As his DA20 turned onto BASE-LEG and started to descend through 900ft QFE (1011mb) heading 180° at 70kt, he noticed that the yellow C170A was on his R some 700ft away and, he thought, he had informed the C170A pilot of his position. No avoiding action was necessary as the C170A pilot then positioned behind his DA20 in the established traffic pattern. The C170A passed no closer than 500m away and 100ft above his ac. In his opinion there was no possibility of a collision due to the fact that he was visual with the Cessna, had alerted its pilot to his DA20's position and was also able to carry out de-conflicting action himself if required.

After landing he approached the pilot of the C170A requesting that he maintain a better lookout for traffic in the cct when joining. The Cessna pilot then told him that he was in the right and would be filing an Airprox whereupon he reminded the C170A pilot of traffic priorities in the cct. The C170A pilot seemed to think that he was correct due

to the fact that his ac was on the R of his DA20 and thought [erroneously] that his DA20 was joining the cct on a R BASE-LEG join.

UKAB Note (1): The Rules of the Air' Regulations Section IV GENERAL FLIGHT RULES – Rules for avoiding aerial collisions at:

(5) - Flight in the vicinity of an aerodrome – requires pilots to - …….(a) conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome…….

and at

(6) Order of landing:

(a) An aircraft while landing or on final approach to land shall have the right-of-way

over other aircraft in flight or on the ground or water.

(b) ……..in the case of two or more flying machines….approaching any place for the purpose of landing, the aircraft at the lower altitude shall have the right-of-way, but it shall not cut in front of another aircraft which is on final approach to land or overtake that aircraft.

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

UKAB Note (3): The UK AIP at AD2-EGPG-1-3 notifies the Cumbernauld ATZ as a radius of 2nm centred on RW08/26, extending from the surface to 2000ft above the aerodrome elevation of 350ft amsl.

UKAB Note (4): Exceptionally, Cumbernauld A/G Station RTF is recorded and a copy was helpfully provided by the aerodrome operator. It is evident from analysis of relevant RT transmissions made that the DA20 was circuiting to RW26 as the C170A pilot executed his overhead join from the N at 2000ft Cumbernauld QFE (1017mb) descending on the DEADSIDE to join the RHC at 1000ft. After climbing away from a previous cct the DA20 crew reported *"DOWNWIND 26 for touch & go"* just after 1409:48. About 28 sec later at 1410:16, the C170A pilot made a transmission which is slightly indecipherable on the recording but appears to be *"DOWNWIND* [indecipherable word] *runway 26"*. Just before 1411:18, the DA20 pilot made a broadcast *"…to ac in the downwind section are you visual with us [C/S]",* to which the reply almost certainly from the C170A pilot but not prefixed with a C/S was *"got you now"*. Thereafter, at 1412:18 the DA20 crew reported "[C/S] FINALS…" for their 'touch & go', which was followed 17sec later by the C170A pilot also reporting "[C/S] *FINALS runway 26".*

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, and a recording of the relevant A/G Station RT frequency.

From the analysis of the RT recording for the Cumbernauld A/G Station, it was evident to Members that the DA20 on its training detail had been established in the RH cct for RW26 before the C170A pilot had joined the cct. In the Board's view, as he had recognised it was a busy cct the C170A pilot should have been keeping a watchful eye on the cct area to ensure that he safely integrated his arrival into the established pattern of traffic formed by the other ac already circuiting and intending to land at Cumbernauld. Thus the reporting C170A pilot was mistaken if he had believed that the Diamond DA20 had joined the RW26RHC on a R BASE-LEG. The Board was briefed that the RT recording confirmed the C170A pilots assertion that the cct was indeed a busy one, with one other ac ahead of the DA20 that was itself No2 in the RW26 downwind traffic sequence, with the C170A third in the sequence when the Airprox occurred. Light ac pilot Members recognised the difficulties of integrating into the visual cct when operating at 'uncontrolled' aerodromes where no ATC is provided – clearly all that is available is what 'information' can be obtained from the A/G Operator, from other pilots' transmissions or from what can be seen visually. Thus pilots must rely on their own lookout and assimilation of the RT calls in order to fit into the established pattern, which can on occasions become excessively large, perhaps understandably so, when considering the presence of student pilots of relative inexperience and limited ability. Without recorded radar data it was not feasible to ascertain the acs' exact tracks in the a/d cct but Members were well aware that it is very easy for a/d ccts at training aerodromes to be 'pushed-out'. This is especially so when there is a preponderance of

different ac types flying at dissimilar speeds, a very experienced GA and fast-jet pilot Member observed. However, in this case it was not possible to ascertain independently whether the DA20 student had flown a very large cct - as the C170A pilot had contended. That was not to say at all that the DA20 instructor pilot here was not keeping a watchful eye on the student pilot in his charge, merely a statement of fact. Nevertheless, after the C170A had executed his overhead join he should have been well placed to integrate into the cct correctly and the RT recording had shown that after the DA20 student had reported DOWNWIND for a touch & go, the C170A pilot had made his DOWNWIND call about 28sec later. Thus, the RT transmissions were a clue in this busy cct to the succeeding C170A pilot who was obliged to maintain a watch on the RT: moreover, the other ac was evidently there to be seen. The reporting C170A pilot should, therefore, have been aware that the DA20 was ahead of him from the RT calls and he should have had ample opportunity to spot it and adopt the appropriate cct spacing. However, it was clear from the comprehensive and laudably frank accounts provided that he was not aware that he was following the DA20 in the cct nor how close he was to it until the latter's pilot alerted him. Although the DA20 pilot had not called FINALS by that stage, he might well have been distracted from so doing whilst ensuring that the C170A pilot had spotted his ac. Whereas at this uncontrolled a/d the DA20 might not necessarily be considered to be on final approach to land because the FINALS call had not been made by the student, the Board considered that to 'all intents and purposes' the DA20 was still ahead in the established pattern. Moreover, it would appear that the DA20 was at the lower altitude as he descended toward the RW. Overall it seemed to Members that the C170A pilot was not aware of the presence of the DA20 on BASE LEG beforehand. Consequently he was not able to integrate properly into the pattern of traffic formed by the other ac intending to land at Cumbernauld. The reporting pilot had cited his pre-landing checks as a factor but a very experienced GA Member was not convinced that this should have impacted his lookout adversely to the point that he was unaware of other traffic already established in the cct. Thus it seemed to the majority of the Members that this Airprox had resulted because the C170A pilot had joined the RH cct and then flown into conflict with the DA20 that was on BASE-LEG, unaware that it was there ahead of him. However, once the C170A pilot realised that the DA20 was in close proximity – he estimated about 300m - he wisely turned away from it. As the C170A pilot had called FINALS a mere 17sec after the DA20 student this might be indicative of how close they were together at this juncture but nonetheless, with both pilots now visual with each others ac, in the Board's view, there was no risk of a collision.

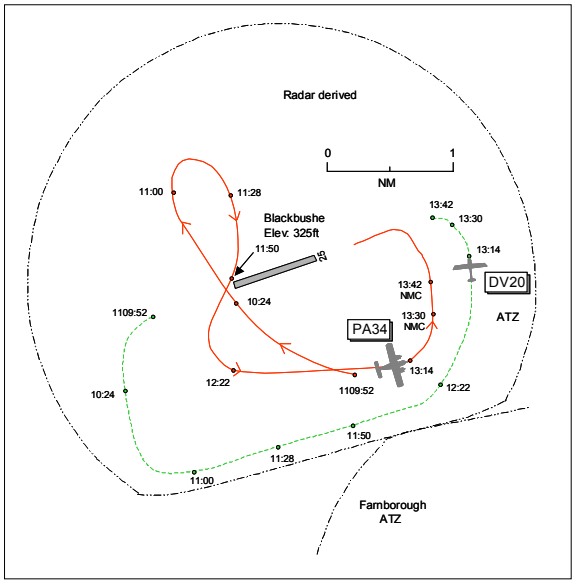
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C170A joined the a/d cct and flew into conflict with the DA20.

Degree of Risk: C.

AIRPROX REPORT NO 067/06

Date/Time:	2 Jun 1114	
Position:	5120N 00049W (1nm FIN APP RW25 Blackbushe - elev 325ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DV20 Katana	PA34
Operator:	Civ Trg	Civ Pte
Alt/FL:	500ft↓ (QFE)	NR↓ (QFE 1018mb)
Weather	VMC CLOC	VMC CLOC
Visibility:	>10km	>10km
Reported Separation:	100ft V&H	not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DV20 PILOT reports flying a dual local training sortie from Blackbushe and in communication with Blackbushe Information on 122·3MHz squawking with Mode C. The visibility was >10km in VMC and the ac was coloured white with a red stripe; no lighting was mentioned. Heading 250° at 70kt and 500ft QFE on final approach to RW25, she heard another ac's pilot call 'final'. She reported 'final' a second time, as she could not see another ac, but believed that it was probably on long final as its pilot had been told to give way to cct traffic. There was no response so she called 'final' for a third time. ATC asked the other pilot if he had the Katana in sight, which he did not. Both she and her student looked L and saw a white twin-engined low wing ac (the subject PA34) in their 9 o'clock about 100ft away and 100ft above, belly-up in a L turn, and descending. She banked hard L and lowered her ac's nose to avoid the PA34 as it turned onto the final approach path. The PA34 passed to their R just above, separated by about 100ft, and she assessed the risk as very high. The L turn was continued into an orbit to reposition back onto final approach.

THE PA34 PILOT reports flying solo inbound to Blackbushe VFR and in communication with Blackbushe Radio on 122·3MHz squawking 7000 with Mode C. The visibility was >10km in VMC and the ac was coloured white with red stripes; no lighting was mentioned. After leaving Farnborough Radar and contacting Blackbushe, he was told that RW25 was in use and the QFE was 1018mb. He set this up and requested an O/H join in order to let down on the deadside. The cct height for twins is 1200ft QFE with singles operating some 400ft lower at 800ft QFE. On entering the O/H at 1200ft he reported for the downwind join and was advised that there were other ac in the cct. Searching the downwind leg as he crossed the O/H, he reported that he did not have visual contact with the other ac. However, he then noticed one on short final so he continued the downwind join, spotting a second ac on final. Due to his height, and for separation, he extended the downwind to base leg. ATC was advising other traffic of a PA34 in the cct, which he presumed was his ac, so he continued the base leg turn onto final. ATC then called *"PA34 c/s there is an ac below you, you will land on him, go-around"*. He immediately responded, putting the power on and reported *"PA34 c/s going-around"*. ATC then announced *"The Seneca is going around, missed approach to the right"*. The other ac was then cleared to final and he continued his climb to rejoin the cct, thinking nothing more about it other than having made a standard advised go-around for avoidance and safety reasons. He resumed the cct procedure and landed safely. Later on he was told that the pilot of the other ac might be filing an Airprox against him. He was unsure how close he flew to the other ac, which was not sighted at all, nor at which point they had started to converge nor whether she had been in the cct or joining on base leg. He went on to say that when flying a complicated twin ac solo into Blackbushe he had a number of problems to negotiate but the situation was not helped by the dual cct height and lower level traffic. Added to this were the lack of lower/forward visibility associated with twins, speed and limited position information available from ATC. He opined that the safety aspect of the dual cct height procedure should be reviewed as had he been flying at the same cct height, his forward visibility would have been greatly improved and this problem would not have occurred.

AIRPROX REPORT No 067/06

THE BLACKBUSHE FISO reports the inbound PA34 flight requested aerodrome information (RW25 LH, QFE 1018mb, 3 ac in the cct). When the PA34 was crosswind, he passed TI on the DV20 as being 'mid to late downwind' to which the PA34 pilot replied 'turning downwind in a minute'. No downwind report was heard from the PA34 flight, the next report heard from its pilot being 'final 25'. In view of no downwind report and seeing the DV20 on final, he queried the 'final' report. The PA34 pilot confirmed on final at which point he, the FISO, saw the PA34 descending above the DV20. He passed urgent TI to the PA34 pilot and as the DV20 commenced a turn to the L he suggested that the PA34 go-around. Its pilot queried this suggestion by which point the ac were approximately 50ft apart and closing. He then instructed the PA34 to go-around in the interests of flight safety, the prevention of a mid-air collision and all parties involved.

UKAB Note (1): The Met Office provided archive data of a Farnborough METAR as EGLF 1120Z 35010KT 9999 BKN037 18/10 Q1031= The AFISO reported the Blackbushe QNH was also 1031mb.

ATSI comments that as far as can be ascertained from the RT transcript, which was transcribed in note format due the very poor recording quality, the FISO provided relevant and timely TI to the PA34 flight on first call and subsequently when its pilot reported O/H. Further relevant TI was passed, including information on the DV20 Katana which was reported as being *"mid to late downwind"*. The PA34 pilot replied as being on base leg. The FISO attempted to clarify this report but received simultaneous transmissions. Eventually he ascertained that the PA34 was *"turning finals now"* and having stated he had the PA34 in sight, suggested *"PA34 c/s Er the Seneca" ??????? (ATSI note unintelligible transmission) as well as underneath you er I suggest you go around".* On receiving the query *"Is that referring to PA34 c/s"* the FISO issued an executive instruction to the PA34 to go-around which was complied with. Further relevant traffic was issued. A FISO is not permitted to issue executive instructions to ac in the air: however, the FISO explained his action as necessary in the interests of immediate safety. This, in the circumstances, is accepted as a reasonable course of action by ATSI.

UKAB Note (2): The UK AIP entry for Blackbushe at AD 2-EGLK1-4 para 2.22 Flight Procedures states: - *a) All circuits are to be flown south of the aerodrome. Circuit heights: Light single-engined aircraft – 800ft (AD QFE); Twin-engined and executive aircraft – 1200ft (AD QFE). At night the circuit height for all aircraft is 1000ft (AD QFE).*

UKAB Note (3): An AIC 49/2006 titled Use of SSR in the Aerodrome Traffic Pattern (Trial at selected aerodromes) was in force (valid 15 May till 11 Aug). A conspicuity code of 7006 would be allocated at certain aerodromes outside CAS that do not have a discreet code – Blackbushe was a participating aerodrome.

UKAB Note (4): Analysis of the Heathrow 23 and 10cm radar recordings revealed that the Airprox was not captured but both ac are shown until the DV20 fades immediately before the incident. The PA34 is identified from a Farnborough squawk approaching the Blackbushe O/H from the ESE at altitude 2400ft QNH before the squawk disappears at 1108:23 with 4nm to run. The primary only return continues on a steady 280° track until 1109:52 when it is seen to commence a R turn 1nm SSE of the Blackbushe as another primary only return pops-up, believed to be the DV20, 1·6nm WNW of the PA34 tracking 260°. The PA34 passes just SW abeam the O/H just under 30sec later tracking 330° whilst the DV20 has turned L and steadied on a track of 170° crosswind. At 1111:00 the PA34 is seen commencing a R turn when 1nm NW of the O/H whilst the DV20 is seen tracking 075° downwind for RW25 1·7nm SW of the O/H. Twenty-eight seconds later the PA34 has turned about, passing through a heading of about 160° as the DV20 crosses 2nm ahead from R to L. The PA34 steadies on a 210° track at 1111:50 passing W abeam the upwind end of RW25 apparently joining crosswind as the DV20 is 1·4nm SSE of the O/H, mid-point of the downwind leg, with 2 other ac ahead of it in the cct, 1 on short final with the other 1·5nm E of Blackbushe on L base. As the DV20 commences a L turn onto base leg at 1112:22 it crosses 1·6nm ahead of the PA34 which is steadying on a 090° track. This downwind track is maintained for about 50sec before the PA34 turns L onto base leg at 1113:14 with the DV20 0·9nm to its NNE tracking 360°. As the PA34 steadies on base leg 14sec later, a 7006 squawk NMC appears co-located with its primary return, with the DV20 turning L onto final approach in its 1230 position range 0·75nm. The DV20 is last seen at 1113:42 on final to RW25 0·5nm ahead of the PA34 which thereafter is seen to turn L onto the FAT and fly through the Blackbushe O/H before repositioning into the LH cct.

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 FISO involved and reports from the appropriate ATC authorities.

ATCO Members commended the actions taken by the FISO, during the critical stages of the Airprox, in issuing positive instructions to the PA34 pilot in an attempt to resolve the deteriorating situation. Pilot Members noted that prior to the Airprox the PA34 pilot did not conform with the standard O/H joining procedure of passing over the aerodrome to let down on the deadside with a L turn to cross the upwind end of the RW. Adoption of this procedure affords the joining pilot a continuous view of the active RW for departing traffic as well as traffic climbing into and already established in the traffic pattern. The dual cct height procedure applicable to Blackbushe is not uncommon at aerodromes where ac can operate with disparate speeds, providing an additional vertical separation safety element. That said, pilots flying at a higher cct height should take 'due regard' of this vertical difference by making allowances for cockpit viewpoint deficiencies and ensuring that the ac's configuration, speed and cct positioning is sorted in good time. Also, at aerodromes where A/G or FISO service is provided, use of standard RT position calls (O/H, deadside, crosswind, downwind and final) is paramount to allow all parties to build a good situational awareness of the cct traffic situation. The FISO had passed cct joining information and told the PA34 pilot of the 3 ac already in the cct. The PA34 pilot did not report downwind but was told about the DV20 which was extending downwind to fit in behind 2 ac ahead. However, as the PA34 pilot routed crosswind, he apparently had seen only the 2 ac ahead of the DV20, positioning his ac accordingly. In doing so, the PA34 pilot did not integrate safely into the Blackbushe cct and flew into conflict with the DV20, which he did not see. This had caused the Airprox.

The FISO had queried the PA34 pilot's base leg report but had received simultaneous transmissions by reply, which could possibly have been the DV20 pilot reiterating her 'final' report as well as the PA34 replying. On receiving confirmation that the PA34 pilot was turning final and seeing the relative positions of the subject ac - separated by an estimated 50ft with the DV20 commencing a L turn - he had told the PA34 pilot to go-around and this was executed promptly. The DV20 pilot heard the PA34 pilot's final call and the FISO querying the PA34's position and visual sighting of her ac. Fortunately she and her student had then visually acquired the PA34, albeit late, to their L and slightly above, turning into confliction, and she had executed a steep L turn and descent to avoid it, passing behind and below by an estimated 100ft. Undoubtedly this had been a close encounter. However, Board Members agreed that although the prompt actions taken by all parties had been effective in removing an actual risk of collision, the subject ac had passed with separation margins reduced to the extent that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

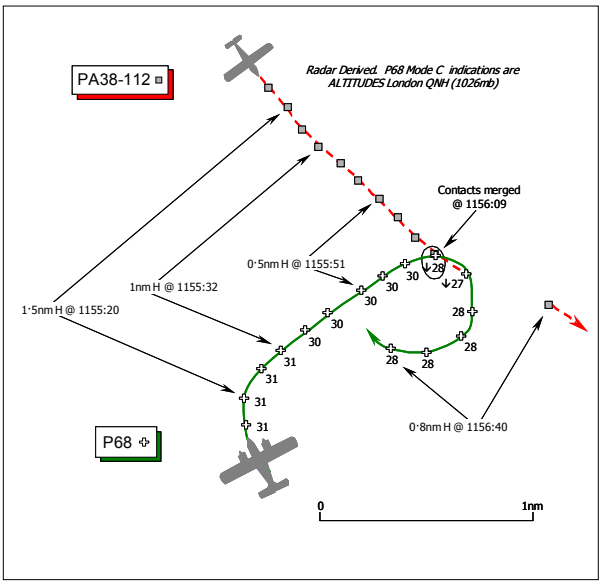
Cause: The PA34 pilot did not integrate safely into the Blackbushe cct and flew into conflict with the DV20, which he did not see.

Degree of Risk: B.

AIRPROX REPORT No 068/06

AIRPROX REPORT NO 068/06

Date/Time:	8 Jun 1156	
Position:	5048N 00010E (3nm NE of SFD VOR near Eastbourne)	
Airspace:	London FIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	Partenavia P68	PA38
Operator:	Civ Comm	Civ Club
Alt/FL:	3200ft (QNH 1028mb)	3000ft (QNH 1027mb)
Weather	VMC NR	VMC Haze
Visibility:	10km	10km
Reported Separation:	30ft V	Nil V/300m H
Recorded Separation:	Contacts merged	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PARTENAVIA P68 PILOT reports he was on a commercial survey flight in VMC overhead Eastbourne and in receipt of a FIS from Shoreham ATC on 123·15MHz. Flying with a co-pilot, they turned onto their eastbound line at 90kt and were ½nm from their start gate, flying straight and level at an altitude of 3200ft Shoreham QNH (1028mb). Heading 090°, he thought, some 3nm E of SEAFORD VOR he glanced out of the P1 window and saw a low-wing single engine ac about 100ft away to port on a converging heading as it appeared over the port engine cowling. A diving turn to the R was initiated to avoid a collision as the other ac – coloured white with a blue stripe – passed 30ft directly above them from L – R with a *"high"* risk of a collision. He added that they lost 500ft whilst orbiting R before recovering to their survey altitude. An Airprox was filed over the radio with Shoreham ATC. The survey flight was then continued for a further 2 hours before landing at Lydd. A squawk of A7000 was selected with Mode C. His ac is coloured white.

UKAB Note (1): Analysis of the Shoreham ATC RT transcript for 123·15MHz reveals that the P68 pilot reported that he was at an altitude of 3300ft (1028mb) when the Airprox occurred. Despite an earlier broadcast, Shoreham ATC advised of the QNH change to 1027mb after the Airprox was reported on RT.

THE PIPER PA38 PILOT reports he was flying a qualifying cross-country solo under VFR from Biggin Hill via Lydd and Southend, with several legs en-route between Biggin Hill and Lydd. His ac has a white colour-scheme with a blue stripe and a squawk of A7000 was selected, he thought with Mode C.

The flight from Biggin Hill to Heathfield had been at an altitude of 2000ft, but after passing Heathfield he climbed to 3000ft QNH (1027mb) en-route to LEWES INTERSECTION VRP. Overhead the VRP he turned onto a heading of 130° for Beachy Head at 1150UTC. Just before calling Lydd on the RT (his last RT communication had been with Biggin Hill), heading 130°(M) at 90kt and shortly before reaching Beachy Head, a scan over his R shoulder revealed that another ac was converging with his ac from the R at the same altitude. It was apparent to him that the other pilot had seen his own PA38 seconds after he himself had spotted the P68, because the other ac had turned sharply to the R to avoid his PA38. In an attempt to "maximise their separation" he turned to the L as fast as possible and when he had established that the other ac had taken up a course to the W he resumed his own heading to Beachy Head. He assessed the minimum horizontal separation as 300m at the same altitude and the risk as *"low"*.

UKAB Note (2): The 1150UTC Shoreham Weather was: Surface Wind: 120/4kt; CAVOK; QNH1027mb.

ATSI reports that no ATC errors were disclosed.

UKAB Note (3): This Airprox is illustrated by the Pease Pottage radar recording although no Mode C is displayed by the PA38, although it's pilot reports that it was selected on. The P68 is shown at 1155:20, in a R turn NE'ly level at 3100ft QNH (1026mb), some 1·5nm due S of the PA38 that is shown on a SE'ly course. The subject ac converge on broadly perpendicular tracks as the P68 descends slightly to 3000ft QNH (1026mb), theoretically about 30ft above the reported altitude of the PA38 at 3000ft (1027mb). At a range of 0·1nm the P68 is shown turning R in conformity with the pilot's reported avoiding action turn. The contacts merged at 1156:09, about 3nm NE of the SFD, just as the P68 descends through 2800ft QNH. Thereafter, both primary and secondary contacts on the PA38 are lost so the pilot's L turn to "maximise" the separation is not recorded, just as the P68 'bottoms out' at 2700ft QNH at 1156:16 and continues into a tight R orbit as reported at 2800ft. The PA38 is not shown again until separation has increased to 0·8nm at 1156:16, after the confliction has been resolved.

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 ATC authority.

Evidently the crux of this Airprox was the visual acquisition of the respective ac by the pilots involved. The P68 pilot reports that they were just setting up for their survey run so, whilst concentrating on this essential aspect of their flight, a Member observed that there was potential for their attention to be diverted from the all important task of lookout scan. A pilot Member opined that the visibility from the P68 is generally good despite the high-wing configuration of the ac and in the prevailing CAVOK weather conditions there seemed little to hinder the crew's lookout. However, as the P68 had been turning to the R earlier – as evinced by the recorded radar data – it was feasible that the ac was 'belly-up' to the PA38 at the critical moment. Nevertheless, it was still somewhat surprising to the pilot Members that the P68 crew had not spotted the PA38 earlier as it should have been in full view as they steadied NE'ly. Members noted however that the radar data also showed that the PA38 had closed on a line of constant relative bearing to the P68 thereby making the white-coloured ac even more difficult to detect. With little relative motion to draw attention to it, the P68's airframe had apparently masked the PA38's presence until the last moment and it was indeed fortunate that the P68 pilot had spotted the other ac out to port when he did – he reports some 100ft away. This was a very late spot indeed and in the Members' view part of the cause.

For his part, the PA38 pilot had a responsibility, in accordance with the 'Rules of the Air', to give way in this situation to the P68 converging from his starboard side. However, the 'Rules' can only work if the other ac is sighted in sufficient time for appropriate action to be taken as necessary. Here it was evident from the PA38 pilot's account that the P68 was not spotted until just moments before the latter's pilot had initiated his avoiding action and was banking his P68 into the R turn. If this was so then the PA38 pilot must have spotted the P68 when it was very close indeed although he apparently had ample opportunity to spot it much earlier. However, the Board recognised that the lack of relative movement that prevented the P68 crew from spotting the PA38 also beset the latter's pilot. Thus in the Board's view this was effectively a non-sighting on the part of the PA38 pilot and the other part of the cause.

Although the PA38 pilot clearly believed he had selected Mode C on his ac's transponder, the absence of any Mode C indications from the PA38 was either the result of an unserviceability or switching problem. This was unfortunate as this clearly denied both ATC and other ac fitted with TCAS altitude data about the light ac. Whilst this was not a factor within this Airprox, the Board stressed the importance of operating Mode C in accordance with national guidelines and light ac pilots should be in no doubt of the overall benefit to flight safety of this essential aid. However, it had also prevented any determination of the minimum vertical separation that pertained here, which was apparently no more than 30ft according to the P68 pilot's own account. Fortunately, the P68 pilot had spotted the other ac just in time and managed to manoeuvre his ac into a rapid dive, which had effectively prevented an actual collision from ensuing – but only just in the Board's view. Although the PA38 pilot reports he turned L to maximise any separation the large-scale radar recording reveals that the contacts merged at certainly less than the minimum separation of 300m reported by the P38 pilot. Although radar data on the PA38 is lost after they merged, and not doubting the veracity of the P38 pilot's report in any way, his reported L turn was probably after the event and any avoiding action he took was thus late, probably ineffective and did little to forestall this close encounter. Given the minimal horizontal separation and the robust avoiding action necessary reported by the P68 pilot, in the circumstances reported here the Board concluded the safety of the subject ac had certainly been compromised.

AIRPROX REPORT No 068/06

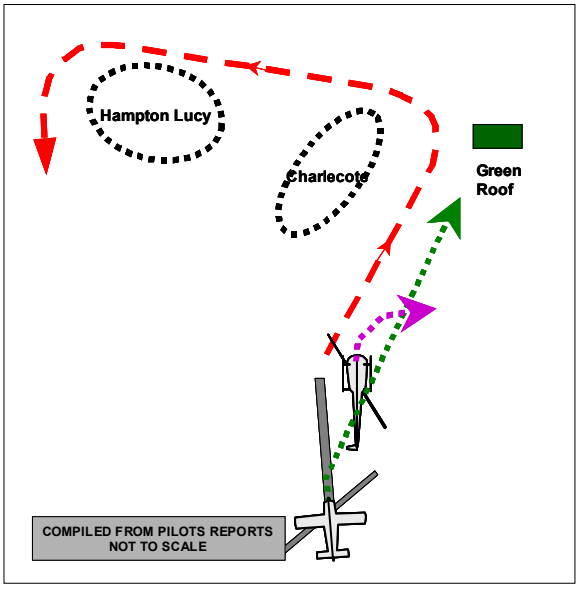
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting by the PA38 pilot and a very late sighting by the P68 crew.

Degree of Risk: B.

AIRPROX REPORT NO 069/06

Date/Time:	8 Jun 1351	
Position:	5212N 00136W (Wellesbourne Mountford Circuit - elev 159ft)	
Airspace:	Wellesbourne ATZ	(Class:G)
	Reporting Ac	*Reported Ac*
Type:	Robin 2160i	Robinson R44
Operator:	Civ Trg	Civ Trg
Alt/FL:	500ft	500 ft↑
	(QFE 1021mb)	QNH NR
Weather	VMC NR	VMC NIL
Visibility:	Unl	NR
Reported Separation:		
	V 150ft/ H100m	Not Seen
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ROBIN 2160i PILOT reports flying a local training flight with another pilot in a grey and white ac, with strobes selected on, and squawking 7000 with Mode C while in receipt of a FIS from Wellesbourne. He took off from RW 36 and was heading 030° at 80kt on climb-out as required by the notified noise abatement procedure (after take off turn right to track 030° *sic*), he saw a helicopter ½nm away in his left 11 o'clock and slightly above. The helicopter appeared to be level at about 6-700ft agl. He asked ATC what it was doing as prior to that he had heard no ATC transmissions; ATC called the helicopter but received no reply. He started to level off at about 500ft to avoid it but it turned across the front of his aircraft about 100-150ft above him and about 100m in front. On landing he spoke to the FISO who informed him of the aircraft registration and that he only had radio contact with it after it had landed at Wellesbourne. He assessed the risk as being medium.

He stated that this is a common problem at Wellesbourne as helicopters often fly in the circuit and turn the wrong way as well as not conforming to recognised RT procedure. Other than the helicopter circuit height, there are no procedures laid down for helicopter operations at Wellesbourne Mountford.

THE ROBINSON R44 PILOT reports that he was flying a local training flight with an examiner conducting a licence proficiency check in a red and white helicopter squawking 7000 with Mode C and in receipt of a FIS from Wellesbourne. They believed that that they were manoeuvring on the 'dead side' of the runway but the reporting pilot subsequently told him that he turned 30° to the right after take off in accordance with the published noise abatement procedure. The helicopter crew did not see the Robin but accept the other pilot's description of the incident. As a result of this incident the helicopter company has instituted new procedures and the use of new 'training areas' on the airfield in order that such a conflict does not arise in the future.

UKAB Note (1): Wellesbourne Mountford is listed in the UKAIP as a licensed airfield with a 2nm ATZ. The aerodrome is not available to ac with no radio. The noise abatement procedure for RW36 is notified as: *'After departure turn right onto a track of 030° to 1000ft QFE before turning crosswind'*. The diagram in Pooley's Flight Guide (from which the diagram above is compiled) shows the ground track as being to the far end of the RW then a right turn onto 030° towards a building with a green roof.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted only of reports from the pilots of both ac.

While accepting that there were scant procedures for helicopter operations at Wellesbourne, the Board could find no reason for the Robin pilot flying into conflict with the Robinson. Members considered that even allowing for the imprecise noise abatement procedures, the Robin pilot could have flown to the far end of the RW - or even the airfield boundary - before commencing a right turn and still remained well clear of the noise sensitive areas and the helicopter.

Members could not determine the reason why the helicopter pilot apparently did not reply to the call from ATC questioning his intentions.

The Board was pleased to learn that clarification of the Wellesbourne Mountford procedures is already underway and that the helicopter company has moved its training operations to a new area.

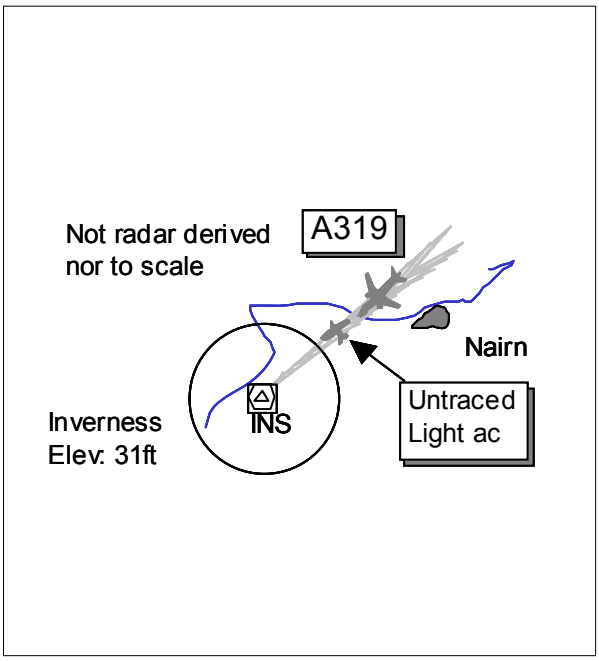
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Robin pilot, although aware of the R44, turned into conflict with it.

Degree of Risk: C.

AIRPROX REPORT NO 070/06

Date/Time:	11 Jun 1406 (Sunday)	
Position:	5735N 00357W (4nm FIN APP RW23 Inverness - elev 31ft)	
Airspace:	SFIR	(Class: G)
Reporter:	Inverness ADC/APP	
	First Ac	*Second Ac*
Type:	A319	Untraced Light ac
Operator:	CAT	N/K
Alt/FL:	1300ft↓	
	(N/K)	(N/K)
Weather	VMC CLOC	NK
Visibility:	20km	
Reported Separation:		
ADC/APP	500ft V/0·75nm H	
	Nil V/1nm H	NR
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE INVERNESS ADC/APP reports that at 1406, when the A319 was on final RW23, the duty ATSA saw, through binoculars, a white-coloured high wing light ac, possibly a Cessna, crossing ahead of the A319 from its L to R (S to N). The A319 crew saw the ac and continued their approach having only once been given TI; the ac's TCAS was reported as being inoperative. The light ac was seen to disappear NE'bound and tracing action was instigated via ScACC Supervisor and Kinloss ATC. He estimated minimum separation as 500ft vertically and 0·75nm horizontally.

The Inverness METAR shows EGPE 1350Z 21011KT 170V250 9999 FEW035TCU SCT046 25/15 Q1016=

THE A319 PILOT reports inbound to Inverness IFR and in receipt of a RAS from Inverness Tower on 122·6MHz squawking an assigned code with Mode C; TCAS was inoperative. The visibility was 20km in VMC and the ac's strobes and beacon lights were switched on. Whilst established on the ILS RW23, heading 220° at 150kt and descending through 1500ft, Tower advised the crew that they had seen a high wing light ac close to the ILS path and that the traffic was not in contact with ATC. Around 1300ft they saw the light ac, which had just crossed the RW axis from L to R 1nm ahead at 1000ft; no avoiding action needed to be taken. It looked like a Cessna 152 on a heading of about 330° and they thought it crossed about 3nm from the RW23 threshold. He assessed the risk as low.

RAC MIL reports that extensive tracing action was carried out but did not disclose the identity of the other ac involved which remains untraced. An "Around UK" Microlight Rally, involving over 40 ac, was taking place between 9th and 16th June with goals set of reaching John O'Groats and Lands End during the period. Lossie ATC only worked one transit ac during their opening hours, a low wing M/Light which was eliminated from the investigation. Kinloss do not keep records of MATZ crossing traffic. Several ac were known to be routeing through the area but crucial flight information had not been completed by pilots at airstrips used enroute which left a cold trail to RAC Mil attempting to trace procedurally.

ATSI comments that there are no apparent ATC causal factors.

UKAB Note (1): The Airprox occurred below recorded radar coverage.

AIRPROX REPORT No 070/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of A319, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Pilot Members were surprised that the pilot of the untraced light ac had flown just outside the Inverness ATZ without communicating with the controlling ATSU. Without the benefit of a report from that pilot, no information as to the ac's radio fit/serviceability or flight circumstances were available to establish a reason. Moreover, of more concern was the fact that the light ac crossed through the Inverness FAT, which is clearly shown on the 1:500000 chart, at a height commensurate with the ILS G/P. Clearly, in order to reduce the risk of a potential conflict, pilots intending to traverse through FATs should, at the flight planning stage, establish a height to fly that maintains adequate vertical separation from any ac that might be following an IAP: a noteworthy safety lesson for the general aviation community. In this case, it is not known whether the pilot of the untraced light ac, who was required to give way under the Rules of the Air Regulations, had seen the A319 and assessed that the light ac's intended flight path was routeing safely clear of the airliner.

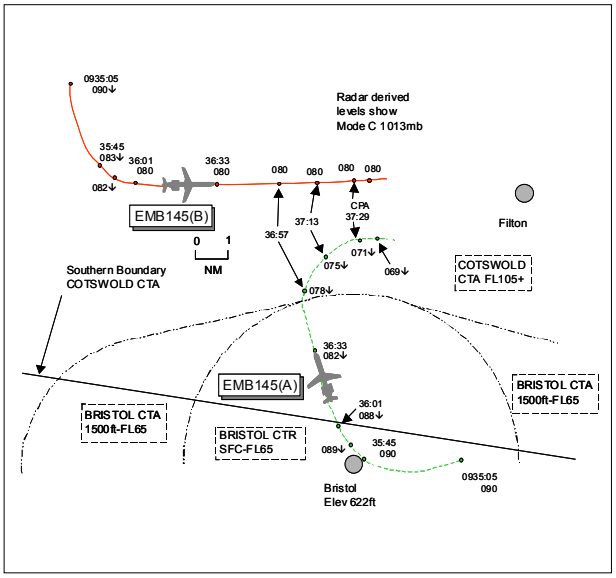
Board Members praised the 'good spot', made by the ATSA, of the light ac which enabled the ADC/APP to pass TI on the potential conflict to the A319 crew in a timely manner. The A319 crew then saw the light ac, which had just crossed the FAT, 1nm ahead and below, quickly assessing that it was clearing their projected flight path and that no avoiding action was needed. These factors were enough to allow the Board to conclude that safety had been assured during this conflict in Class G airspace on the Inverness FAT.

Cause: Conflict in Class G airspace on the Inverness FAT.

Degree of Risk: C.

AIRPROX REPORT NO 073/06

Date/Time:	12 Jun 0937	
Position:	5131N 00245W (8nm N Bristol - elev 622ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	EMB145(A)	EMB145(B)
Operator:	CAT	CAT
Alt/FL:	↓FL60	FL80
Weather	IMC NR	VMC CLOC
Visibility:	NR	>10km
Reported Separation:		
	Nil V/2nm H	Nil V/2nm H
Recorded Separation:		
	900ft V/1·8nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMB145(A) PILOT reports that Bristol SSR was u/s which resulted in their flight being left high with a late handover from London. Approaching BRI NDB at FL90 they were told to turn onto heading 340° and to descend to FL60. The turn was carried out but although FL60 had been selected the descent had not been initiated until some time later, possibly owing to a distraction. About 2nm N of BRI heading 340° at 200kt, ATC asked for their passing level (given as FL86, he thought) and again as they approached FL80. They were then advised of traffic at FL80 in their 12 o'clock and were told to turn R Eastwards during which a TCAS TA alert was generated with the display showing the CPA as 2nm with the other ac at the same level.

THE EMB145(B) PILOT reports that during vectors to RW27 at Bristol, after a handover from Cardiff, their initial call on frequency was ignored but the frequency was very busy. Heading 090° at FL80 and 200kt traffic was seen on TCAS closing from their R at the same level. TCAS then gave a TA alert and the other ac, an EMB145, was visually acquired to their R but commencing a R turn. They prepared for an RA warning but the conflicting EMB145 turned R and descended before any RA occurred, showing on the TCAS 2nm ring as it manoeuvred. ATC were without SSR and the controller's workload seemed very high. No Airprox report was made at the time but they made comment that *"that was a bit close"* to which ATC replied that the flight's RAS was limited without SSR.

THE BRISTOL RAD1 reports vectoring traffic to RW27 in a non-SSR environment owing to an earlier lightning strike at Bristol. EMB145(A) was inbound from POMAX towards the BRI NDB descending to FL90 and as it approached the aerodrome he turned the flight R onto heading 340° to position into a RH pattern and told the flight to descend to FL60. Shortly after this he received a handover from Cardiff Radar controller on EMB145(B) 12nm NW of BRI heading 100° at FL80. He told EMB145(A) flight to turn R onto heading 105° and passed TI to both EMB flights, which were under a limited RAS owing to equipment unserviceability problems. He became aware that both ac were at similar levels as EMB145(A) turned inside EMB145(B) but he believed he had 3nm separation between the subject ac. The EMB145(B) crew subsequently commented on the RT *"that was a bit close".*

UKAB Note (1): Met Office archive data provided the Bristol METAR as EGGD 120920Z 23007KT 190V260 CAVOK 21/17 Q1018= EGGD 120950Z 23007KT 200V260 CAVOK 21/17 Q1018=

ATSI reports that during the previous evening an electrical storm had disrupted many facilities at Bristol Airport. One of these was the Secondary Radar Data Processing system connected to Bristol Radar. This meant that the controllers only had primary radar on their radar displays.

AIRPROX REPORT No 073/06

During a high workload period involving extra coordination, two Embraer 145 jet ac were vectored to within 1 to 2 miles from each other whilst at a similar flight level. Both crews reported this to Bristol ATC in a telephone call after landing.

Owing to the failure of the Bristol Secondary Radar Information (SSR) all inbound IFR ac had to be radar-identified to Bristol by the adjacent units. This was an unusual occurrence, creating extra workload not only for the Bristol Controllers but also for neighbouring ATC units.

Before 09:30 the Cardiff Radar controller had tried to give the Bristol Radar controller radar identity on four Bristol inbound ac from the Brecon area. Due to workload the Bristol Radar controller accepted 3 but not the 4th (EMB145(B) involved in the Airprox). At 09:30 Sector 23 Planner (S23P) at LACC started a lengthy landline call to Bristol radar to try and pass the radar identity of one of the inbounds, EMB145(A). It took 3 attempts to establish the identity because the Bristol controller could not correlate the position of the ac with the positions being given by the S23P.

Eventually a radar ident was achieved, but by this time EMB145(A) was considerably closer to Bristol than usual, hence the S23P asked for further descent, which was agreed, to FL110.

[UKAB Note (2): At 0933:00 the Bristol controller, in response to the EMB145(A) flight's initial call 30sec earlier - which was not acknowledged - transmits *"er EMB145(A) c/s Bristol Radar good morning you are identified one two miles northeast of Bristol limited radar advisory service due to primary only service continue towards the Bravo Romeo India descend and maintain flight level nine zero"*. The crew replies *"Okay er radar advisory descend flight level nine zero towards the B R I EMB145(A) c/s"*. The controller responds *"It a limited radar advisory service I have no ident or height information on any er aircraft at the moment primary only"*. The EMB145(A) crew reply *"Roger EMB145(A) c/s"*.]

The radar controller was also vectoring other inbound ac. His plan at this stage was to vector EMB145(A) through the Bristol O/H and then turn it RH downwind to follow a DHC8 as No 3 in the sequence. He stated that EMB145(B) was not in his plan although he was aware it was inbound. He descended EMB145(A) to FL090 initially, as vertical separation against the DHC8 which was approaching Bristol from the NW.

As EMB145(A) passed through the radar O/H radar contact was lost on it temporarily, so the controller would not have had any information on its heading or rate of turn as it was positioned behind the DHC8. Additionally, he expected to achieve vertical separation between EMB145(B) and EMB145(A) whenever the former ac appeared because it would be at or above FL080. He descended EMB145(A) to FL060, following the DHC8.

[UKAB Note (3): The Bristol RT transcript reveals the Bristol Radar controller issuing descent clearance to the EMB145(A) flight to FL60 just after 0935 and then instructing the flight to turn R onto heading 340° as vectoring RH for the ILS RW27 being No 4 in traffic.]

It was at this time that Cardiff radar identified the inbound EMB145(B) to the Bristol controller. He then realised that EMB145(B) was going to be closer than usual, about 8nm NW of Bristol, on an E'ly heading level at FL080, due to an extended routing from Cardiff (because the 'radar ident' could not be accepted earlier).

[UKAB Note (4): The RT transcript at 0935:46 reveals the Bristol Radar controller transmitting *"EMB145(A) c/s report your passing level"*. The EMB145(A) crew reply *"er passing er flight level eight nine descending six zero EMB145(A) c/s"*. At 0936:20 the EMB145(B) flight makes its initial call on frequency but this call is not acknowledged as the controller immediately instructs the EMB145(A) flight to turn R onto heading 105°. Following this the controller asks the EMB145(A) flight's passing level to which the crew replies *"passing flight level eight zero EMB145(A) c/s"*.]

As EMB145(A) routed from the Bristol O/H onto a downwind R position the controller judged that he would achieve 3 miles separation between these two ac. He passed TI to each flight which the pilots responded to, watching the traffic on TCAS. EMB145(B) commented at 0937:30, "*a bit close*". Neither ac reported any TCAS TA or RA. The subject flights continued to be vectored for ILS approaches to RW27.

With the benefit of hindsight, the Bristol Radar controller stated he believed he made two mistakes. The first was to allow EMB145(A) to fly towards the Bristol radar O/H such that he subsequently lost radar contact in the

overhead. The second mistake was that he could have gleaned more information from the Cardiff Radar controller on the handover of the relative positions and height of the 2 subject ac. The Bristol Radar controller stated that the presence of unknown traffic S of the Bristol Zone precluded a LH downwind routing for EMB145(B) and that it would be easier for sequencing to keep ac following each other (downwind RH). He also agreed that contributory factors were the lack of SSR, the late descent of the EMB145(A) from FL090, the upper wind direction and strength and the lengthy amount of co-ordination required in primary-radar-only operations.

The Bristol Radar controller was handling a busy ATC situation in unusual and complex circumstances (no SSR) which included a great deal of extra coordination. At the time the Radar controller believed he achieved the required 3nm horizontal separation between the 2 subject ac and in addition would have achieved vertical separation had EMB145(A) descended when instructed. After landing the flight crew reported in a telephone call that the minimum distance between them may have been less than 3 miles whilst at a similar level.

[UKAB Note (5): Analysis of the radar recording at 0935:05 shows EMB145(A) 3·2nm E of Bristol tracking 260° level at FL090 with EMB145(B) 14nm NW of Bristol tracking 165° descending through FL090. As EMB145(A) passes O/H Bristol at 0935:45 in a R turn at FL090, EMB145(B) is 11·5nm NW of EMB145(A) (and Bristol Airport) passing FL083; the preceding DHC8 is to the NE of Bristol downwind RH passing FL064. Eight seconds later (0935:53) the EMB145(A) is seen to have commenced a descent (FL089↓). On the next sweep at 0936:01, EMB145(B) is passing FL081 9·3nm NW of EMB145(A) and just rolling out onto an E'ly heading whilst EMB145(A) is passing FL088 and continuing its R turn onto radar heading 340°. By 0936:57 with EMB145(A) passing FL078 and now in a R turn onto radar heading 105°, EMB145(B) is 3·4nm away in its 11 o'clock maintaining FL080 and on a downwind heading 100°. As EMB145(A) continues the R turn, the distance 16sec later reduces to 2·3nm with EMB145(B) at FL080 moving into EMB145(A)'s 10 o'clock, vertical separation showing 500ft as EMB145(A) descends through FL075. EMB145(A) continues the R turn until at 0937:29 the two ac are abeam each other on parallel tracks, 1·8nm apart with EMB145(B) maintaining FL080 and EMB145(A) descending through FL071. Vertical separation is established on the next sweep at 0937:37 when both ac are still 1·8nm apart. Thereafter separation is maintained and both ac are sequenced for the ILS RW27.]

At the time of the event there were 3 valid watch keeping Controllers and 1 valid Unit Manager available. Both Radar 2 and Radar 1 positions were open.

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 sympathised with the Bristol controller's predicament. ATCOs opined that in unusual circumstances like this, without SSR, controllers have to modify working methods, falling back into 'primary radar only' techniques without the benefit of retained radar ident and continuous display of height readout that SSR brings. Being used to a radar environment with fully functioning SSR, the controller apparently continued to work in the usual 'modus operandii'.

As regards EMB145(A), vectoring had placed the ac through the radar O/H. The RAD1 had cleared the flight to descend but without ensuring the ac had commenced descent, in accordance with his plan, or was descending as intended. Some Members thought that the slow initiation of descent by the EMB145(A) crew had contributed to the Airprox, as a prompt descent would almost certainly have resulted in the subject ac being vertically separated before lateral separation was lost. This viewpoint was not shared by all. Pilot Members were puzzled by the EMB145(A) crews actions as, from their perspective, the ac was high in the Bristol O/H and it was thought that the crew would have been keen to descend as soon as possible, having been subject to a late handover from LACC, to regain their ideal descent profile. Leaving these hypotheses aside, following a vote, by a slim majority the Board decided that the EMB145(A) crew's slow commencement of their descent had not contributed to the incident.

From an ATC viewpoint, techniques were available to the RAD1 to ensure that the EMB145(A) had left FL90 when instructed but the controller's mindset appeared to be focussed on providing lateral separation using radar. One option, discussed by ATCO Members, which could be applied in these circumstances, was the acceptance of inbound ac vertically separated from adjacent units and placing flights that were unable to be vectored into the procedural hold at the BRI. Another option would have been to impose flow restrictions in order to slow the traffic rate down when ATC capabilities are degraded. The controller was undoubtedly busy, being unable to take radar

handovers when offered at the time. At some other units Coordinators are available to take handovers for radar controllers and assist with sorting out the traffic situation but this was not available to the RAD1. Notwithstanding these deliberations, the RAD1 had been happy that the situation was under control. Even though the EMB145(A) crew had reported descending through FL89, when requested, the controller still believed that he could continue to achieve standard lateral separation and had reported that this had been maintained throughout. This was not the case, the Clee Hill recorded radar clearly revealing the flight profiles flown by both EMB crews whilst following ATC instructions and had shown a loss of separation during this fluid incident. The Board agreed that the Bristol RAD1 vectored EMB145(A) into conflict with EMB145(B) and this had caused the Airprox.

The NATS Advisor informed Members that Bristol were planning to introduce a second SSR source from another feed in 2007 but this would not have helped in this particular case as it was the SSR data processing equipment that had been unserviceable. Also, ATC has introduced primary only operations into the Unit Training Plan.

Looking at risk, when the RAD1 became aware of the EMB145(B) presence he had endeavoured to resolve the situation by issuing a R turn to the EMB145(A) flight. As the phrase 'avoiding action' was not used, it appears a normal Rate 1 turn was executed using A/P. TI was then passed to both flights with both crews reporting seeing each other's ac on TCAS. The EMB145(B) crew had also seen EMB145(A) visually whilst monitoring its progress as it turned away and descended. The radar recording shows EMB145(A) already turning to the R away from EMB145(B) as lateral separation reduces below 3nm with both ac running parallel to each other 1·8nm apart before 1000ft vertical separation is established. All of these elements when combined were enough to allow the Board to conclude that safety had been assured during the encounter.

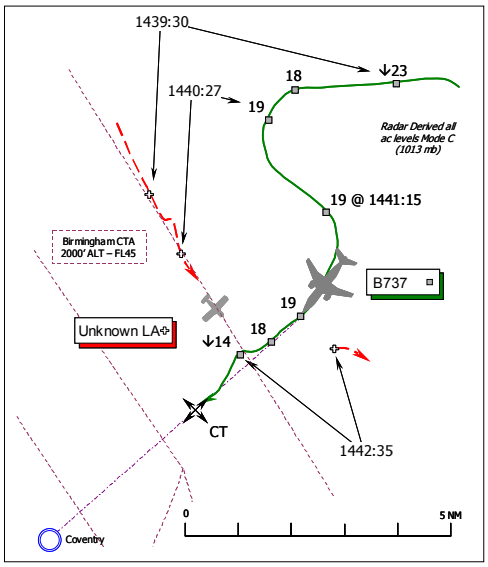
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Bristol RAD1 vectored EMB145(A) into conflict with EMB145(B).

Degree of Risk: C.

AIRPROX REPORT NO 074/06

Date/Time:	12 Jun 1441	
Position:	5225N 00122W (Vicinity of CT NDB)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-500	Untraced Light Ac
Operator:	CAT	N/K
Alt/FL:	2000ft	NR
	(QNH (1017mb)	(N/K)
Weather	VMC NR	NK NR
Visibility:	10km	NR
Reported Separation:		
	500ft V/nil H	NR
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-500 PILOT reports he was inbound to Coventry for an IFR approach to RW23, flying in VMC, under a RAS from Coventry APPROACH on 119·25MHz. A squawk was selected with Mode C and the ac's lighting was on including all the landing lights and HISLs.

Whilst being radar vectored by ATC at 170kt toward the ILS for RW23 at 2000ft Coventry QNH (1017mb), they received numerous radar vectors to avoid non-transponding traffic. This involved crossing the FAT at 90° and then turning back onto a heading of 200° to intercept the LLZ from the N. The traffic was reported as being at their 3 o'clock at a range 1·5nm altitude unknown. No instructions were received at that stage to intercept the LLZ and he assumed that the controller was going to take them through the FAT for further avoiding action. Just before crossing the FAT, another controller instructed them to intercept the LLZ and although still unsure about this traffic, he did so as they assumed that the unknown traffic had cleared away from the approach lane. About 30sec later, heading 230° - into sun - they saw a small light aircraft (LA) - possibly a white Piper Warrior with red nose - pass approximately 500ft directly beneath his ac with no horizontal separation. He assessed the risk as "medium" and stressed that no TCAS alerts were enunciated at all. A normal approach into Coventry was then completed.

He added that although the other ac was flying in the 'Open FIR' in Class G airspace, its pilot was not talking to Coventry nor transponding Mode A/C (as the LA was not seen on TCAS).

THE RADAR ANALYSIS CELL (RAC) AT LATCC (MIL) reports that despite extensive enquiries, including what proved to be an incorrect suggestion from Coventry ATC, the identity of the reported LA remains unknown. Although the B737 is seen on the radar recording, the reported LA is shown only briefly as a primary contact. All lines of enquiry have been exhausted and unfortunately the RAC's comprehensive tracing action has been unable to identify the reported LA.

THE COVENTRY APPROACH CONTROL SURVEILLANCE CONTROLLER (APS) reports that this Airprox was first brought to his attention about 1month after the event by his Manager whose records indicated that he was the controller at the time of the Airprox. However, due to the intervening period that had elapsed since the incident he had no recollection of the Airprox at all. He offered several observations about the reporting pilot's report:

After numerous radar vectors to avoid unknown traffic, he would be unlikely to ignore further conflicting traffic.

A change of voice indicates a change of controller, who would not accept traffic in confliction.

A possible explanation is that the LA had the B737 in sight and effected his own separation or that the PA28 did not show up on radar.

UKAB Note (1): The foregoing is one of the two reports provided by Coventry controllers. The other APS controller reported that he had no knowledge of any Airprox in the FIR during the period.

UKAB Note (2): The recording of the Clee Hill Radar does not show the Airprox clearly as only the B737 is shown at the moment of the Airprox, which is believed to have occurred some 5¼nm finals for RW23. The B737 is shown being vectored for the approach in a wide pattern around to the N of the RW23 centre-line. A primary contact, which might be the LA referred to in the B737 pilot's report, is shown on a generally SSE'ly course just at the eastern lateral boundary of the Birmingham CTA where the base is 2000ft amsl. This primary contact fades at 1440:27, some 2·8nm SSW of the B737 as the latter turns SE'ly onto a R base-leg at 1900ft Mode C (1013mb). At 1441:15, the B737 commences a R turn inbound onto a closing heading for the LLZ, but the primary contact associated with the reported LA is not shown again until 1442:35, about 1nm SE of the RW23 centre-line after the Airprox has occurred.

ATSI reports that it was not possible to obtain a transcript of this Airprox and it is not seen on the associated radar recording. Accordingly, ATSI can add nothing to the controller's report, which was written some time after the Airprox occurred.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report solely from the B737 pilot, radar video recordings, reports from the air traffic controllers involved and a report from the appropriate ATC authority.

It was unfortunate that despite the best efforts of the RAC at LATCC (Mil), it has not been possible to identify the reported LA. Moreover, it appeared that as a result of administrative difficulties the Coventry APS RT recording was not impounded and inadvertently returned to service. Thus the absence of an RT transcript made analysis of the ATC aspects of this encounter in Class G airspace doubly difficult and ATSI had understandably been able to contribute little to this Airprox investigation. Therefore, the Board could only base its assessment as to cause and risk on the B737 pilot's account and the recorded radar data.

The Clee Hill Radar recording replicated the B737 pilot's account very closely indeed up until the point before the Airprox occurred and showed a primary radar contact – the unidentified LA - before and after the encounter, but it was unfortunate that the contact faded at the critical moment. Clearly, when providing a RAS to IFR traffic in the 'Open FIR', the controller would be seeking to achieve prescribed separation against other observed traffic and the avoiding action vectors detailed in the B737 pilot's account seem to relate to the untraced LA shown on the Clee Hill Radar recording. But if that traffic was not displayed to the controller, for whatever reason, he would be unable to assist. The Board recognised that the Clee Hill recording did not replicate exactly what was displayed to the Coventry controllers at the time. The radar recording suggested that the untraced LA might have flown across the FAT on a broadly perpendicular course and thus tangential to the Coventry radar beam after it had faded and just as the Airprox occurred. Nonetheless, it seemed totally implausible to controller Members that if an APS were providing avoiding action around an unknown contact he would then subsequently ignore it and turn traffic towards it if the contact was still displayed to him. Plausibly, the Coventry SRE might have been subject to 'tangential fade' whereby the primary contact of the LA, flying a course tangential to the radar's radiated beam, might appear to be 'stationary' to the SRE's moving target indicator circuit (MTI) and thus be rejected and not displayed to the APS at the time. Thus a controller might possibly have lost track of the contact in these circumstances. Feasibly, this could happen during the handover of a control position - as might have occurred here if a change of voice was apparent - but as neither of the Coventry controllers who were providing an ATS during the period of this Airprox were able to recall any detail of the encounter any further comment on this topic was only speculation. So whilst the B737 crew could reasonably have expected to be afforded safe separation against other traffic - and one of the APS controllers had proffered two observations about this himself - for whatever reason, this was not achieved.

From the LA pilot's perspective there are several important lessons that could be wrought from this report but alas they will probably go unheeded by those concerned here. Whilst the Board recognised the legitimate right of pilots operating in the FIR to fly where this LA did and not to communicate with ATSUs, good airmanship would dictate that pilots should avoid flying beneath or through the airport's final approach track if at all feasible. But if they

planned to do so, pilots should ensure that they communicate with that unit's ATC in good time. Unfortunately Coventry ATC is not equipped with SSR so they are unable to spot if other ac are in close vertical proximity to their own traffic. However, the B737 pilot correctly pointed out that the LA involved here was not squawking so his ac's TCAS was also rendered blind to the LA. The Board stressed the importance of pilots selecting Mode A/C, where fitted, in accordance with national guidelines. Pilots should be in no doubt of the overall benefit to flight safety that can accrue from operating Mode C, which in addition to enhancing their conspicuity to SSR-equipped ATC radar units will also facilitate a warning of their presence to the pilots of other ac in the vicinity fitted with TCAS.

With only one side of the story available, it was difficult to reach any more meaningful conclusions from this report. On the sparse information available, the Board could only conclude that this Airprox had resulted from a conflict in the vicinity of the RW23 approach track. As the reported LA did not display Mode C it was not feasible to determine independently the vertical separation that pertained here. However, there was no reason to doubt the veracity of the B737 pilot's account which stated that the untraced LA directly underflew his ac by about 500ft. The Board agreed, therefore, that no risk of a collision had existed.

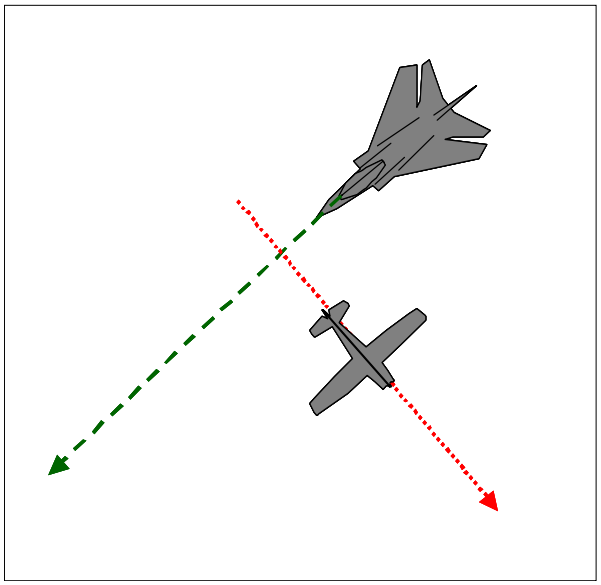
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the vicinity of the RW23 approach track.

Degree of Risk: C.

AIRPROX REPORT NO 075/06

Date/Time:	14 Jun 0937	
Position:	5735N 00620W (North Tip of Skye)	
Airspace:	Scottish FIR/LFA14 (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4A	C172
Operator:	HQ STC	Civ Comm
Alt/FL:	650ft Rad Alt (RPS 1019mb)	NK
Weather	VMC CAVOK	NR
Visibility:	20km	NR
Reported Separation:	100ft V/200m H	Not Seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4A PILOT reports that he was flying a grey ac with HISLS and nav lights switched on as No2 of a pair on a routine low level evasion sortie in LFA14. While heading 235° at 420kt and having just crested a ridge of high ground, they were descending from approx 800ft Rad Alt back to 250ft into a large bay at the north end of Skye when he saw a white and blue Cessna ac, very close in his left 1130 and slightly above them. The Cessna appeared to be heading right to left on a track perpendicular to them. He did not have time to take avoiding action and assessed that they passed 200m behind the Cessna and about 100 feet below. The Cessna did not appear to manoeuvre. At the time his lookout was divided between the front sector and regaining visual contact with his leader who was approx 2nm abeam him to his left. His navigator was unsighted to the Cessna for the whole incident and when the pilot exclaimed *"that was close"*; the navigator thought that they had come close to a bird. He thought that the Cessna had been obscured from his view by the front cockpit canopy arch and had only become visible when it emerged from behind it.

On playing the ac HUD video, the Cessna can be seen for about 3sec on the FLIR display. It appears static directly in front of their ac then quickly moves up and left as they descend and move closer. The shape of the other ac can be seen clearly. At the time he assessed that the risk of collision was high and this was confirmed by the video.

THE C172 PILOT provided a brief report stating that he was flying a blue and white ac on a local VFR sortie from Plockton with a single pilot and a photographer. He did not see any other ac on the flight.

UKAB Note (1): The incident took place below recorded radar cover.

HQ STC comments that this was very close and gave the GR4A pilot no time to react before the ac had passed. The description of the geometry seems to have put the Cessna behind and below the ridgeline. This would have made it very difficult for the Tornado crew to see the Cessna any earlier.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac; a HUD video from the Tornado and a report from the Tornado operating authority.

The Board noted that both ac were operating legitimately in Class G airspace and that neither had any form of ACAS fitted: therefore the prime means of collision avoidance was the 'see and avoid' principle. From the Tornado pilot's view-point, the Cessna was behind and roughly parallel to the ridgeline, perpendicular to the Tornado's track, thereby rendering it out of view. Similarly the approaching Tornado would not have been visible to the

Cessna pilot until it appeared above the ridge. Furthermore, since the Cessna was the lower of the two ac, it would not have been visible to the Tornado's navigator until after they had passed.

The Tornado's HUD video showed that there had been both horizontal and vertical separation, albeit less than optimum. Members considered that whilst this had been enough to compromise normal safety margins, there had been no actual risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

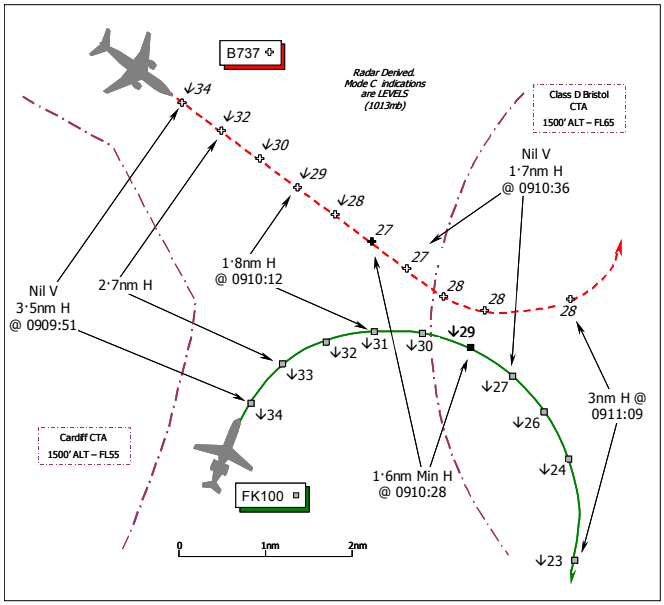
Cause: Conflict on a ridgeline in Class G airspace.

Degree of Risk: B.

AIRPROX REPORT No 076/06

AIRPROX REPORT NO 076/06

Date/Time:	14 Jun 0910	
Position:	5133N 00258WW (9½nm W of Bristol - elev 226ft)	
Airspace:	FIR/CTA	(Class: G/D)
	Reporting Ac	*Reported Ac*
Type:	Fokker 100	B737-800
Operator:	CAT	CAT
Alt/FL:	3000ft (QNH 1022mb)	NR (N/K)
Weather	IMC NR	NK NR
Visibility:	10km	NR
Reported Separation:	Nil ft V/<1·5nm H	NR
Recorded Separation:	200ft V @ 1·6nm Min H Nil V @ 1·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FOKKER 100 (FK100) PILOT provided a brief account reporting that he was inbound to Bristol (Lulsgate) from Amsterdam in IMC and in receipt of an ATS from Bristol APPROACH on 136·075MHz. A squawk of 7330 was selected with Mode C.

Established on the LLZ for RW09, at about 10nm, at 3000ft QNH flying at 250kt, ATC instructed them to turn onto a heading of 160° immediately for avoiding action. Another ac – the B737 – also inbound to Bristol was given avoiding action as well but this did not increase the "spacing". A further instruction to descend to 2500ft was then issued by ATC followed by further vectors for a new line-up. Neither a TCAS TA nor an RA was enunciated during this period as the B737 passed astern with minimum horizontal separation of less than 1·5nm at the same altitude. He was told by ATC that there had been a "miscommunication" between Cardiff and Bristol. The "risk" was not specified.

UKAB Note (1): Three requests for an Airprox report from the B737-800 pilot through his company proved fruitless. In an e-mail response to a subsequent telephone call, the B737 pilot's company advised that the pilot commented that his flight was handed over late to Bristol ATC and therefore the crew did not hear any previous conversation between Bristol ATC and the FK100 crew. On handover they were given an immediate turn onto a heading of N. When the manoeuvre was completed they asked for details and were told that they were on a converging heading as a result of "miscoordination" with Cardiff. The B737 crew received no TCAS TAs nor RAs and in conclusion were advised by ATC on departure that the other crew would be filing a report. Not being part of any previous conversation between Bristol ATC and the FK100 crew nor receiving any TCAS "warning" the crew were not aware of an impending "situation" until given the heading change. To the B737-800 pilot, there appeared to be insufficient information available to complete an Airprox report of any value.

THE BRISTOL RADAR 1 CONTROLLER (BRI RAD1) comments that he was operating RAD1 bandboxed with LARS. He was vectoring the FK100 R DOWNWIND for RW09 descending to an altitude of 3000ft Bristol QNH (1022mb) under a RCS/approach service. His intention was for the FK100 to be No1 against the B737-800 that was conducting a straight-in approach from the W, initially working Cardiff. An altitude of 3000ft QNH had been given to Cardiff for the B737 and he agreed that they could give him a late handover on the flight because of another ac departing from their RW12. A military jet then called on the frequency for what he believed was to be a NW transit of the Bristol CTA at FL60. He identified the fast-jet and gave a RAS as requested. However, the fast-jet crew was in fact requesting a westbound transit of N864 at EXMOR and this track put the fast-jet in possible confliction with Yeovilton traffic thereby requiring co-ordination with Yeovilton ATC. This took rather longer than he had anticipated and once resolved he needed to co-ordinate the fast-jet's crossing clearance of N864 with

Cardiff. Unfortunately this also took longer due to Cardiff's workload - the end result was a delayed turn onto the ILS for the FK100.

This late turn and the apparently high inbound speed of the B737 combined to create a potential conflict on FINALS between the FK100 and B737. Therefore, he contacted the Cardiff RADAR controller via landline to instruct him to turn the B737 away from the FK100 but Cardiff informed him that they had already transferred the B737 across to his frequency. Initial attempts to contact the B737 crew produced no response and so he instructed the FK100 crew to turn R for avoiding action, at the outset onto a heading of 130° then further onto 180° with an immediate descent to 2500ft QNH.

On initial contact with the B737 crew he issued avoiding action with an instruction to stop descent immediately and turn onto a heading of 360°. His initial turn instruction to turn R was incorrect: this was pointed out to him by his ATSA and he immediately corrected this to an avoiding action L turn. Prescribed separation was eroded, he thought, to 2nm horizontally/500ft vertically. Both ac were then vectored back onto FINALS without further incident.

UKAB Note (2): The Bristol RTF transcript gives only 30sec and 1min time injects.

UKAB Note (3): The 0850UTC Bristol Weather was: Surface Wind: 020/11kt; Visibility >10km nil Wx; Cloud: BKN @ 1400ft; QNH1022mb.

ATSI reports that the BRI RAD1 controller was operating as the RADAR 1 and RADAR 2/LARS (R2/LARS) controller in bandboxed configuration. He described the traffic loading as light, although he was busy at the time carrying out co-ordination with other local ATC Units. He commented that a trainee was present, waiting to plug in on the sector, as also was another controller who was to open the R2/LARS position, albeit, due to staffing considerations, slightly later than usual. He did not consider the presence of these people created any distraction. The runway in use at Bristol was RW09 and at Cardiff RW12.

BRI RAD1 explained that he was expecting the subject ac inbound to Bristol under IFR. The FK100 was inbound from the E and the B737 from the W. At 0859, he agreed co-ordination with Cardiff ATC who would be in control of the B737 before Bristol, to descend the B737 to 3000ft and to position it straight in for the ILS RW09. His plan, due to their relative positions, was to position the FK100 as No 1 in the traffic sequence and the B737 as No 2.

The FK100 crew established communication with Bristol at 0901 in the vicinity of Lyneham. The FK100 pilot reported passing FL180, descending to FL120, heading 232° and was instructed by BRI RAD1 to continue on the heading to be vectored for the ILS for RW09. Shortly afterwards, the FK100 was instructed to descend to FL50 and, at 0903:30, to turn R heading 255°. The pilot had earlier requested RW27, if available, but due to other traffic this was not possible and the arrival runway was confirmed as RW09. A further R turn onto a heading of 270°, to position the FK100 RHD downwind, was issued at 0905. At the time the FK100 was about 10nm SE of Bristol Airport, passing FL117. Meanwhile, the B737 was 44nm NW of the FK100, passing FL99, with Cardiff. As the FK100 was passing 5nm S of the airport [outside CAS], BRI RAD1 cleared it to descend to 3000ft QNH. The B737 was now 29nm NW of the FK100, passing FL73 descending also to 3000ft. BRI RAD1 was confident that his arrival plan would succeed as he would turn the FK100 onto base leg, well ahead of the B737. Shortly afterwards, Cardiff called on the landline and requested that they handover the B737 late because of outbound traffic from Cardiff Airport, but as the BRI RAD1 controller was already busy on the telephone with another call, this call from Cardiff was intercepted by the on-coming R2/LARS Controller. Cardiff's request was agreed following acceptance by the BRI RAD1 controller.

Having cleared the FK100 to descend to 3000ft, the controller established communication with the fast-jet ac which was identified 15nm S of Bristol Airport. This flight had been pre-noted by Boscombe Down and BRI RAD1 understood that the ac would be routeing N through Bristol's airspace to mid-Wales but the pilot reported tracking W and requesting an Airways crossing of N864. The controller commented that Bristol would not normally work traffic on that routeing as it would be within the Yeovilton AIAA. However, as it was already on his frequency, he agreed to provide a RAS to this fast-jet and because its flight path conflicted with traffic displaying a Yeovilton assigned squawk, he telephoned that ATSU to co-ordinate separation. He said that the telephone conversation, which lasted 1min, took longer than he expected. As soon as it finished, at 0908:30, he instructed the FK100 - now 10nm SW of the airport and passing FL47 - to turn R heading 010° onto a R BASE LEG for RW09. The controller explained that he had been distracted by the protracted telephone call, to the extent that he had turned

the FK100 about 2nm later than he originally intended, but he still believed that he could position the FK100 ahead of the B737. The latter ac is shown on the radar recording 12·8nm NW of the FK100, passing FL43, tracking SE.

BRI RAD1 telephoned Cardiff APPROACH to co-ordinate the fast-jet traffic across Airway N864. Once again this conversation took longer than expected as the Cardiff Controller was busy. In fact the communication was ended by the Cardiff Controller before co-ordination was agreed, saying he would call back. BRI RAD1 who again was distracted by the telephone call, realised that he had not turned the FK100 towards the ILS as he had intended. Consequently, he instructed the FK100 crew to turn R heading 060°, to close the LLZ from the R. The radar recording, timed at 0909:30 – as the pilot is just finishing his readback to this instruction - shows the FK100 at FL35, with the B737 in its 1130 position some 5·9nm away, the B737 passing FL37 at a GS of 251kt. BRI RAD1 said that he telephoned Cardiff with the intention of instructing the Cardiff Controller to turn the B737 away from the FK100. However, after establishing communication, the Cardiff Controller reported that *"I've just given it to you I thought he was number one"* adding afterwards that the fast-jet was cleared to cross N864. In accordance with local instructions, the separation required was 5nm between the FK100 & B737. However, once both flights were on the Bristol frequency – under the control of the same ATSU – that required was 3nm.

The Bristol Controller then tried to contact the B737 crew. However, although he made two transmissions, he did not receive a response. Consequently, as the two ac were still closing, he issued the FK100 with an 'avoiding action' R turn onto a heading of 130°. The subject ac were now 2·7nm apart, the FK100 at FL33 and the B737 at FL32. The controller tried again, unsuccessfully, to contact the B737 crew before instructing the FK100 crew after 0910, *"avoiding action turn right heading 1-8-0 degrees descend immediately 2 thousand 5 hundred feet"*. BRI RAD1 commented that he had not realised that the FK100 was higher than the B737 at the time. As soon as the FK100 pilot read back the instruction, the B737 crew made their initial call on the frequency, reporting descending to 3000ft, heading 125°. The controller responded straight away *"stop descent immediately immediately turn right heading three six zero degrees avoiding action"*. This transmission was overheard by the Assistant [ATSA], who realised that the controller really meant to make it a L turn and warned him accordingly. The instruction was repeated to the B737 *"Left turn left turn heading 3-6-0 degrees"*. The controller explained to the pilot that it was avoiding action against traffic positioning ahead. [UKAB Note (4): The Burrington radar recording evinces minimum horizontal separation of 1·6nm at 0910:28, as the FK100 descended through 2900ft (1013mb) some 200ft above the B737 at 2700ft (1013mb).] The radar recordings reveal that horizontal separation was 1·7nm as the FK100 was turning away from the B737 and at one point both ac were indicating 2700ft (1013mb) [about 2970ft QNH (1022mb)] at that range. The two flights were then repositioned for the ILS to RW09 - the FK100 from the S and the B737 from the N.

When the FK100 crew initially contacted BRI RAD1 the flight was within Class A CAS at the lateral boundary of Airways L9/Y3. Shortly afterwards it crossed the southern boundary of Y3 into Class G airspace. Thereafter the FK100 did not enter CAS again until just as the Airprox occurred. BRI RAD1 did not inform the pilot accordingly or determine the radar service being provided. This is not in accordance with the instructions in MATS Part 1, Section 1, Chapter 5, Page 2. It is not known whether Cardiff advised the B737 when it left CAS, inbound to Bristol. Nevertheless, no comment was made on the Bristol frequency about the type of radar service being provided after it contacted BRI RAD1 controller. Although technically both flights were being provided with a RAS by Bristol at the time of the Airprox, it is not considered that the type of radar service affected the outcome of the incident. The controller should have achieved standard separation between the subject ac whether they were inside or outside CAS. The Cardiff Controller handled the B737 in accordance with the co-ordination agreed with the Bristol Controller. BRI RAD1's plan relied on him turning the FK100 onto the ILS sufficiently ahead of the B737 to ensure separation was maintained between these two flights. However, BRI RAD1 allowed himself to be distracted from monitoring the progress of the FK100 by telephone calls and did not vector it towards the ILS as he intended. Consequently separation was lost.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident to the Board that the pilots involved here had little impact on the fundamental cause of this encounter which was intrinsically an ATC issue. However, the Board was dismayed that it took so long to establish that the B737 pilot felt that he was unable to make any constructive contribution to the investigation. Nevertheless, it was apparent from the comprehensive ATSI analysis that the BRI RAD1 controller had elected to provide a service to

transit traffic which was evidently a distraction whilst engaged in vectoring the FK100 in the ILS pattern. The ATSI report had shown that another controller was available and was about to open up the second R2/LARS position during the period that the Airprox occurred. It was therefore unfortunate that the BRI RAD1 controller had become embroiled in co-ordination with other ATSUs when he did. The Board was advised that airspace changes have now reduced the amount of co-ordination necessary and furthermore there is already an established procedure for opening up the second radar position in busy traffic levels. Clearly, this had distracted him at the critical moment when turning the FK100 inbound onto the LLZ and which resulted in the erosion of standard separation against the B737.

Controller Members were surprised that Cardiff ATC had not been made aware that the B737 was No2 in traffic to the FK100 and it was most unfortunate that the B737 was not sent across earlier. Controller Members noted that although the BRI RAD1 controller had reported that he was providing a RCS/APPROACH service to the FK100, no 'contract' had been established with the FK100 pilot, nor indeed with the B737 crew when they called. Here again was ample evidence of the need to reinforce to controllers the necessity of specifying the type of ATS provided. Clearly pilots had an equal responsibility to inform controllers of the ATS required when operating outside CAS. Nonetheless, if they did not then there was an inherent responsibility on controllers to ask what radar service was required and then to obtain a 'read back' as appropriate. This topic had been the subject of a recent Air Traffic Services Information Notice (ATSIN) Number 90 – dated 4 Sep 2006 – and issued as the result of a recent UKAB Safety Recommendation addressed to the CAA stemming from the Board's assessment of Airprox 15/2006.

The Board was briefed by the NATS Advisor on the encouraging proactive stance taken by the Unit where an Airprox Working group had been established with the laudable aim of eradicating Airprox at Bristol. The recent revisions to the Bristol CTA will result in less vectoring of CAT outside CAS, Members were advised. Furthermore, phraseology issues will be stressed by Local Competency Examiners (LCEs) within their annual competency checks of controllers. All of these measures augured well for the future.

Returning to the nub of the Airprox, it was clear that although no ATS had been specified, the controller was in effect providing a RAS outside CAS and applying a RCS within the Class D CTA. As such he was seeking to achieve 5nm horizontal separation until both flights were on the Bristol frequency whence a minimum of 3nm was required for flights at the same altitude. The ATSI report made it plain that having been distracted by the co-ordination for another flight the BRI RAD1 controller had not turned the FK100 at the appropriate point which resulted in an erosion of separation against the succeeding B737. The Board therefore concluded that this Airprox had resulted because, having allowed himself to become distracted, the Bristol RAD1 controller turned the FK100 onto finals later than planned and into conflict with the B737.

Turning to risk, the Board recognised that none of the crews involved here had spotted the other ac visually nor had TCAS provided a warning of their proximity. It was also clear that when BRI RAD1 finally appreciated that separation was going to be eroded and issued the avoiding action turn to the FK100 in the first instance, he mistakenly transmitted an instruction which included the wrong turn direction. Nevertheless, this was quickly pointed out to the controller by his alert ATSA and the error corrected. In the Board's view this was a good example of 'Team Resource Management' in action [CRM applied to the operational ATC environment] that, notwithstanding the serious loss of separation, had ultimately reduced the potential risk in an otherwise very serious situation. Although horizontal separation was eroded to 1·7nm with no built-in vertical separation, the complementary avoiding action L turn promptly transmitted to the B737 crew when they called also ensured that these two ac were quickly turned away from each other and standard separation was restored in a little over 30sec. Whereas the BRI RAD1 controller had not apparently realised that the FK100 was above the B737 when the former's crew had been instructed to descend, by that stage the FK100 was already turning away clear ahead of the path of the B737. The Board agreed therefore that the BRI RAD1 controller's avoiding action instructions, which had been promptly complied with by both crews, had effectively removed any risk of a collision even at these close quarters.

PART C: ASSESSMENT OF CAUSE AND RISK

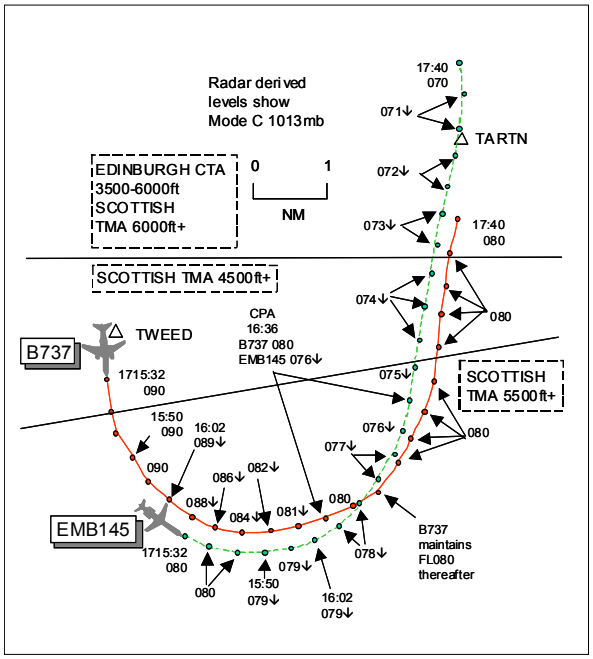
Cause: Having allowed himself to become distracted, the Bristol RAD1 controller turned the FK100 onto finals later than planned and into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT No 077/06

AIRPROX REPORT NO 077/06

Date/Time:	9 Jun 1716	
Position:	5540N 00317W (TWEED Hold)	
Airspace:	STMA	(Class: D)
Reporter:	Edinburgh APR	
	First Ac	*Second Ac*
Type:	EMB145	B737
Operator:	CAT	CAT
Alt/FL:	↓FL70	↓FL80
Weather Visibility:	IMC KLWD	IMC IICL
Reported Separation:		
APR	400ft V/1nm H	
	Not seen	Not seen
Recorded Separation:		
	400ft V/1·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EDINBURGH APR reports that during a period of holding at TWEED, ScACC handed him in sequence the EMB145 and the B737, both established in the hold. The EMB145 flight called first, descending to FL90, and was given further descent to FL80 which had been vacated by preceding traffic. As the EMB145 was descending he was handed the B737 flight descending to FL90 and on initial contact the crew asked the duration of holding, which he explained, and told the flight to maintain FL90 in the hold. A short while later the EMB145 crew reported reaching FL80 and, recognising that the preceding flight was clear downwind, he descended the EMB145 flight to FL70, asking the crew to report vacating FL80 which they did almost immediately. He then gave the B737 flight descent to FL80. He was using procedural descent in the hold owing to volume of traffic and considerable garbling of their labels. A short while later he noticed that STCA had activated showing a confliction in the hold but he was unable to ascertain which ac were involved until several seconds later when the labels became visible with the EMB145 showing FL71 and the B737 showing FL80. After later checking the SMF it was clear that the EMB145 flight had descended relatively slowly and the B737 flight fairly rapidly leading to a subsequent loss of separation.

THE EMB145 PILOT reports inbound to Edinburgh IFR and descending in the TWEED hold to FL70 working Edinburgh Approach. At this time nothing was noted by the crew, only being informed of the incident post flight. No TCAS alerts or warnings were received; no other ac were seen visually owing to IMC, the crew believing therefore that safety had not been compromised.

THE B737 PILOT reports inbound to Edinburgh IFR descending in the TWEED hold at 210kt and FL90 and in communication with ScACC and Edinburgh Approach. There were delays owing to deteriorating visibility and they were held at TWEED until their fuel state required diversion to Glasgow. Numerous descents were carried out in the hold at shallow RODs to comply with ATC instructions and other traffic was seen in the hold via the TCAS display. They were unaware of any conflict until they were told post flight that ATC had received an STCA between their ac and an EMB145 during stepped descent of both flights. No other ac were seen visually nor were any TCAS alerts received. No comment was made either by ATC or any other flight about a conflict at any time.

THE EMB145 & B737 FLIGHT SAFETY DEPT carried out a full investigation, viewing the NATS radar recording as well as FDR download data. The EMB145 flight reported leaving its level as soon as the ac had descended out of FL80 (passing FL79) which is what ATC had requested. Following this it appears the controller cleared the B737 flight to descend to FL80. As this descent commences the EMB145 shows FL79 as the B737 shows FL90 but vertical separation decreases as the EMB145 passes FL76 as the B737 levels at FL80. RODs were calculated for both flights – the EMB145 was descending (in AFS Vertical Speed (V/S) mode) at approximately 550fpm, the

B737 (in LVL CHG mode) at approximately 1420fpm. The EMB145 was descending in AFS Vertical Speed (V/S) mode thereby moderating descent rate whereas the B737 was in LVL CHG mode which commands idle thrust. The GSs were shown on the radar as EMB145 215-220kt with the B737 slightly faster, 220-230kt. At the time of the incident, the B737 Captain was off-air obtaining weather whilst the FO was flying the ac and monitoring the radio. The Captain elected to divert owing to insufficient fuel to remain in the hold for the specified time and also the high possibility of a go-around at Edinburgh owing to the prevailing weather conditions.

There are no SOPs for either fleet for what ROD should be flown in a hold. Crews can select their own choice of AFS vertical mode (V/S or LVL CHG) as they deem appropriate. Crews seem to be aware of the minimum ROD of 500fpm in the hold but not what the maximum ROD should be. Selection of an appropriate ROD is by own choice, not a specified target V/S. No TCAS warnings activated on either ac: however, TCAS Change 7, embodied in the B737, reduces the sensitivity of the equipment in terminal areas to avoid nuisance warnings which could interfere with ATC. Crews are to be made aware by Flight Crew Notice (FCN) that descent rates in the hold should typically be 700fpm and not more than 1000fpm nor less than 500fpm. Guidance should be sought from the CAA and NATS as to whether ac should have vacated a level by 300ft or more before they can be deemed to be vacated.

ATSI reports that this Airprox occurred between a B737 and an EMB145 in the Edinburgh Tweed hold. Multiple traffic was entering, and subsequently leaving the Tweed hold due to deteriorating visibility at Edinburgh. The EMB145, at the lower level, was first to enter the hold followed by the B737.

The Edinburgh APR was working several flights in the Tweed hold and, due to label overlap and garbling, was providing procedural vertical separation to ac in the hold. This is in accordance with MATS Part 1, Section 1, Chapter 3, Page 14, Para 10.4.3 which states *'Radar separation shall not be used between aircraft holding over the same holding point'*. He had been giving 'step down' descents in the hold to a series of ac with no untoward indications.

At 1712:00 the EMB145 flight reported in the hold descending to FL90. The APR advised position in traffic and at 1713 gave further descent to the EMB145 to FL80 with a request that a report when level at FL80 was made. The B737 flight called the APR at 1714:30 and reported descending to FL90. Position in traffic was passed by the APR with the comment *"...give you further descent shortly and get you out of the hold as soon as I can"* and was asked *"...any er estimate for the er final hold"*. The APR advised it would probably be twice more round the hold. At 1715:10 the EMB145 crew reported, as requested, level at FL80 and was instructed to *"...descend FL70 now"*. The EMB145 crew, in a transmission that ended at 1715:30, in response to a request from the APR reported *"Wilco and er just leaving eight zero now EMB145 c/s"*. The APR replied *"Thank you* (to the EMB145) *B737 c/s descend flight level eight zero"*, receiving an affirmative acknowledgement to the instruction.

[UKAB Note (1): The Lowther Hill radar recording at 1715:32 shows the B737 flying 2·25nm behind the EMB145 with both ac proceeding outbound in the TWEED hold. The radar sweep at 1715:50 shows the EMB145 having commenced a descent (FL079) with the B737 2·1nm astern at FL090. Twelve seconds later the B737 is seen also descending through FL089 with the EMB145 still indicating FL079 2nm ahead. Thereafter vertical and horizontal separation slowly decrease until the CPA occurs at 1716:36, the B737 levels at FL080 as the EMB145 descends through FL076 1·8nm ahead. Thereafter separation increases as the EMB145 continues its descent, levelling at FL070 at 1717:40 2nm ahead of the B737. Average RODs are calculated to be:- B737 1500fpm; EMB145 520fpm.]

At 1716:30 the B737 crew started a dialogue with the APR stating that a diversion to Glasgow would have to be initiated unless an approach to Edinburgh could be commenced immediately. The APR advised he would not be able to accommodate this due to several ac ahead and commenced organising the diversion to Glasgow. At 1717:40 the APR cancelled the EMB145 hold with an instruction to fly a radar heading.

At an undetermined time in the above sequence of events the APR observed an STCA alert indicating that a loss of vertical separation had occurred in the hold although, due to volume of traffic, labels were garbling and he was, initially, unable to determine which ac were involved. Several seconds later, when the labels became readable, the APR noticed the EMB145 was indicating FL71 and the B737 FL80 and he was able to determine these were the ac that had triggered the STCA. There were no reports of any TCAS alerts.

During the Unit investigation a rough calculation of descent rates based on SMF data indicated the descent rate of the EMB145 was approximately 800fpm and that of the B737 approximately 2,000fpm. It was also noted that there was a fairly rapid increase in speed of the B737.

MATS Part 1, Section 1, Chapter 3, Page 3, Para 5.4 Changing Levels at Para 5.4.4 states *"Controllers shall exercise caution when instructing an aircraft to climb or descend to a previously occupied level. Consideration shall be given to the fact that aircraft may climb or descend at markedly different rates and, if necessary, additional measures such as specifying a maximum or minimum climb or descent rate for each aircraft shall be applied to ensure that the required separation is maintained. This is particularly relevant when the aircraft concerned are established in the same holding pattern."*

There had been no indications to the Controller that there would be a marked change in the descent rate of either ac, both of which had been established in the hold for some time.

UKAB Note (2): The UK AIP at ENR 1-1-3 General Flight Procedures, Para 2 Climb and Descent, 2.1 Vacating (Leaving) Levels states *"When pilots are instructed to report leaving a level, they should advise ATC that they have left an assigned level only when the aircraft's altimeter indicates the aircraft has actually departed from that level and is maintaining a positive rate of climb or descent in accordance with published procedures"*. Para 2.2 Minimum Rates of Climb and Descent states *"In order to ensure that controllers can accurately predict flight profiles to maintain standard vertical separation between aircraft, pilots of aircraft commencing a climb or descent in accordance with an ATC clearance should inform the controller if they anticipate that their rate of climb or descent during the level change will be less than 500ft per minute, or if at any time during such a climb or descent their vertical speed is, in fact, less than 500ft per minute. This requirement applies to both the en-route phase of flight and to terminal holding above Transition 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 and operating authorities.

ATCO Members agreed that both flights had been under a procedural Approach control service from the Edinburgh controller who was applying procedural separation whilst 'stepping down' both the subject ac in the TWEED hold. From the RT transcript and radar timings, it appears that the EMB145 crew were quick to report that they were leaving FL80, before an actual descent had commenced, whereas conversely the B737 crew were quick to actually commence their descent. The situation was further exacerbated by the EMB145 crew's selection of a ROD close to the minimum stipulated – 500 fpm - whereas the B737 crew's use of 'Level Change' mode had resulted in a much higher ROD. The outcome of these two elements was that the B737 levelled at FL80 before the EMB145 had reached its cleared level of FL70 which led to STCA activating, warning the controller of a potential conflict based on radar separation. The controller had been concerned and was only able to identify the ac involved when their respective labels ceased garbling; later SMF had revealed the subject ac's flight profiles and separation distances.

ATCO Members agreed that the controller had acted appropriately, applying the MATS Part 1 procedures correctly: procedural separation had not been lost. Neither flight crew had received any TCAS alerts or warnings during the incident. The Board were able to conclude that the controller had perceived a loss of separation in the TWEED hold due to STCA activation, which had led to the Airprox report being filed, and that safety had been assured during the encounter.

The NATS Advisor informed Members that with the introduction of Mode S, the LTCC radar display system is able to show controllers at that Unit the levels of holding ac in a separate 'vertical stack' window, to assist with level occupancy assimilation during holding situations.

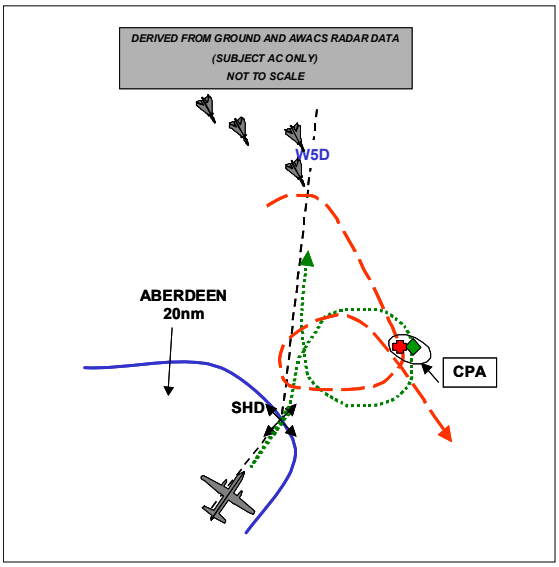
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Perceived loss of separation in the TWEED hold due to STCA activation.

Degree of Risk: C.

AIRPROX REPORT NO 078/06

Date/Time:	15 Jun 1318	
Position:	5743N 00145W (30nm NE Aberdeen)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Saab SF340	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL210	21000ft (QNH 1016)
Weather	VMC NR	VMC NR
Visibility:	>30km	NR
Reported Separation:	300ft V/ 100m H	0ft V/1nm H
Recorded Separation:	1700ftV/0.7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

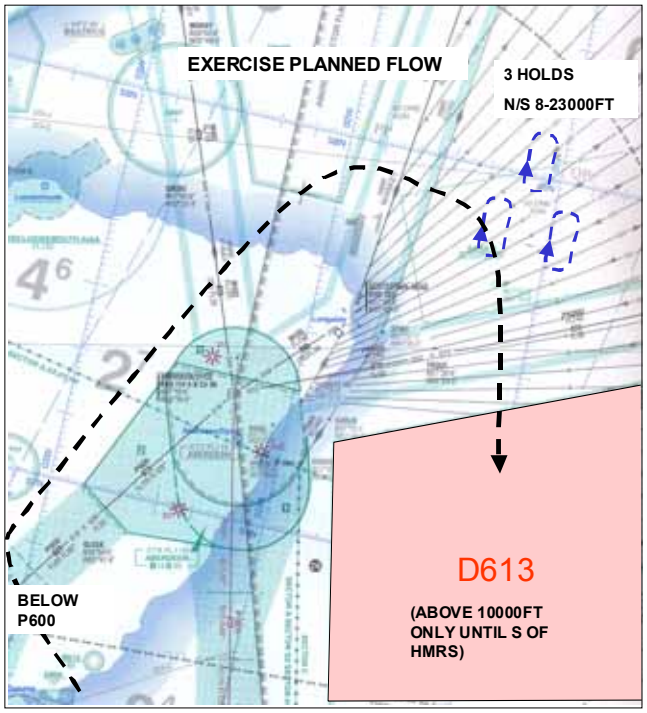
THE SAAB SF340 PILOT reports that his ac was on a scheduled passenger flight from Glasgow to Sumburgh with a standard crew of 2 on the flight deck (the first officer was under line training) and one in the cabin. They were routeing along W5D at FL210 in a N'ly direction and receiving a RAS from ScACC. The first indication of another ac was when TI was passed on 2 ac maintaining FL210 in their eleven o'clock position. Then a further call asked if they had visual contact and advised if not visual to turn right 30° as avoiding action. The next call advised that the other ac were still heading straight at them and advised a further right turn onto heading 090°. They responded that they had TCAS contact and ScACC advised that they follow any TCAS RAs received. As they continued the turn he sighted the ac slightly to the left of their nose and to the N, in a 'box four' formation [he thought] and heading straight for them. At about this time they received a TCAS RA instructing a climb of 1800-2000fpm. He immediately initiated a climb in accordance with the RA, converting speed to rate of climb to achieve the desired rate. At FL210 and a take-off weight of just over 12,000kgs, the performance of the ac was such that a climbing turn of 1800fpm was not sustainable so he maintained the best rate of climb that he could achieve given the ac performance. During the climbing turn he observed that there were 4 contacts displayed on TCAS during the RA; two red square contacts directly below their ac climbing towards them [he thought] and two contacts to the left of the display at about 2nm away in the 10 o'clock position, one solid blue diamond and one yellow circle. Due to the proximity of the contacts it was not possible to read the data tag associated with each ac as they were distorted with other data tags superimposed over them. As they approached heading 090°, ScACC gave them an instruction to continue the turn onto 180°. The climbing turn was continued as instructed and the climb was continued until the RA ceased at FL224. At this point he sighted the 4 ac again to their S, now in echelon formation and turning to the N in a climbing right turn. ScACC advised them to continue their turn onto a heading of 270° at which point he advised visual with the 4 ac and they were advised to continue en-route. He then contacted ScACC to ask what level they would like them to maintain and were allocated FL230. The 4 jets were seen to pass them on their W side heading N at about their new level then heading off in an E'ly direction. Whilst he considered that this was a very serious degradation of separation and flight safety, he suspected that it would be found that there was no actual risk of collision due to the other pilots, in the fighter ac, having visual contact with them.

He subsequently considered the avoiding action that they took, both the heading changes from ScACC and the TCAS RA, and whilst he considered that the crew and the controller all acted correctly given the information available and in the best interest of flight safety, he now believes that in manoeuvring his ac in accordance with the information presented to him, he may have in fact exacerbated the situation by turning into the path of the fighters.

THE TORNADO F3 PILOT reports that he was leader of a 4-ship formation of grey ac in receipt of a FIS from an AWACS and was part of a large package in Exercise CQWI [Combined Qualified Weapons Instructor], a

NOTAMed exercise. They were operating in VFR airspace [sic] and were about to enter the area of the holds. Due to the disposition of the three holds (see map below), the vertical deconfliction within them and the proximity of another (planned) 24 fighter ac, the safest avoiding action for his formation of 4 ac was to remain laterally deconflicted from the Saab while also avoiding the other exercise ac and the holds. The AWACS attempted to talk to the Saab ac through ScACC but he was not informed of the result. The civil ac was passed 3 times, the closest being the last occasion when the separation was assessed by all the crews to be about 1nm; on each time they passed, the No 4 ac wing-rocked. All crewmembers remained visual with the reporting ac throughout as they cleared it to the West.

Disposition of Holds and Routeing to them.



North Hold: Ac at 8-13000ft, 18-19500ft and 24000ft

West Hold: Ac at 8-13000ft, 18-19500ft and planned at 21000ft (4 x F3s concerned)

East Hold: Ac at 8-13000ft and 18-23000ft

UKAB Note (1): Exercise CQWI was the subject of both an ACN (CQWI 1/06) and NOTAM. All ATC units and the airline concerned were addressees.

UKAB Note (2): Since there was ambiguity regarding the formation of the F3s, the UKAB contacted the pilot for clarification. The formation was in 'loose arrow' formation throughout the incident.

MIL ATC OPS reports that the E3D Strike Controller was controlling a formation of 4 X F3 ac under a FIS, routeing towards a tactical hold at 21000ft on the Force QNH of 1016mb. A Saab 340 was routing NE on W5D towards Scotstown Head (SHD). The AWACS transmitted TI to all ac on frequency at 1311:27 *"All players, civi transiting through hold, France 350/74, FL210, tracks North East, C/S XX [not the F3s concerned] acknowledge";* there was no acknowledgment from any of the crews. The AWACS confirmed the F3 [incident] Formation's altitude at 1316:30 and the Formation leader responded *"F3 C/S, level twenty-one"* and the AWACS immediately replied *"AWACS copied, Stranger BRA 200, 8 miles, tracking north, FL210."* F3 Formation lead acknowledged the TI and at 1316:46 reported *"F3 C/S visual traffic."* AWACS acknowledged and at 1318:06 F3 Formation lead states *"Civi is now in the hold, turning at FL210, can you try and raise them."* AWACS replies *"Affirm, we're going through to Scottish now."*

[An analysis of the Aberdeen Radar was provided which has not been included as it was essentially the same as the one at UKAB Note (3) below which had the benefit of additional, AWACS-derived information.]

The passing and updating of TI fully met the AWACS controller's duty to inform aircrew of the proximity of other ac and fulfilled the controller's responsibilities under FIS. The crew of the F3 Formation acquired the Saab visually and took their own separation appropriate to the airspace classification.

UKAB Note (3): The recording of the Aberdeen radar shows the incident. A diagram of events with salient points is included at the beginning of this investigation report. The Tornados come close to the Saab on 3 occasions but there is much label overlap and the area is very congested making it difficult to analyse. On the first occasion, the Tornados were heading about 170° as the Saab – turning through a heading of about 090° - crossed the closest Tornado's track from W to E just over 2nm ahead and 400ft above it climbing. The Saab then turned right from 090° onto 180° immediately ahead of the Tornados and climbed while the Tornados turned slightly right away from it onto about 180° and descended from 21000ft to just below 20000ft. Due to the speed difference they overhauled the Saab on its R (to the W) displaced laterally by about 0.7nm and 1700ft below. This is the CPA which occurs at 1318:00. (The distances are verified from the AWACS radar photographs.) The Tornados then turned right onto W maintaining 2000ft below and the Saab which then also turned onto a similar heading a few seconds later and continued to climb. The Tornados separated slightly further to the W and maintained the vertical separation while the Saab departed to the N at FL230 having completed a full climbing orbit. The Tornados then turned to the E well separated from the Saab and when clear departed to the SE. While this evolution takes place two tracks clearly indicating low level - assumed to be helicopters - passed to the SE and below the formation; another exercise formation is holding about 5nm further to the E and about 500ft below the F3s and there is a third formation further to the W of the F3s concerned but well below them, clearly indicating 12000ft.

UKAB Note (4): The transcript of the RT shows that the Saab pilot declared at 1317:05 that he was climbing in response to a TCAS RA. At that time the ac was passing through a heading of 090° and had already been given [and commenced] a further turn onto 180°accompanied by accurate TI. He had not been given the final turn onto 270° at this stage.

AWC WADDINGTON (EXERCISE PLANNERS) reported that the CQWI Exercise is a most complex and important exercise for training leaders of large tactical formations and AWACS crews.

The mission concerned was planned by the Course participants supervised closely by the AWC staff. The airspace and rules were briefed prior to the start of the planning cycle. The tactical part of the exercise was planned to be carried out in D613 complex (South of P600D) with forces of both Air Defence (AD) and Ground Attack (GA) in the N of the areas and opposing AD to the S. Ac were Leuchars based and to achieve this a flow plan was designed which involved the ac departing to the NW [out of Leuchars], under P600, and then turning right onto N to the W of both P600 and Aberdeen before turning onto E to cross W5D. The mission plan involved holds for the Air Defence assets prior to the entry of the D613 complex so in order to minimise time within the ADRs, the mission planned to cross W4D and fly through a point at 5750N 00210W and then E directly across W5D. Having cleared the ADR they would then flow S-bound, hold if required and then directly through P600D and into the D613 complex. The Air Defence ac consisting of F3s and F18s were planned to hold to the N of P600D in 3 distinct holds, all clear to the E of W5D and orientated N/S. The GR4s [the ac to the W and below the F3 formation] were not planned to hold as such but were planned to fly through the holding area and the ADRs. Although the holds were flexible, there were no planned holds within the ADR boundaries promulgated on the charts. (See map above).

Because the flow went around Aberdeen the AWC planners had previously (on Thurs 8 Jun 06) consulted Aberdeen ATC to discuss the planned flow and routeing. Although this compromised tactical freedom, it was agreed with them that during the tactical part of the exercise ac would remain above 10000ft in order to minimise issues with the helicopters in the HMRs operating out of Aberdeen.

The sensitivity of advisory airspace were briefed at the pre-planning met brief and re-briefed at the mass brief. On completion, the plan was reviewed personally by the Course Director and passed as being safe for flight. This review was conducted by conducting a full mission 'flythrough' using an Advanced Mission Planning Computer with all mission participants' routes and operating areas shown on the viewer along with evaluation of the holding and recovery plans. The mission simulation showed that there were no planned confliction issues between participants.

The mission commander [airborne] highlighted the location of the ADRs, Airways and CAS to participants at his brief to highlight the fact that the mission was operating in open airspace and that participants would have to be vigilant for non-participating ac.

The AWC was initially informed by Aberdeen Radar that there had been an Airprox in the vicinity of Aberdeen; AWC staff confirmed with them that the incident had taken place outside the ADR. The incident was later discussed in detail at the debrief. The 'stranger' was specifically called to all the crews in its vicinity and all other players were aware of it but it was not apparent to anyone why the Saab had continued to turn towards and into the F3 formation which was turning to get out of its flightpath.

THE MORAY TACTICAL CONTROLLER reported that he was providing a RAS to a SF340 on W5D at FL210 following its transfer from Tay sector. He observed multiple contacts to the E of the ADR and was informed by Scottish Mil of activity ahead of the Saab as a 'heads up' call.

There were various groupings of ac to the N of SHD and TI was provided to the SF340 pilot. It became apparent that 3 tracks to the W of W5D were turning Southbound, apparently almost down the centre line of the ADR at FL210. The SF340 was given avoiding action to the E, in the belief that the Southbound traffic would pass to the W of it. As the avoiding action took effect he became aware of Northbound tracks to the E of the SF340 that he considered might come into conflict. Further avoiding action was then given initially to the S then, as the original contacts closed on the SF340, a turn to the W was given.

He cannot remember at which point the SF340 pilot reported visual with the original contacts but he informed him that they were getting constant RA [he thought] so he emphasised to the pilot to follow the TCAS warning. The original threat then seemed to almost orbit the SF340 at such close range that he was unable to differentiate his traffic from the military ac.

The SF340 climbed to about FL225 under the RA before the incident finished, then resumed its own navigation to Sumburgh.

In conversation with the SF340 pilot, he informed him that he had been given an RA that the performance of the ac precluded him from following and although he had been visual in the latter stages, he was unsure if he could have avoided the military ac.

ATSI reports that at the time of the Airprox, the Saab pilot was in communication with the ScACC Moray sector Tactical Controller (TAC). He described both the workload and traffic loading as moderate.

The Moray sector is a large sector and encompasses traffic utilising Upper Air Routes, Airways, Advisory Routes and operations in Class G airspace. TAC has the use of the following radars: Aberdeen, Stornoway, Allanshill and Sumburgh, the latter being SSR only. Typically, a range of 120nm is selected to carry out the functions of the sector. At the time of the Airprox, both a Tactical and Planner manned the sector.

A CQWI exercise was taking place from 5th to 16th June. An ACN described the activity as a medium exercise that includes tactical leadership training sorties involving up to 30 fast jet ac operating in massed-formations, supported by Air-to-Air Refuelling (AAR), Airborne Early Warning (AEW) and Electronic Counter Measures (ECM) ac. The exercise area was extensive and covered much of the airspace located within the Moray TAC's area of responsibility. TAC reported that he had been on duty prior to the day of the Airprox when the exercise was taking place and that he was fully briefed on the content of both the NOTAM and the ACN; however, he commented that there was little to inform civil controllers as to what the exercise ac would actually be doing or where they would be holding. [See also Exercise Planners' report].

At 1308:55 the Saab pilot established contact with TAC and reported maintaining FL210 while the ac was about 10nm SW of Aberdeen. Visible on the radar, some 50nm NE of the Saab, were a number of military squawks and as the Saab passed SHD (21nm NE of Aberdeen) TAC realised that there was a strong possibility that these ac may become a problem to the Saab. At 1311:25, he transmitted "C/S *be advised just left controlled airspace it's Radar Advisory at the moment but there's multiple military targets operating to the north northwest northeast of Scotstown Head*". The crew read back that it was a RAS and the TAC added "*That's Radar Advisory transponding aircraft only*".

The Saab was following ADR W5D which, on passing SHD, follows a direct track of 012º to Sumburgh. As the Saab proceeded along the ADR, numerous targets could be seen ahead, some of which were on a track that would take them through the ADR. Whilst this was taking place, TAC was busy co-ordinating traffic in the upper air including dealing with some that would be entering the Oceanic area. Although the Planner was assisting, analysis of the RTF and telephone recordings show that both were busy. At 1315:35, TAC transmitted "*Saab* C/S *Scottish traffic for you in your twelve o'clock turning towards you two targets showing flight level two one zero range of ten miles*". This group of ac had previously been Northbound, but were then seen to turn right onto a SE track thus causing the TAC to pass TI. Although the controller passed a range of 10nm, analysis of the radar recording showed that they were in fact 18nm from the Saab. It is accepted than when using such a large range display, in this case 120nm, accurate estimation of distances can be difficult.

As the military ac rolled out of their turn onto SE, TAC instructed the Saab pilot "*C/S if traffic not sighted turn right forty degrees reporting your heading*"; the crew replied that they were turning and their new heading was 050º. At this point the traffic was in their 11 o'clock position at a range of 17.7nm. As the labels on the military ac were overlapping it was not possible [on the recording] to distinguish a code or the Mode C readout. As the traffic closed to a range of 11.5nm TAC issued an avoiding action instruction to the Saab pilot to turn right heading 090º and at that time, 2 of the squawks appeared as 0000 while the other 2 showed 4763 but only one had a discernable Mode C readout which was FL207. [Note: 4763 is a Special Event squawk and so has to be regarded as providing unvalidated Mode A and unverified Mode C data].

TAC updated the TI and asked whether the Saab crew had the ac in sight; at that point the ac were 8nm N and still tracking SE; they advised that they were not visual but the traffic was displayed on TCAS. The controller instructed the crew to continue turning right onto a heading of 180º and to "*…go with your TCAS if you get one*". At 1316:40, when the crew reported that they had the traffic on TCAS, analysis of the radar shows that the nearest group of ac (the ones TAC was passing avoiding action and TI in respect of) were 8nm N. There was further traffic 17nm SE of the Saab tracking towards it at FL190, traffic 29nm NE in a racetrack and further returns 24nm N manoeuvring. The controller informed the Saab crew of the traffic to the SE and then they reported a TCAS [RA] climb.

Having acknowledged this, TAC transmitted "*C/S if you can continue your right turn rollout heading two seven zero degrees*" which the crew acknowledged and advised that they were still climbing. The traffic was now 3.2nm N of them and the Mode C of one indicated FL207 whilst that of the Saab showed FL213. Meanwhile, the traffic that was closing from the SE was now at a range of 8.3nm and the Mode C of that group showed FL195. The original group of ac flew past the Saab before turning onto a reciprocal track (i.e. back onto NW) when approximately 1nm S of the Saab and then crossed from left to right through the 12 o'clock of the Saab at a range of 2.4nm. At 1318:45, the Saab pilot transmitted "*Scottish C/S we've got four contacts they were chasing us up so quickly we were running right out of climb performance*". TAC acknowledged this but advised that all the contacts had overlapped on his radar and it was not possible to clearly distinguish what was happening. The captain advised that they could see 4 ac in his 12 o'clock, which were flying to *'climb round us'*. TAC advised that if the crew were visual with the traffic and happy to continue back on track to Sumburgh then that was approved.

Both the ACN and NOTAM that were issued contained the expression: 'Aircraft will remain clear of regulated airspace'. The controller explained that his interpretation of this was that the exercise traffic would remain clear of ADRs as well as other CAS. Investigation has revealed that there is no official definition of 'regulated airspace' and the term clearly means different things to different people. Accordingly the following recommendation was made [by ATSI]: Use of the term 'regulated airspace' should cease immediately and not be used until an agreed official definition has been promulgated [see AUS action at Part B]. TAC advised that he was aware that other problems had occurred during the exercise, i.e. that civil controllers had been required to pass avoiding action to their traffic in respect of exercise ac. He felt that this was due, in part, to the lack of specific information provided. He praised the briefing facilities provided at the unit but felt that more details of the 'mass launches and recoveries' that were an integral part of the exercise should have been provided. He stated that flights routeing along W5D from and to Sumburgh were an everyday occurrence and yet the exercise holds had been established across this busy ADR [he thought]. He felt that the problems he was required to solve in the upper air had, to some degree, distracted him from his responsibilities for traffic under ATSOCAS. In the past, the present Moray Sector had been split but it had been established with its present area of responsibility for some time. It was quite common to have such a mix of traffic but this was not always helped by the necessity to select a large range, in this instance 120nm, on the radar. Accordingly, the following ATSI recommendation is also made: 'The unit should reassess the area

of responsibility of the Moray sector and determine whether the present arrangements are optimal for the volume and complexity of traffic' [See NATS action at Part B].

The controller advised that he did not attempt to contact the exercise traffic through the military ATC system. The Watch Supervisor added that although it was supposed to be possible to pass a message to the Master Controller at either Boulmer or Scampton, who in turn could contact the AWACS crew and pass a message that way, this process simply did not work. She had tried to follow it, but without success. It was a long drawn out process and therefore unreasonable to expect a controller handling a busy sector to be able to follow. It was suggested that use of crossing corridors established across the ADRs might help. Civil controllers could then avoid these and permit a degree of freedom to the exercise traffic. As a result the following ATSI recommendation is made: 'The relevant authorities should urgently review the procedures available to civil controllers to contact ac engaged in military exercises via the military ATS network and ensure their practicality. Consideration should be given to establishing crossing corridors where exercises are planned to be in close proximity to active ADRs. [See Part B, C and Note 5].

[UKAB Note (5): Following the Board's assessment of Airprox 027/06 in June 2006, a civilian Controller Member and the ASACS Advisor undertook to investigate what could be done to improve communications links between civilian controllers and fighter controllers. It was agreed that in parallel with this activity the Chairman would brief MoD: action is in hand on both fronts].

The TAC explained that when he observed the military traffic heading towards the Saab he tried to 'hook' one of the targets and separate it out. This was unsuccessful and so he had an unclear picture displayed to him. He added that having a larger display and / or a mosaic radar system might have helped him. He also opined that had the military traffic been working Scottish Military then the incident would not have occurred.

UKAB Note (6): The ScACC Unit Report also made several recommendations that have already been accepted by the management and action allocated.

THE CAA FLIGHT OPERATIONS INSPECTOR (FOI) comments that the incident was discussed with the Saab Captain. Initially, the Saab 340 was following W5D, Class F airspace, before being turned out into Class G airspace which is where the Airprox occurred.

The pilot reiterated points made in his report [above] regarding responding to the RA. In summary, the Saab 340 pilot was faced with a dynamic traffic situation outside CAS. FOI consider that the current guidance given to aircrew in CAP 579 regarding a TCAS RA event remains sound and does not require any changes as a result of this Airprox where the Saab aircrew and the ScACC controller were faced with a very intricate tactical situation.

HQ STC comments that this very complex scenario has taken some time to unravel. The Saab was, unfortunately, turned into a piece of airspace which was about to be occupied by the F3s that were about to enter their planned and deconflicted hold. The F3s had very limited lateral or vertical 'wiggle' room and remained, as much as possible, in their cleared holding 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, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

This had been a most complex incident to analyse fully with several misconceptions of the respective pilots' intentions among the major participants. It was also important to understand that the airspace in which this incident took place was shared, with no single user having any precedence over any other. In this context there was some discussion amongst Members about the standing of an ADR. It was pointed out by Advisors that the UK AIP states that an ADR is a route notified between two points where an ATC service [usually a RAS] is provided but pilots are responsible for their own collision avoidance. Recognising that status, the intention of the military exercise planners was that the formations were to cross the ADRs at right angles with no altitude change, in accordance with recommended procedures.

The difficulty of ground-based ATC controllers communicating with Air Defence controllers in an AWACS is a known issue and the Board was briefed in some detail regarding the progress of work being undertaken in this area. In the circumstances of this incident however, experienced Controller Members pointed out that any ground-to-air negotiation would most likely have been fruitless as the F3s, were they to accept any limitations to their flight, might then not be able to meet the requirements of their mission. Further, as is the norm, the F3s were in receipt of a FIS from the AWACS while the Saab was on a RAS from ScACC. Responsibility for issuing TI was therefore with both the ATC/Air Defence agencies involved whilst provision of traffic avoidance lay solely with ScACC, to the Saab. Members considered that even if the only information passed had been that the Tornados were in receipt of a FIS - and therefore not able to be manoeuvred by the AWACS controllers - that in itself may have been an influential factor to the ScACC controller when he was formulating his plan. There was no record at ScACC, however, of any military agency having contacted them with a request for information following the Tornado leader's information request to his controller in the AWACS.

The comment reportedly made by the Moray TAC Controller suggesting the use of Scottish Military Radar on such an exercise was addressed by the AWACS Advisor who informed the Board that this was not their function. On exercises and the operations that they mirror, fighter ac are controlled/informed/directed either by ground or air-based Air Defence agencies, not military ATC agencies that perform a very different function. Members and specialist Advisors then analysed the part played by the two sets of Controllers.

The Board was informed that the AWACS had three controllers available and all had been busy passing both tactical and safety critical information to the five fighter formations and other exercise participants under their direction. In this instance the TI passed to the subject F3 leader had been copious, accurate and, by pointing out the Saab, had assisted him with his lookout responsibilities in the ADR and in Class G airspace. Members were pleased to observe that the Controller had specifically stated that the stranger was a civilian (and therefore non-participant) ac. This TI had enabled the F3 leader to see the Saab and had informed him that it was not an exercise participant.

The Board then analysed in detail the part played by the ScACC controller(s). The AWACS Advisor and other controllers observed that the approach adopted by the ScACC controller appeared to be that such military traffic should be co-ordinated rather than avoided. The Advisor pointed out however, that due to the nature of the exercise being conducted, tactical freedom was essential in order to mirror as closely as possible real events. Relatively uncongested Scottish airspace was regularly selected for exercises (to minimise the impact on other airspace users) and controllers should be familiar with and expect unpredictable manoeuvring by exercise traffic.

The Secretariat and ATSI had spent many hours analysing the tapes of several radar heads and had an in-depth knowledge of the situation; they pointed out however that in a dynamically changing situation the study of static pictures could be misleading by over-simplifying the situation. Both also totally accepted that the recordings did not necessarily reflect the picture presented to the ScACC controller. In particular, it was noted that although with the current sectorisation the use of a 120nm scale radar picture might be unavoidable due to the size of the airspace in which the service is being provided, this had most likely been a significant constraint since the determination of ac tracks, discrimination of ac labels and range estimation are more difficult than with a smaller picture. Although one controller Member did not agree that this had been a factor, the majority of pilots and controllers considered it to have been important. Members welcomed the statement from the NATS Advisor that ScACC were conducting a review of their procedures for the Moray Sector. [The findings of the review were expected by 1 Jan 07 and would then be considered by local management]. With the benefit of hindsight and the additional information from other radar head recordings however, almost all Members were of the opinion that the Moray Controller would have been better to take the Saab to the W of the Tornado formation concerned rather than to the E of it. The ATSI Advisor who investigated the incident had observed that the Moray Controller had very little time to establish the new track being taken up by the Tornados and to decide whether or not another formation, further to the W, was likely to be a significant factor. Although the radar recording clearly showed that these ac had been in the lateral area of interest, they were not a factor since they were well below at FL125. The controller might not have assimilated this however, either due to the reported label overlap or his workload at that precise moment. [Although the Moray Controller described his workload as being moderate, a Member informed the Board that he had also been working other high level traffic at the time].

Three further points were mentioned regarding the civilian ATC aspects. Firstly, it was suggested that the Danger Areas to the W (D809 complex) had limited the room for manoeuvre but it was established that these were not active. Secondly, it was observed by a pilot Member that the transcript had showed that the Saab pilot called at

1317:10, immediately following the instruction to turn onto a heading of 180°, that he was climbing in reaction to a TCAS RA. That call had had been acknowledged by the Moray Controller but at that time the Saab would have already been in the turn [onto 180°]. The Controller then, just over 10sec later, gave a further turn instruction onto 270° (after the TCAS climb declaration by the Saab pilot) contrary to the instructions in MATS Part 1 (Sect 1, CH 9, 5.2) which states that on being notified that an ac is manoeuvring in accordance with a TCAS RA a controller must not issue control instructions to that ac after a pilot had declared that he is reacting to an RA. Lastly, although the ScACC controller described his briefing facilities as being good and he was therefore aware of the ACN and the NOTAM, he also considered that the information they had contained was not particularly useful to him and regarding the avoidance of 'regulated' airspace had been misleading. The disposition and dimensions of the holding areas for instance would have been most useful information to the Moray TAC Controller. In this regard, the Board was informed by the DAP Advisor that work had already been undertaken by them to clarify the standardised wording used in Exercise ACNs and NOTAMS. Members were further advised that AUS would brief all future CQWI exercise participants. Although there had been liaison between the exercise planners and Aberdeen ATC regarding the mission routeings, similar consultation had not taken place with ScACC. Members were surprised that Aberdeen ATC had not further consulted ScACC when contacted by the exercise planners when they were constructing the exercise traffic flow plan.

Turning to the flight operational aspects of this Airprox, the Board noted that the Tornado pilot was leading a relatively slow and unmanoeuvrable formation, which could not have been broken up without seriously impacting his mission objectives, and was probably not in a position, at least initially, to take anything other than relatively modest lateral avoiding action after he saw the Saab apparently turning into the portion of airspace that he had planned to and wanted to be in. Members considered his decision to turn right, away from the Saab, to be correct and sympathised with his surprise when the Saab also turned right onto a Southerly course just ahead and slightly above him. Members noted that the Tornado leader also descended his formation thereby building in increased safe vertical separation at the same time as the Saab pilot was also increasing it by reacting to the climb RA.

As regards the TCAS aspects of the event and the Saab pilot's assertion that whilst responding to the RA the performance of the ac was such that a climb of 1800fpm was not sustainable whilst turning, pilot Members considered that had he rolled out of the turn then he might have been able to attain the required rate of climb. Members also noted that CAP 579 states at Para 6.2.2, in relation to a TCAS RAs, that: *"Pilots are to initiate the required manoeuvre immediately, adjusting flight path aircraft power and trim accordingly"*.

It was apparent to the Board that the notwithstanding the various issues arising from this Airprox, the cause was a conflict in the FIR in the vicinity of the ADR. The slightly unmanoeuvrable Tornado formation was turning and maintaining visual separation to avoid the Saab which was turning (being turned) to avoid them at the same time as the formation was descending and the Saab climbing. That the pilots, and their respective controlling agencies, were not able to communicate with one another whilst they both independently followed correctly their respective procedures may well have lead to concern in the pilots' minds. However, both the Saab pilot and the Tornado leader had seen the opposing ac and despite slightly unmanoeuvrable ac they were taking action to avoid one another; therefore there was no collision risk. In bringing its discussion to a close, the Board noted that despite the absence of any risk or degradation of safety standards and the laudable follow-up actions initiated by some of the key agencies involved, there may well be room further to develop procedures to reduce the likelihood of such an incident from happening again. Members considered the responsibility for this to be joint civil and military, involving planners, civil and military ac operators and their respective authorities. Noting that SRG had commenced the implementation of the ATSI recommendations and that NATS is also taking action arising from this Airprox, the Board was minded to recommend that the CAA and MoD should further develop procedures to ensure that during notified UK air exercises integration of exercise traffic and passenger–carrying ac is improved.

PART C: ASSESSMENT OF CAUSE AND RISK

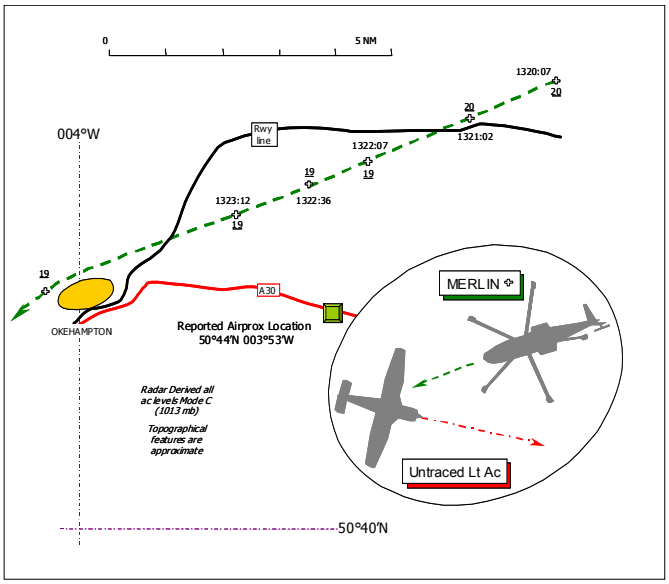
Cause: Conflict in the FIR in the vicinity of ADR W5D.

Degree of Risk: C.

Recommendation: The CAA and MoD should further develop procedures to ensure that during notified UK air exercises integration of exercise traffic and passenger–carrying ac is improved.

AIRPROX REPORT NO 079/06

Date/Time:	16 Jun 1320	
Position:	5044N 00353W (4nm E of Okehampton)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Merlin HM Mk 1	Untraced Lt Ac
Operator:	C-in-C Fleet	NK
Alt/FL:	2000ft (RPS 1015mb)	NR
Weather	VMC CLBC	NR
Visibility:	20km	NR
Reported Separation:	Nil V/500m H	NR
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MERLIN HM Mk 1 PILOT reports his helicopter has a sea-grey camouflage scheme and the HISLs were on whilst conducting a VFR training NAVEX with a crew consisting solely of himself and his navigator. They were in receipt of a FIS from Exeter APPROACH on 128·975MHz and squawking A7000 with Mode C on. Neither TCAS nor Mode S are fitted.

Heading 245° at a position 4nm E of Okehampton approaching a turning point at 120kt in a level cruise at an altitude of 2000ft WESSEX RPS (1015mb) – at 1320UTC just before returning to Culdrose - a yellow Cessna was sighted in their 2 o'clock at the same altitude just under 1nm away. He maintained course and speed to avoid a collision with the Cessna, which crossed ahead from R – L and continued on its course down the port side of their ac. Minimum horizontal separation was 500m with a medium risk of a collision. No report of the occurrence was made on RT, but on reflection after landing he elected to submit an Airprox report.

THE RADAR ANALYSIS CELL (RAC) AT LATCC (MIL) reports that despite exhaustive enquiries through known operators in the area; all the local airfields, farm strips and independent operators, the identity of the reported light ac remains unknown. Although the Merlin is seen on the radar recording nothing is shown of the reported Cessna, neither did extended recordings made either side of the incident time reveal any tangible leads. The reported ac did not receive an en-route ATS from Exeter, Plymouth or St Mawgan. Regional airports as far N as Cardiff and Swansea were also canvassed but without success. The RAC thus exhausted all lines of enquiry and therefore tracing action has been unable to identify the reported light ac.

UKAB Note (1): The Burrington radar recording shows the Merlin in transit through the area but the helicopter's track does not pass through the reported location at 50°44'N 003°53'W – on the A30 some 4nm E of Okehampton. The Merlin is shown tracking about 2½nm N of the reported location just before 1322:36 and continues WSW to pass N abeam Okehampton indicating 1900ft Mode C (1013mb) – about 1960ft amsl RPS. No radar returns which could be associated with the reported light ac are evident either in the vicinity of the reported location, the vicinity of the actual track made good or at the helicopter's position at the reported time of the Airprox at 1320UTC. Consequently, this Airprox is not shown on recorded radar.

ATSI reports that the pilot of the Merlin requested and was given a FIS by Exeter APPROACH. The flight was not identified nor was the other traffic known to the controller. No ATC causal factors.

C-in-C FLEET comments that this Airprox highlights the importance of making an initial report as soon as possible by radio to the controller providing the ATC service iaw JSP551 Vol 1. Such a report may, in this case, have assisted with tracing action and Airprox position detail.

AIRPROX REPORT No 079/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report solely from the Merlin pilot, radar video recordings and reports from the appropriate ATC and operating authorities.

In the 'see & avoid' environment of Class G airspace, this Airprox was fundamentally a look-out issue. The Member from C-in-C Fleet confirmed that the crew composition on the Merlin was a single pilot with a navigator occupying the LH pilot's seat: no aircrewman was carried on this navigational training sortie. As the untraced light ac's pilot had not himself originated an Airprox report, Members might reasonably surmise that either the pilot did not see the helicopter at all, or, if he did he was not unduly concerned about its proximity. Clearly it was most unfortunate that the reported ac could not be identified, despite the best efforts of the RAC. Thus the Board could only base its assessment as to cause and risk on the report conscientiously provided by the Merlin pilot.

It was clear from the helicopter pilot's report that the light ac had been sighted in their 2 o'clock at the same altitude and just under 1nm away. In this scenario, as the light ac was crossing from R – L it was evident that under the 'Rules of the Air' the helicopter pilot was required to 'give way' to the light ac if that proved necessary. As it was, the Merlin pilot elected to 'stand-on' and he said the light ac passed ahead and no closer than 500m clear to port. It appeared to the Board that if the Merlin pilot had perceived a necessity to turn to avoid the light ac he would have done so and it would seem that he had both time and airspace at these speeds in which to accomplish avoidance manoeuvres if needs be. Nevertheless, this was not required and the Board debated whether this was a conflict or merely a sighting report of other traffic observed in the FIR. As the Board was evenly divided on this issue a vote was deemed necessary. By the narrowest of margins the Board concluded that this Airprox had resulted from a conflict in Class G airspace with an untraced light ac. Turning to risk, some Members wondered if there was sufficient information upon which to base an assessment in the absence of a report from the light ac pilot as the radar recording had not illustrated the encounter. Despite some small anomalies between the Merlin pilot's report and the recorded radar data, there was no reason whatsoever to doubt the veracity of the pilot's estimate of either the sighting distance or the minimum separation that pertained – 500m. Therefore, the Board concluded there had been no risk of a collision in the circumstances reported here.

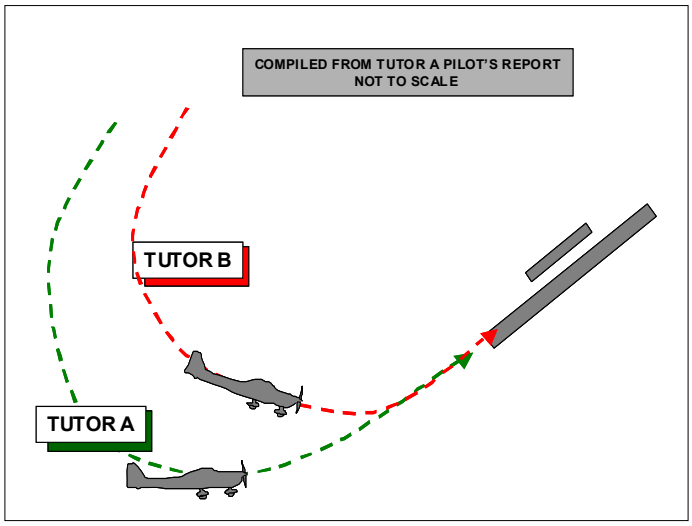
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace with an untraced light ac.

Degree of Risk: C.

AIRPROX REPORT NO 080/06

Date/Time:	9 Jun 0930	
Position:	5108N 00146W (Finals RW05 Boscombe Down - elev 407ft)	
Airspace:	Boscombe ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Tutor	Grob Tutor
Operator:	HQ PTC	HQ PTC
Alt/FL:	100ft↓	NR
	(QFE)	NR
Weather	VMC NR	VMC NR
Visibility:	999	NR
Reported Separation:	40ft V/15m H	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

GROB TUTOR (A) PILOT reports that he was in communication with Boscombe ADC carrying out a flapless circuit demonstration with a student as part UAS training syllabus in good weather. The pilot of another Tutor called *"(callsign), downwind to roll, request the main"* and Boscombe TOWER replied *"(callsign), main approved, surface wind ***/**"*, to which he replied, *"main approved (callsign)"*. The other pilot then called *"(callsign) finals, main"* and was told, *"(callsign) continue"*. In the later stages of the finals turn (slightly lower and further out than for a normal circuit), he saw the other Tutor [Tutor B] half way round the finals turn for a normal circuit. He asked on the RT whether the other ac was positioning for the Northern RW but got no reply. At the time the other ac was in an attitude such that it was 'belly up' and it would not be possible for the pilot to see them. The other Tutor continued the finals turn to position in front and above of him and at a higher rate of descent. He assumed that the other pilot was positioning to land long and turn a tighter than usual normal circuit. From this position he was about 40ft away from the other Tutor, did not have the option of descending, accelerating or overshooting to avoid conflict and was being pushed closer to the ground so he moved right to the R/W deadside to add lateral separation. Following several calls from ATC both ac executed an overshoot, achieved separation and carried out uneventful landings.

He assessed the risk as being high.

GROB TUTOR (B) PILOT reported several weeks after the event that he saw nothing of the incident and was only made aware of it 2½ hrs after it had happened.

THE STATION comments that it seems that the second Tutor pilot did not assimilate the information passed by ATC that he was 'Number 2' to a Tutor ahead; thus he turned finals believing that he was 'Number 1' and came into conflict with the Tutor already on a slightly extended (flapless) final. The chain was broken by the good lookout of the pilot of the ac already on finals who spotted the second Tutor turning belly-up ahead of him.

Following extensive discussion, the Station has decided not to change any of the standard circuit RT procedures, with the exception of an additional call for Tutors joining on RW 05. All pilots have been reminded of the vital importance of maintaining accurate situational awareness within the visual circuit and, particularly, of a positive and thorough lookout scan. Controllers have been reminded of the key role they play in maintaining safe separation in the circuit through the visual following of ac from the tower – in this instance the well-documented difficulty in seeing a small white-painted Tutor against a white hazy background probably contributed to the incident.

AIRPROX REPORT No 080/06

MIL ATC OPS reports that a Tutor aircraft (Tutor A) was operating in the Boscombe Down visual circuit under the control of ADC that was manned by a U/T controller and a mentor. Simultaneously, at 0926:02, another Tutor crew (Tutor B) called ADC "*Tutor B C/S, approaching High Post"* [Reporting point for Boscombe Down Visual Circuit]. The ADC passed standard joining instructions to Tutor B crew stating "*Tutor B C/S, Boscombe Tower, join runway 05, QFE 1008, one joining northside, one northside, one in*". Tutor B crew readback the RW and QFE. At 0928:15, Tutor B crew stated "*request cross*". This call went unacknowledged by ADC and 30sec later Tutor B crew restated "*Tutor B C/S, request cross for downwind circuits*". A different voice, the mentor controller, responded with an acknowledgment and added with a supplementary call "*Tutor B C/S, roger it's a visual circuit, if you cross at your discretion there's one Gazelle on the 23 threshold departing runway track off runway 05 and VAAC is downwind*" No response was received from Tutor B crew. Tutor A crew then called "*very late downwind to roll, request the main*". A change of voice back to the U/T is heard when ADC approved the approach to the main RW and passed the surface wind. Instantly, Tutor A crew reported "*now finals main*". The ADC passed "*Tutor A C/S, clear roll main, barrier down*". Tutor A crew acknowledged the clearance. At 0929:54, Tutor B crew reported "*Tutor B C/S, downwind to land the main*". ADC responded "*Tutor B C/S, main approved, one ahead, surface wind 120-12knots".* At 0930:33 Tutor B crew called "*Tutor B C/S, finals main*". The ADC then instructed Tutor B crew to "*continue*": this was correctly acknowledged. At 0930:54, Tutor A crew reported "*Tutor A C/S, there's a Tutor turning finals, confirm he's for the northern".* ADC Screen erroneously instructed another Tutor not involved in the Airprox to "*go around*" and immediately corrected himself and instructed Tutor B crew to "*go around*" and then made a blanket call stating "*OK the second Tutor on finals is to go around*". Six seconds later Tutor B crew reported "*Approach, Tutor B C/S, finals for the main*". The ADC screen immediately reiterates "*All Tutors are to go around from the finals position*". A call from an unidentifiable crew states "*gliding, going around*". Both Tutor crews go around and reposition in the visual circuit without further incident.

Due to the location of this Airprox no radar recording is available.

During Tutor B crew's integration into the visual circuit the crew used non-standard RT phraseology causing the ADC mentor to take control from the U/T. Tutor B crew were given accurate and standard TI regarding other traffic in the visual circuit and should have been positioning on finals behind Tutor A. However, Tutor B crew appear not to have assimilated the TI pertaining to Tutor A's position ahead in the visual circuit and turned in front of it after Tutor A crew had already received a clearance to use the RW. There appeared to have been confusion as to the positioning of the Tutors as the Airprox occurred. However, the ADC applied positive control by breaking off all Tutor ac and instructed the crews to reposition in the visual circuit.

HQ PTC comments that this incident was caused by a combination of poor lookout, loose R/T discipline and some questionable airmanship. There are no new lessons here and this Airprox illustrates the importance of adherence to well thought out circuit procedures, making clear and correct radio calls and, just as importantly, listening to all the calls and responses to allow an overall picture of circuit traffic to be established.

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 was briefed on Mixed RW operations at Boscombe and that normally they cause little concern. Members agreed that the principal cause of this incident had been a breakdown of the communication chain between the ADC and the pilot. Although the circuit was busy and many transmissions were made by the agencies involved, the ADC did clearly state that Tutor B had '*one ahead'*; the pilot however apparently did not assimilate this information despite reading back the clearance to use the main [RW] but not reading back that there was one ac ahead. The Mil ATC Advisor informed the Board that there was no requirement to read back the TI, only the clearance. In order to avoid any potential confusion the mentor sensibly stepped in, telling all ac to go around from finals allowing them to reposition in an orderly manner.

Following some discussion, and despite that the separation between the ac had been less than desirable, the majority of Board Members decided that the action taken by the pilot of Tutor A - by seeing the problem and moving out of the path of Tutor B - had removed any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

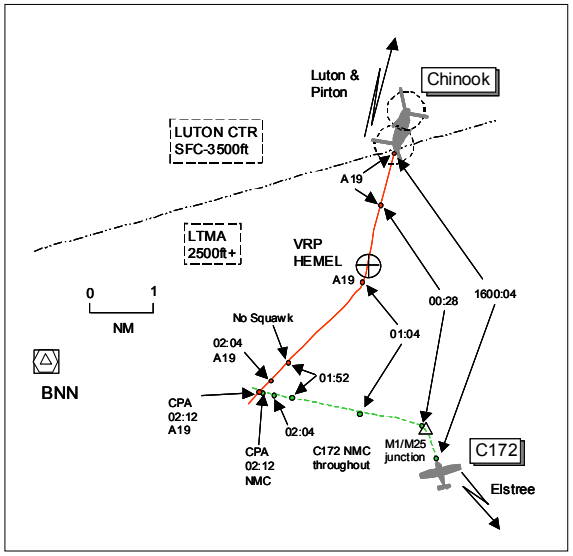
Cause: Tutor B pilot did not assimilate the TI and flew into conflict with Tutor A.

Degree of Risk: C.

AIRPROX REPORT No 081/06

AIRPROX REPORT NO 081/06

Date/Time:	25 May 1602	
Position:	5143N 00028W (3nm E BNN)	
Airspace:	FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C172	Chinook
Operator:	Civ Trg	JHC
Alt/FL:	2000ft	NK
	(QNH)	(NK)
Weather	VMC CLOC	VMC CLOC
Visibility:	>10km	>10nm
Reported Separation:		
	Nil V/100m H	Not seen
Recorded Separation:		
	<0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C172 PILOT reports flying a dual local IMC instructional sortie from Elstree, in communication with Elstree Radio on 122·4MHz and squawking 7000 with NMC. The visibility was >10km in VMC and the ac was coloured white/blue with anti-collision light switched on. After departing Elstree RW26, the student put on 'foggles' to simulate climbing into IMC whilst he, the instructor, took responsibility for lookout. They climbed to 2200ft, their target altitude, before reaching the M1/M25 road junction where they turned L onto heading 270°, into sun. The student carried out the FREADAMI checks whilst he continued to lookout, advising the student to 'do the checks' one at a time and after each one to 'fly the aeroplane' i.e. make sure the ac was still on heading and at the correct altitude. However, during these checks the student lost 200ft, whilst he, the instructor, continued to lookout particularly as they were approaching BNN VOR, a busy area of sky. As he scanned to his R, he noticed a green Chinook helicopter about 300-400ft away which was about to cross their path from R to L, heading 240° at the same level, 2000ft. The Chinook passed very close in front, about 100m ahead, and the student even saw the helicopter as it passed to their L. No avoiding action was taken as they would pass behind the helicopter and he assessed the risk as high.

The instructor expressed several concerns regarding the incident. He was keeping a good lookout as his was the only pair of eyes in the cockpit doing so, knowing this 'corridor' is extremely busy, having had one other 'near miss' 12 months previously; he could not explain why he had not seen the helicopter earlier. Also, he was aware that he should have given way but by the time he saw the helicopter there was no opportunity to turn and a L turn could have increased the danger. Even passing behind the helicopter, they did not feel any turbulence, which led him to believe that perhaps it was not so close as he recollected. He could not think of an effective way of ensuring a similar incident does not occur again. Consideration had been given to making an early call to Northolt for a FIS or RIS but, in this busy airspace, that can be a distraction too especially when instructing a student as well. Changing procedures at Elstree aerodrome would not have helped. The high wing configuration of the Cessna seems to pose particular problems for seeing other ac, even when flying straight and level. Although not germane to this Airprox, the pilot further opined on airspace congestion around Class D CAS in the area and implications for student training when requests for transit approval are denied.

THE CHINOOK PILOT reports flying from Cranwell to Odiham VFR in VMC squawking with Mode C. The visibility was >10nm in VMC and the helicopter was coloured green with nav, two landing lights and white strobes all switched on. He was unaware of being involved in an Airprox but was apprised of the situation when traced by RAC Mil. At the time and position reported, he had just completed a PIRTON to HEMEL crossing of the Luton CTR and was routeing to pass between the London CTR and Booker at 130kt flying into sun. He may have been working Luton on 129·55MHz under a FIS, post zone crossing. None of the crew saw the reporting ac.

UKAB Note (1): The Chinook pilot was detached on exercise and completed the Airprox Report form over 1 month post incident.

ATSI comments that the Luton RT tape had already been released back into service before it could be transcribed.

UKAB Note (2): Analysis of the Heathrow radar recording reveals at 1600:04 a 7000 squawk with NMC, believed to be the C172, 3·4nm NW of Elstree tracking 345° with a G/S of 90kt. Simultaneously, the Chinook is seen squawking 4670, a Luton discrete code, leaving the Luton CTR 1·9nm NNE of Hemel VRP tracking 195° at altitude 1900ft QNH 1018mb with a G/S of 130kt. The subject ac are 5nm apart. The C172 is seen to commence a L turn 24sec later over the M1/M25 road junction before steadying on a track of 280° shortly afterwards, with the Chinook now 3·6nm to its NNW. Just over 30sec later at 1601:04 the Chinook turns R after passing the Hemel VRP onto a 225° track which converges with the C172 2·1nm to its S. The subject ac continue on steady tracks until the CPA occurs at 1602:12 as the Chinook, indicating altitude 1900ft, passes <0·1nm immediately ahead of the C172. However, apparent at 1601:52, 20sec prior to the CPA, the Chinook squawk disappears completely for 3 sweeps before showing a 0000 label at 1602:04 at 1900ft altitude before changing again 8secs later at the CPA, to 7000. This indicates that the Chinook crew were probably terminating their ATS with Luton before changing to their en-route frequency immediately prior to the Airprox.

JHC notes that the Chinook crew were unaware of the Airprox until after the flight. Whilst it was the Cessna pilot's responsibility to give way, this incident serves as a good reminder to all crews that when flying in known choke points/busy airspace, a good lookout is essential at all times. JHC HQ notes the delay in staffing this Airprox and will remind units to give this action a high priority. Details from the Luton RT tape may well have increased our understanding of this incident. Without such a transcript, it would be wrong to assume that the Chinook crew were in the process of transferring ATS at the time of the Airprox. Nevertheless, the Chinook SOP is for crewmembers to call 'eyes-in' when changing frequencies/transponder settings, so that the other crewmembers can take-up the lookout.

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 C172 pilot's comments on the incident were noted and comprehensively discussed. A Member with specialist knowledge of operations at Northolt said that an ATS may have been available from Northolt if requested, even though it is a non-LARS ATSU. Pilot Members considered that the integration of this additional RT and flight information from ATC into the cockpit-training environment was something that instructors are expected to deal with during pilot training even though workload is increased. ATCO Members commented that within this busy piece of airspace, there were at least 4 ATSUs (Heathrow, Northolt, Luton and London FISO) that could be working traffic so that even whilst receiving a service from one ATSU there would probably still be several unknown ac in the area. The Cessna's high wing configuration is known for its potential to obscure other ac in certain circumstances but airmanship training to students should highlight this issue which can often be alleviated by lifting the ac's wing to scan for other ac which may be flying close-by whilst masked during the usual 'straight and level' cockpit viewpoint. Both crews had turned to fly into sun shortly before the Airprox but had ample opportunity to see each other's ac 'beam on' as they converged. The Chinook SOPs were sound for when a frequency or squawk change was required but, for whatever reason, the C172 passed by unnoticed. Although the Luton RT transcript was not available, under a FIS the Chinook crew could not have expected to be passed TI on conflicting traffic. As this Airprox occurred in Class G airspace, 'see and avoid' prevailed as the primary means of ensuring safe separation. As was seen in this case, this had not worked which led Members to agree that the cause was a non-sighting by the Chinook crew and a late sighting by the C172 pilot.

The radar recording shows that for just over 1min prior to the CPA, the subject ac were converging almost on a line of constant bearing. This can make visual acquisition harder as the other ac appears as a stationary object (no relative movement across the scanned area) when viewed from the other cockpit. Fortunately the C172 pilot saw the Chinook, late to his R and close-by, and after assessing that they would pass behind it, watched the helicopter as it quickly crossed 100m ahead from R to L at the same level. Although the actual flight paths flown had meant that the subject ac were not going to collide, the C172 had passed the Chinook in very close proximity, unsighted by its crew, to such an extent that the Board agreed that safety had not be assured during the encounter.

AIRPROX REPORT No 081/06

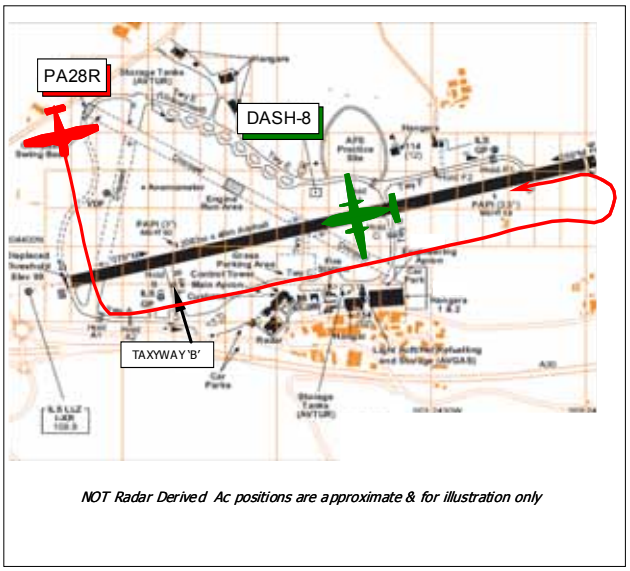
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Chinook crew and a late sighting by the C172 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 083/06

Date/Time:	22 Jun 1222	
Position:	5044N 00324W (RW26 Exeter Airport - elev 102ft)	
Airspace:	Exeter ATZ	(Class: G
	Reporting Ac	*Reported Ac*
Type:	DHC Dash-8	PA28R
Operator:	CAT	Civ Trg
Alt/FL:	Nil ft (aal)	400-500ft (aal)
Weather Visibility:	VMC CLBC 10nm+	VMC NR 10km
Reported Separation:	300ft V/50ft or less H	4-500ft V/½nm H
Recorded Separation:	Not recorded	



NOT Radar Derived Ac positions are approximate & for illustration only

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC DASH 8-400 PILOT reports they were just completing the landing roll on RW26 at Exeter in good VMC, whilst in communication with Exeter TOWER on 119·8MHz. As he decelerated through 100kt to slow his ac to taxying speed, a low-wing single-engine white ac – the PA28R - overflew his ac on a reciprocal heading some 50ft or less to port, whilst waggling its wings and about 300ft above his Dash 8. The other ac overflew them and the commercial apron in a L turn from the landing direction (RW26) and then manoeuvred to the S of the airport before landing. He assessed the risk as *"minimal"* but *"high"* if they had to complete a low go-around – or were a base training ac on a touch & go exercise. ATC was informed on RT when the light ac was sighted initially.

THE PA28R PILOT reports his ac is coloured white and he was airborne on a local flight from his base at Exeter. At about 25nm range from the airport, his ac suffered a small electrical wire burn, which resulted in a total electrical failure, so he elected to return to his base at Exeter Airport. Without any RT or an operational SSR transponder, he returned to Exeter VFR from N of the Airport in VMC with a flight visibility of 10km. At a range of 5nm he observed that RW26 was in use because a Dash 8 was approaching to land. He remained N of the runway and 'go-around' flight path until after the Dash 8 had landed on RW26 and it was more than halfway along the runway almost at taxying speed. Crossing ½nm ahead of the Dash 8, whilst overflying the RW08 threshold heading S at about 4-500ft aal, he turned L downwind for RW26 and flew past the Tower heading 090° at 100kt rocking his ac's wings to indicate his emergency of a total electrical failure. Turning inbound to overfly the aerodrome, by this stage the Dash 8 was taxying in on TAXIWAY BRAVO towards the apron. A sharp L turn was executed DOWNWIND again in front of the Control Tower at the intersection of RW26 and the disused RW. His undercarriage had been lowered using the emergency system and he was hoping that the ADC might be able see whether it had lowered successfully – thinking [erroneously] that any green lamp signal from the Tower might also indicate that it appeared 'DOWN' to the ADC. On receipt of a green lamp-signal from the Tower he landed his ac on RW26.

In his opinion, there was no degradation of safety since he had taken into account the 'flight-phase' of the Dash 8, which had already landed and was on the ground when he overflew the upwind threshold. He stressed in a subsequent telephone call that he was aware that the slow speed of the Dash 8 and its position on the runway would preclude any 'go-around' when he crossed the upwind threshold.

UKAB Note (1): The UK AIP at AD 2-EGTE-1-7 notifies the Exeter ATZ as a radius of 2nm centred on RW08/26, extending from the surface to 2000ft above the aerodrome elevation of 102ft amsl.

UKAB Note (2): The UK AIP at ENR 1.1.3 - GENERAL FLIGHT PROCEDURES specifies at 3.2.3.1 that a VFR flight experiencing communication failure shall:

When VMC can be maintained, the pilot should set transponder on Mode A, Code 7600 with Mode C and land at the nearest suitable aerodrome. Pilots should take account of visual landing aids and keep watch for instructions as may be issued by visual signals from the ground. The pilot should report arrival to the appropriate ATC unit as soon as possible.

THE EXETER AERODROME CONTROLLER (ADC) reports that at about 1222, he observed an unknown light ac over the upwind end of the runway in use - RW26. The ac flew eastbound down the runway at approx 300-400' rocking its wings, and over the DASH 8 that had just landed. The unknown ac then lowered its undercarriage before making a R turn, followed by a L turn and flew down, or close to, the runway heading W. Near the end it turned L into the Cct. The ac was given a green Aldis light and blind transmissions were made to the PA28's pilot on RT. The ac landed on RW26 at 1228.

UKAB Note (3): The Exeter RTF transcript gives only 30sec and 1min time injects.

ATSI reports that neither the ADC or APR Controllers were aware that the P28R had entered the Exeter ATZ until the pilot of the Dash 8 reported just after 1222 and after landing, *"Tower are you visual with the aircraft just flying over the airfield".* The APR confirmed he had not seen the P28R approach the airport. Just prior to the Dash 8 arriving, another flight had departed to the N and was warned about a number of ac to the N of Exeter Airport showing on primary radar only. These were believed to be possibly gliders as North Hill was active. It is not known whether the P28R was one of these returns.

Although the VCR faces N towards the approach routeing of the P28R, the ADC had not noticed its approach. He was busy controlling the arriving Dash 8 on RW26 at the time. On being made aware, he gave the P28R a green Aldis light signal and it landed on RW26.

UKAB Note (4): The RT transcript reveals that just before 1222:30, TOWER instructed the Dash 8 crew to *"…vacate on Taxy*[way] *bravo…"*. At 1224, TOWER advised the Dash 8 crew that the PA28R was *"..coming back again for a low pass"*, to which the Dash 8 pilot advised that the PA28R was *"waggling his wings"*. After the Dash 8 crew advised TOWER of the ac's registration the ADC added, *"..he's downwind it looks like he's* [- the PA28R -] *gonna land".* At 1226:30, Tower transmitted blind on RT "[PA28R C/S] *Exeter if your read me you're clear to land runway 2-6…".*

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 a report from the appropriate ATC authority.

To the GA pilot Members present it seemed that the PA28R pilot had acted appropriately when he returned to Exeter after having suffered a total electrics failure. It was clear from his account that he had foreseen the potential for conflict with other aerodrome traffic; had spotted the Dash 8 whilst it was approaching to land and had, he believed, taken appropriate measures to keep safely out of its way. Whilst the PA28R pilot had judged there was no likelihood of any 'go-around' by the Dash 8, a CAT pilot Member observed that the PA28R pilot still crossed through the RW26 climb-out unnecessarily and contrary to the established traffic flow. CAT pilot Members considered whether the PA28R pilot might have flown a more conventional cct by joining on R base before overflying the RW, thereby remaining on the DEADSIDE for the initial fly-through of the cct area. However, some thought it might have denied the controller clear sight of the aeroplane and controller Members thought that the PA28R pilot probably wanted to land his aeroplane with the minimum of delay. The tight pattern flown evidently got the Dash 8 crew's attention before the controller spotted the PA28R as it passed over the upwind threshold, but it was clear that the PA28R pilot's aim of drawing the controller's attention to his ac was achieved and subsequently drew the desired response with an Aldis lamp signal from the Tower. Whilst others might have flown wider downwind in conformity with the traffic flow on RW26, it was clear that the PA28R was indeed completely aware of what the Dash 8 was doing and had taken account of it whilst dealing both with his emergency and setting himself up to land. In assessing 'cause' and the 'risk' of collision, the Board only ever considers what actually occurred, not what might have happened in different circumstances. It was clear to the Members from the Dash 8 pilot's report that there was no intention whatsoever to roll for a 'touch & go' neither did a 'go-around' evidently occur. In the Board's view, therefore, this report was a sighting report by the Dash 8 pilot of emergency traffic joining the cct where there was no risk of a collision whatsoever. However, it was important to point-out that the

PA28R pilot's perception that a lamp signal from a Tower at a civilian aerodrome might also indicate that his undercarriage appeared 'DOWN' to the ADC was an erroneous assumption.

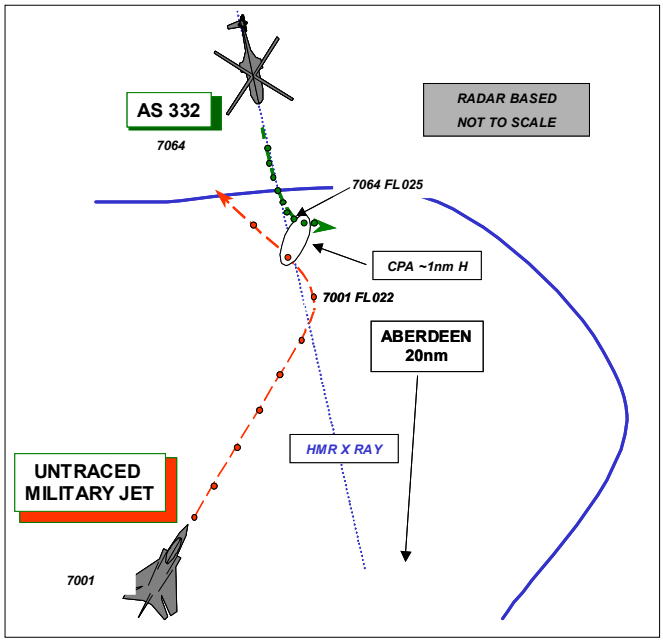
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 084/06

Date/Time:	20 Jun 1345	
Position:	5737N 00230W (2nm S Banff)	
Airspace:	Scottish FIR (HMR X-RAY)	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	AS332L2	Untraced Reported as Tornado GR4
Operator:	CAT	NR
Alt/FL:	2000ft (QNH 1001 mb)	NR
Weather	VMC CLBC	NR
Visibility:	>10km	NR
Reported Separation:	0 V / >1nm H	NR
Recorded Separation:	NR V / > 1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS332 PILOT reports flying a non-scheduled passenger flight from an Oil Rig to Aberdeen with all available lights on, heading 160° along HMR X-RAY at 2000ft on the Aberdeen QNH and at 140kt. He was squawking as directed and in receipt of a FIS from Aberdeen Radar when pop-up military traffic was reported by ATC in their 1 o'clock position at 3nm and he became visual with it in the reported position at about 2nm. The other ac commenced a steep climbing left hand turn and passed up through their level at less than 1nm, before descending away to the W. Immediately after they became visual they commenced a 30° turn left to avoid the ac that they identified as a Tornado GR4. He assessed the risk as being moderate.

UKAB Note (1): Despite extensive tracing action the ac reported as a Tornado was not traced. On the day in question there was a large military exercise that was the subject of NOTAM H1310/06. The Exercise control agency reported however, that there was no exercise activity at or near the reported position and time. In addition, they stated that all exercise participants would have been squawking an exercise squawk [See UKAB Note (2)]. The RAC then contacted the crews of all British Tornados booked into LFA14 and none were in the area at the time. Due to the nil response, the pilots of all other ac booked into LFA 14 (Harriers and Hawks) were contacted and all Tornado F3 units, again with a nil response. Since this action again failed to identify the military ac involved, the Ops Staff at RAF Lossiemouth carried out a second and completely independent check of all their ac airborne at the time but the result confirmed their previous nil response. At the time there were 4 non-British GR Tornados operating from Lossiemouth. Two were not airborne at the time of the Airprox and although the other two were not booked into the LFS, their base was contacted and cooperated with the enquiry but reported that both their ac were over 20nm further N (over the sea) at the time.

UKAB Note (2): An in-depth analysis of both the ScATCC and locally recorded Aberdeen Radar was conducted. A contact squawking 7001 with Mode C can be seen transiting towards the incident position from the S at heights seeming to be about 1000ft agl while the helicopter is seen transiting SE bound at FL026. As the helicopter crosses the coast it descends slightly while the 7001 contact climbs then turns hard left passing through the helicopter's 12 o'clock about 1nm away. The last indicated level of the 7001 contact was FL022 (probably climbing) before it disappeared while the helicopter was at FL025. The 7001's Mode C reappeared a short time after the contacts pass showing FL017 with the helicopter at FL026. The 7001 contact then disappears apparently heading W descending.

THE ABERDEEN RADAR CONTROLLER reports he had taken over the INT/FIN position from a trainee controller and his mentor and that he was monitoring the AS332 helicopter. The subject ac was identified but placed on a FIS because of poor radar coverage due to its position, inbound from the N for a VFR recovery.

As he scanned the radar, he noticed a fast moving contact appear to the S of the helicopter by about 5nm, heading toward it at a similar level. He immediately passed TI to the helicopter and the pilot reported that he was visual with the other ac. As the fast jet entered the helicopter's 12 o'clock position at about 1nm, the pilot of the helicopter informed him that he was turning left to avoid it and the controller acknowledged this. The fast jet then made a turn to the left and was approximately 400ft below the helicopter with the radar returns almost merging. Once the fast jet was observed about 3nm away from the helicopter and continuing away from it in a W direction, he informed the helicopter pilot who resumed course for Aberdeen.

ATSI concurred the Aberdeen Controller's recollection of events and added that although there were 2 radars available to the INT Controller he was using the Perwinnes radar in accordance with SOPs. The other radar was giving very marginally better performance regarding the 7001 squawk involved but in the event this had no significance in terms of controller performance. The INT Controller gave accurate and timely TI to the helicopter pilot regarding the 7001 contact following which the pilot immediately advised that he was visual.

The helicopter crew did not report the Airprox on RT and it was not until 2 days later that the Unit was advised that an Airprox had been filed.

Both ac were operating in Class G airspace where the 'see and avoid' principle applies. The TI provided by the controller enabled the helicopter pilot to see and avoid the other ac and the ATC actions exceeded those required by MATS Part 1 for the service being provided

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the AS332 pilot, transcripts of the relevant RT frequencies, a video recording, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Although there was considerable discussion and some speculation regarding the identity of the military ac, the Board unanimously accepted that, notwithstanding the AS332 pilot identifying it as a Tornado GR, it should be recorded formally as an 'unidentified military jet' since all known British and Foreign Tornados had been eliminated from the inquiry.

In the absence of a report from the pilot of the untraced jet, some of the Board's discussion was necessarily informed speculation. It was however apparent that the Aberdeen Controller had done well to identify the approaching fast jet as early as practicable; determine that it may come into conflict with the helicopter on the HMR to the N and inform the pilot accordingly thus enabling him to see the jet and commence an effective avoidance manoeuvre. In the prevailing circumstances, the Board determined that this had all taken place as early as had been reasonably possible. Based on the AS332 pilot's report and the radar recording, the Board thought that the jet pilot had most likely also seen the helicopter and reacted to it but, in the absence of a report from the jet pilot, this could not be verified. Although they suspected that the avoidance might have been slightly later than optimum, Members had no way of knowing and therefore concluded that the incident had been a conflict in Class G airspace. Again, although it was difficult to determine with any degree of certainty, Members considered that there had been no risk that the ac would have collided.

PART C: ASSESSMENT OF CAUSE AND RISK

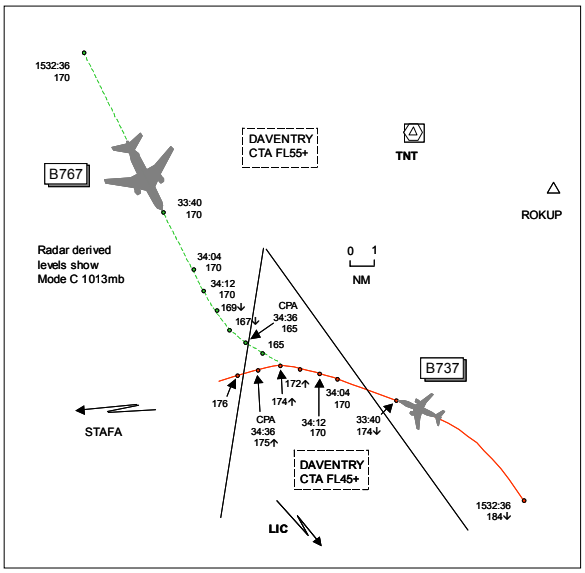
Cause: Conflict on HMR X-RAY resolved by the AS332 crew and apparently by the jet pilot.

Degree of Risk: C.

AIRPROX REPORT No 085/06

AIRPROX REPORT NO 085/06

Date/Time:	26 Jun 1534	
Position:	5254N 00151W (10nm NW LIC NDB)	
Airspace:	Daventry CTA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B767-300	B737-700
Operator:	CAT	CAT
Alt/FL:	FL170	FL165↓
Weather	IMC KLWD	NK NR
Visibility:		NR
Reported Separation:		
	800ft V	NR
Recorded Separation:		
	Nil V/5·6nm H OR 1000ft V/1·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B767 PILOT reports heading 155° at 300kt en route to Luton IFR and in receipt of a RCS from London, he thought, on 134·42MHz squawking 4377 with Mode C. Whilst N of PEDIG at FL170 in IMC, he observed traffic on TCAS 15nm ahead flying in the opposite direction 800ft above but descending slowly and levelling at his level. ATC were very busy but he reported the traffic and ATC issued avoiding action to the B737 flight and then to them, both ac to turn L. Simultaneously they received a TCAS RA 'descend' with which they complied whilst turning onto the given heading of 120°. The traffic was not seen visually but TCAS indicated that the traffic passed 800ft above. He assessed the risk as high.

THE B737 PILOT reports en route to Liverpool IFR. Descending at 280kt through FL165, he thought, for FL160, they received a TCAS TA alert on traffic in their 12 o'clock range 6nm at the same level. The opposing traffic, the B767, alerted ATC who gave them, the B737 flight, a L turn onto heading 210° and then gave avoiding action to the B767. At this point, TCAS gave an RA 'climb' and the guidance was followed whilst continuing the turn. 'Clear of conflict' was received as they climbed through FL173 so they re-established their descent to FL160. Calls were made to ATC and manoeuvres were flown in accordance with SOPs. The conflicting traffic was heard to report a TCAS descent.

THE MACC SE RADAR CONTROLLER reports the RT loading was moderate and the traffic situation complex. The B737 flight called on handover on a radar heading of 325° descending to FL200 and was given descent to FL180. A few minutes later the B767 flight called approaching MCT at FL170 and it was told to route MCT-CLIPY and to make that a radar heading. The B737 flight was then cleared to FL160 and as it approached East Midlands was then told to route to KEGUN. A few minutes later STCA alerted him to the potential confliction: the B737 was seen to be maintaining FL170 on a direct track towards the B767 with separation at 7·3nm. Avoiding action was given to the B737 flight to turn L onto 220° and then the B767 flight was told to turn L onto heading 120°. This was not acknowledged, he thought, so the call was repeated with avoiding action. The B737 crew reported a TCAS climb followed by the B767 calling with a TCAS descent.

ATSI reports that the controller described his workload as moderate but added that the traffic situation in the sector was complex. He had been in position, as the bandboxed SE Sector Radar Controller, for 1hr 10min. He had been aware that the Tactical Traffic Manager (TTM) had discussed the traffic situation with the Coordinator and it was not considered necessary to split the sector. Local investigations reveal that the Watch Manager and the TTM had checked the proposed traffic flow for the SE Sector at the start of the shift. Although it was forecast to be busy between 1515-1530, it was shown to decrease from 1530-1540, before reducing significantly. The TTM continued to monitor the flow and checked with the sector controllers whether it was considered necessary to split the sector. The TTM assessed that, due to the traffic split, most of the flights would have been on one sector i.e. Stafa and a

split would not have been beneficial. NB. See last paragraph below for MACC procedures for splitting/bandboxing sectors.

The B767 flight established communication with the MACC SE Sector, at 1528, reporting at FL170. The flight, outbound from Doncaster, was instructed to route Manchester (MCT) to CLIPY, which the pilot acknowledged. The B737 flight, inbound to Liverpool, made its initial call on the frequency one minute later, routeing N'bound towards TRENT, descending to FL200. The pilot was instructed to turn L 10° (heading 325°) and shortly afterwards to descend to FL180. The controller commented that this descent was not to ensure separation from the B767 but from other sector traffic. At 1530:50, the B767 flight was instructed to continue its *"present heading"*, resulting in it transiting through the centre of the sector, S'bound towards LIC.

At 1531:50, the SE Radar Controller instructed the B737 to descend to FL160. At the time, the subject ac were 34·5nm apart, on reciprocal tracks, the B737 was passing FL191. Some 40sec later (1532:36), when the two ac were 26nm apart, the B737 was routed direct to KEGUN. This placed it behind a S'bound Manchester departure and for the standard arrival gate for Liverpool inbounds. However, this action resulted in the ac turning towards the track of the B767, without vertical separation being assured. The controller commented that he had overlooked the presence of the B767 at the time. He explained that, normally, Doncaster flights, en route to mainland Europe, are climbed into Sector 29 airspace but because its destination was Luton the B767 remained at low level. It was possible, therefore, that he had mentally dismissed this ac as traffic to his sector, especially as he did not need to change its level whilst on his frequency. Additionally, the potential confliction was not immediately obvious from the fps display board, as fpss for both ac were only displayed in the LH bay under the STAFA designator and would not have been displayed adjacently. Unlike the B737, no fps for the B767 was produced for the LIC/ROKUP designator, which is situated in the central bay, although the ac routes via LIC, not STAFA.

The controller said that, for the next 40sec, he became distracted by another flight calling on the wrong frequency. He commented that it is not unusual for flights intending to contact LTCC in the Clacton area to transmit on the MACC SE Sector frequency (135·425/134·425 respectively). Accordingly, he tried to establish its position by increasing the range of his radar display to cover the Clacton area. During this period he was distracted from monitoring the progress of the subject ac and, consequently, was still unaware that they were on conflicting tracks. The Coordinator was busy carrying out his own tasks, including establishing the position of the ac on the wrong frequency and, therefore, was also not aware of the developing situation.

As soon as the 'wrong' flight was transferred back to its original frequency, the pilot of the B767 transmitted *"er B767 c/s we have traffic same level opposite direction"*. The controller said that, at the same time, STCA activated with a high severity alert. The radar recording at 1533:40 reveals that the subject ac were on conflicting tracks, 11·8nm apart. The B767 is still maintaining FL170 and the B737 is passing FL174. The controller said that he first decided to issue an 'avoiding action' L turn heading 220° to the B737 flight (1533:50) probably because it was already in a turn. He then instructed the B767 flight to turn L heading 120°. After its pilot read back the instruction, the controller repeated the call, adding the term avoiding action. This time the pilot responded *"B767 c/s TCAS descent now"*. He reiterated the L turn heading 220° instruction to the B737, the pilot reporting *"left heading two two zero B737 c/s TCAS climbing now"*. The radar recordings reveal that, at 1534:04, both ac were at FL170, 7·1nm apart and 8sec later separated by 5·6nm. Thereafter, as the horizontal distance decreases, the vertical separation increases as the B767 descends and the B737 climbs in accordance with their respective RAs. By the time the subject ac were 2·6nm apart (1534:28), vertical separation had increased to 700ft and standard vertical separation was restored at 1534:36, when the distance between them was 1·2nm. (The required radar horizontal separation was 5nm.) The controller commented that when STCA activated, a number of his colleagues shouted warnings across the Control Room. Whilst appreciating the well intended assistance, he found that the calls were somewhat distracting.

As referred to in the first paragraph, the following are the relevant procedures for the splitting/bandboxing of MACC sectors. They were published in a Supplementary Instruction (524/06), effective 24 April 2006. *'It is the responsibility of the TTM, to determine, by use of the TLPD (Traffic Load Prediction Device) and enhanced tactical flow management system, the periods during which ACC sectors are to be split or band boxed, taking into account availability of staff and predicted traffic levels'*. It also states that the Radar and Coordinator Controllers *'shall not retain the right to keep a sector band boxed'*. It still allows controllers to request a sector to be split if they consider it necessary.

AIRPROX REPORT No 085/06

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.

Pilot Members applauded the good situational awareness displayed by the B767 crew and commended their actions in alerting ATC to the potential confliction. ATCO Members were surprised that both the RC and the Coordinator had together searched for the 'rogue' ac that called on their frequency at a crucial time. It was thought that better utilisation of TRM could have tasked one controller to deal with the searching element for the ac or alternatively perhaps the flight could have been instructed to return to its previously assigned frequency. Conversely, worthy of note was the good TRM shown by the TTM and Watch Manager, with a good thought process and eventual outcome to the Sector traffic management, following the decision not to split the Sector which showed no traffic overload as predicted.

The B767 was flying at a lower than usual level, owing to its short sector length to Luton, entering and exiting the SE Radar Sector without any need to alter its level, and this may have indeed influenced his plan of action when the RC overlooked the B767's presence. The NATS Advisor commented that there was a fps issue on the Sector, as highlighted by the ATSI investigation, but the potential confliction should have been revealed from a visual scan of traffic on the radar display. However, for whatever reason, the MACC SE RC routed the B737 towards the B767 without ensuring vertical separation and this had caused the Airprox.

Members noted the RC's comments that he found his colleagues shouted warnings distracting when STCA activated. The good intent of other controllers in these circumstances was understandable but to some controllers actually in the 'hot seat' at the time trying to resolve a confliction, it could easily disturb their thought process. However, as shown on previous Airprox, these warnings can be more beneficial rather than detrimental particularly when the controller has not noticed a potential incident and the aural warning has drawn his attention to a traffic situation, sometimes prior to the STCA safety net activating.

The SE RC reacted to the warning given by the B767 crew of the deteriorating situation, simultaneously with STCA activating and issued L turns to both flights. With hindsight, ATCO Members thought that perhaps a R turn to both may have been a better resolution to the incident as the B737 appears to have steadied on course when the turn instruction was issued or alternatively issued climb or descent clearances to either or both flights to resolve the conflict in the vertical plane. That said, the L turn seemed the best option to the RC at the time. Fortunately, the B767 crew had seen the approaching B737 before any alerts or warnings were received and told the SE RC. The avoiding action turns issued to both flights coincided with coordinated RA commands to both flights, the B767 to descend and the B737 to climb. These TCAS commands were promptly executed with both crews also turning L. These combined actions were enough to allow the Board to conclude that any risk of collision had been quickly and effectively removed.

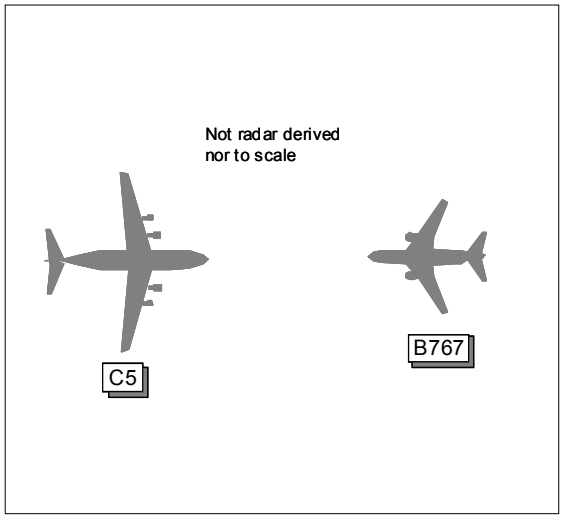
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The MACC SE RC routed the B737 towards the B767 without ensuring vertical separation.

Degree of Risk: C.

AIRPROX REPORT NO 086/06

Date/Time:	29 Jun 0709	
Position:	5005N 02720W (Mid Atlantic)	
Airspace:	Shanwick OCA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B767-300	C5
Operator:	CAT	Foreign Mil
Alt/FL:	FL300	FL310
Weather Visibility:	VMC CAVOK	VMC NR
Reported Separation:	400-600ft V	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B767 PILOT reports en route to the USA heading 270° at 450kt and FL300 and in communication with Shanwick squawking with Mode C. At about 0655 he, the Captain, went on a break and another pilot took command. At 0703, the co-pilot told him there was approaching traffic at 12 o'clock and 20nm, 1000ft above, of which – having his camera to hand - he may want to take a picture. At approximately 0704 and position 5005N 02720W they received a TCAS TA on the traffic as it approached the 10nm arc on the TCAS display indicating the ac to be 500ft above. This was followed shortly thereafter by an RA 'descend', commanding a 1500fpm ROD. The A/P was disconnected and a descent was commenced but the RA descent then increased to 2500fpm which was followed until an altitude of 28500ft was reached at which point the opposite direction traffic passed directly O/H 400ft above, showing 28900ft on the display. The TCAS aural alerts/warnings had annunciated 'traffic, descend' followed by 'increase descent'. Since he had his camera out he took a picture to identify the ac which was seen as a high wing 4 engined military ac. They informed Shanwick ATC of a 'near miss' and climbed back to their assigned level of FL300.

THE C5 PILOT reports heading 090° at M0·77 and FL310 en route to Germany and in communication with Shanwick squawking 2000 with Mode C. The flight had departed the USA at 0235UTC and all system checks, engine start, take-off, climb, cruise, coast-out and oceanic procedures were accomplished with no problems/ malfunctions noted. ATC did not note any problems with the IFF Mode C altitude reporting before coasting out. Before the Airprox occurred with the subject B767 a TCAS RA manoeuvre was flown against traffic (a DC10 not the subject B767) shortly after passing 30W, about 50N 29W, at FL310. This initially started when a TA occurred with the annunciation of 'traffic'. The PNF toggled TCAS range down whilst the PF and Flight Engineer (FE) attempted to visually acquire the target, without success. The TCAS showed the target at 12 o'clock 3-4nm away –500ft and climbing. As the TA altitude display changed to –300ft and then –200ft and closing, an RA was received and announced 'climb'. The PF disconnected the A/P and initiated a climb, following the RA guidance, during which the RA sounded a single 'increase climb'. At approximately FL328 TCAS annunciated 'monitor v/s' and then 'clear of conflict' after which the PF descended back down to FL310 and re-engaged the A/P. The PNF contacted Shanwick on HF Primary frequency and told them of the TCAS RA that had just occurred. Attempts to contact the other flight on VHF 121·5MHz and 123·45MHz were unsuccessful. Approximately 10-12min after this initial incident, another TA alert was received with traffic, the B767, showing 12 o'clock 4-5nm ahead and 500ft below. The crew were initially unable to visually acquire the target but confirmed that their ac was established at FL310. Again, shortly after this TA an RA 'climb' was received so the PF disconnected the A/P and followed the RA guidance until approximately FL325 when 'clear of conflict' was announced. Meanwhile the crew visually acquired the other ac as it passed below going in the opposite direction. The PF descended back to FL310 and the crew contacted Shanwick to inform them that another TCAS RA had been received. The crew of the other ac, the B767, were heard to inform Shanwick that while they were flying at FL300 they had to descend to FL285 to follow their RA. Suspecting a problem with their ac's TCAS equipment, they offset their course by 2nm and requested Shanwick to keep oncoming traffic clear while the crew continued to investigate the problem. Shanwick issued

the C5 with a revised routeing and advised the crew that TCAS should be turned off, which they did by switching the TCAS to standby and then continued with their investigation. Whilst coasting-in at FL310 the crew contacted Shannon on VHF and informed them of the situation. Shannon issued a Mode 3 code, announced radar contact and informed them that the ac's Mode C was reporting FL305. The crew selected the Central Air Data Computer (CADC) select switch from AUTO to No 1 and queried Shannon who informed the crew that Mode C still showed FL305. The crew then switched the CADC Select switch to No 2 and Shannon informed them that Mode C had changed from FL305 to FL310 so the CADC was left in No 2 position. During the next 10min the crew queried ATC several times to confirm the indicated level of FL310 was displayed and all checks were positive. After more troubleshooting with ATC participation and concurrence it was determined that with the CADC switch in the No 2 position, the TCAS equipment displayed normally whilst ATC reported receiving correct Mode C altitude reporting. The flight continued without further incident to destination. The failing CADC No 1 was identified in the maintenance forms after landing and a removal/replacement of the CADC No 1 was performed.

THE C5 COMMAND reports that it was determined that coasting-out and oceanic procedures were followed correctly. The ac was operating with TCAS in TA/RA mode which was functioning properly according to the checks carried out and the on-board systems. After safely manoeuvring the flight following 2 RA warnings, the PF, PNF and FE had closely examined all altitude systems to confirm their cleared altitude of FL310. All altimeters were set to 29·92in and indicated exactly 31000ft including the standby Attitude Indicator (AI) with Rad Alt indicating 30600ft. All TCAS and IFF controls and indications were double-checked – no error codes, warnings or messages were revealed. The FE checked the MADAR (Malfunction Detection, Analysis and Recording) for any TCAS, IFF or CADC malfunctions but none were found. After coasting-in the crew coordinated with Shannon to help troubleshoot the ac's altitude reporting problem which was deduced to be the No 1 CADC. The ac commander asked ATC to confirm altitudes and locations of ac in the area and he confirmed that the TCAS displayed those targets correctly. Later, when all targets were well clear, the ac commander received permission from ATC to try the No 1 CADC again which displayed TCAS targets at incorrect altitudes such as +1500 instead of +1000 etc and ATC reported that Mode C was reporting 500ft low. A previous tech log entry for the ac concerning Mode C altitude reporting, dated 3 days prior to the subject flight, stated *"ATC was unable to receive Mode C, all onboard checks OK"*. Maintenance corrective action was *"recycled system power, MOC (maintenance ops check) good"* and the ac was signed off. Based on all the indications received by the flight crew during the incident flight, all actions taken by them were in accordance with applicable directives and procedures. Post incident flight, ground technicians replaced the No 1 CADC and completed operational system checks since when everything has operated normally with there being no recurrence of the problem.

THE SHANWICK EN-ROUTE CONTROLLER reports at time 0709 the B767 crew reported *"a near miss with traffic in the opposite direction. We had a TCAS Alert and Resolution. Traffic opposite direction at FL300. We descended to FL285, again maintaining FL300"*. At time 0715, the C5 crew reported *"we have had a second TCAS Alert and Resolution at position 5005N02712W. We had to climb. Opposite direction traffic at FL300. Request to know have you opposite direction traffic, maybe our TCAS is not fully functional? Do you wish us to turn it off now?"* The C5 was rerouted 51N020W DINIM GIPER to establish lateral separation against other potential W'bound traffic at FL300 and also routeing via 50N020W. The C5 flight was asked to confirm FL and altimeter pressure setting to which the crew replied *"FL310 our altimeter shows 2992 and Radar Altimeter shows FL305 so looking pretty good"*. After lateral separation was assured the C5 flight reported *"We suspect our TCAS is malfunctioning and switched it off"*. When the C5 reached DINIM Shannon advised that Mode C showed the C5 at FL305. The B767 flight later reported "*At 5005N02720W/0704 near-miss with opposite direction ac TCAS alarm. We dove to FL285, it showed ac as close as 400ft"*.

ATSI comments that the C5 was E'bound across the Ocean at FL310 whilst the DC10 and B767 were both W'bound at FL300. At 0702, the C5 crew reported that soon after passing 30°W they had received a TCAS RA climb. At 0709, the DC10 crew reported a TCAS alarm. At the same time the B767 crew reported a 'near miss' with opposite direction traffic resulting in them following a TCAS RA descent. The C5 crew were issued with a revised routeing by Shanwick and on entering radar cover were advised by Shannon that their Mode C was indicating FL305. The crew checked their altimeters and confirmed they were maintaining FL310. They then selected the CADC from 'auto' to 'No. 1' and, on checking with Shannon, were informed that the Mode C was still showing FL305. They then selected CADC 'No. 2' and the Mode C changed to FL310. Over the next 10 to 15 minutes they checked with ATC and confirmed that the Mode C was still indicating FL310.

It would therefore appear that the C5 was maintaining FL310 whilst within oceanic airspace and the TCAS alerts were caused by incorrect data from the No. 1 CADC. Standard separation appears to have been maintained throughout and no ATC errors have been disclosed.

UKAB Note (1): The Met Office archive provided a surface pressure for 5005N 02720W at 0600UTC as being approximately 1010mb.

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.

Members commended the full reports received from the C5 crew and their Command. Both subject acs' crews had acted promptly in response to TCAS TA alerts then RA warnings and followed the issued guidance whilst visually acquiring each other's ac. The C5 crew had acted appropriately when faced with 2 TCAS encounters during a short period, checking their systems using onboard diagnostic equipment (MADAR) which did not reveal any faults. After offsetting their track and then accepting a re-route from ScOACC, the cause of the problem (a faulty CADC) was revealed when Shannon radar reported erroneous Mode C reporting on the C5 whilst all other equipment had indicated that the ac was flying at its assigned level. These factors left Members in no doubt that at the time of the incident, the actual separation had been greater than that perceived 'in the heat of the moment'. The Board were therefore able to conclude the cause of this incident had been a TCAS RA triggered by a technical fault on the C5 and that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

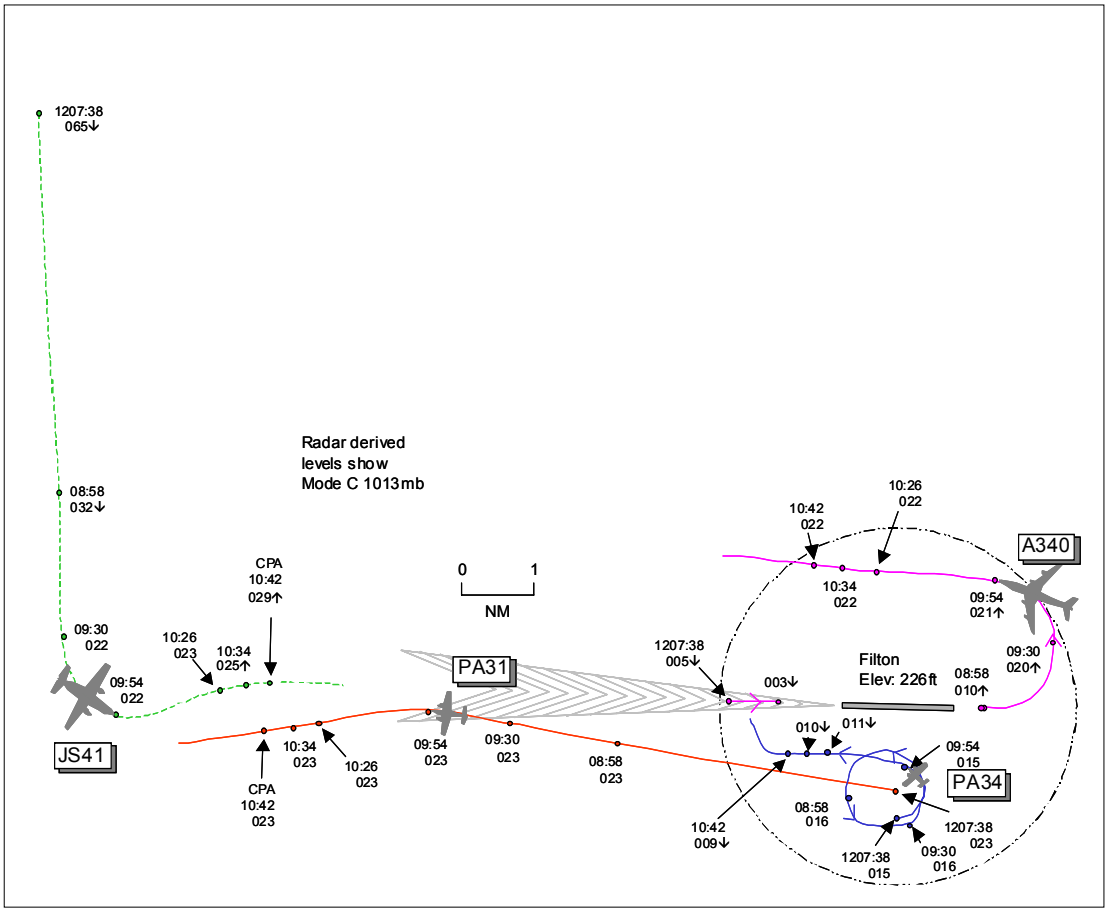
Cause: TCAS RA triggered by a technical fault on the C5.

Degree of Risk: C.

AIRPROX REPORT No 088/06

AIRPROX REPORT NO 088/06

Date/Time:	28 Jun 1211	
Position:	5131N 00249W (9nm W Filton - elev 226ft)	
Airspace:	LFIR	(Class: G)
Reporter:	Filton APR	
	First Ac	*Second Ac*
Type:	JS41	PA31
Operator:	Civ Comm	Civ Comm
Alt/FL:	2500ft (QNH 1021mb)	2500ft (QNH 1021mb)
Weather	IMC KLWD	VMC CLBC
Visibility:		>10km
Reported Separation:	NR	Not seen
Recorded Separation:	600ft V/0·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FILTON APR reports that the JS41 was inbound to Filton under a RAS being vectored for an ILS RW09 whilst the PA31 was a W'bound transit which he understood to be VFR at 2500ft. Other traffic included an A340 carrying out LH visual ccts, a PA34 conducting RH ccts with the Tower and a PA28 [not shown on the diagram] tracking S

VFR to pass under the RW09 approach at 1500ft. Owing to the A340's N'ly ccts at 2500ft, the PA31 was told to pass S of Filton and was offered a heading to achieve this but its pilot indicated that she could pass to the S by visual reference. The PA34 had to orbit to allow the A340's vortex wake to subside and TI was passed to both crews by coordination via APR-TWR. As the PA31 passed to the S of Filton, the JS41 was being vectored onto about a 10nm final descending to 2500ft, maintaining vertical separation from the S'bound PA28 at 1500ft and intending to pass 7nm W of Filton. He saw what he believed was the PA34, which had retained its 4250 squawk, late downwind RH fitting in behind the A340 so he told the JS41 crew that he would vector the flight through the ILS for spacing. At this point he realised that the W'bound ac was in fact the PA31 at 2500ft so he turned the JS41 straight onto the ILS and told the PA31 pilot to turn L 20°, hoping this would allow the PA31 to pass safely S of the JS41. TI was passed to both flights and the PA31 pilot was told to turn L 30° as it became obvious the 2 ac would pass quite close. The JS41 crew reported they were following a TCAS RA and climbing to 3000ft, the 2 ac passing each other with about 1-2nm horizontal separation but with very little vertical separation. The JS41 was subsequently vectored onto the ILS for a second time and the PA31 was transferred to Cardiff.

UKAB Note (1): Met Office archive data was not available for Filton. Bristol International METAR shows EGGD 281150Z 16007KT 130V210 9999 SCT017 SCT023 18/13 Q1020= and EGGD 281220Z 19007KT 150V230 9999 SCT023 18/12 Q1020=

THE JS41 PILOT reports flying IFR inbound to Filton at 160kt. Whilst in the mid-estuary of the Bristol Channel they were advised by Filton Radar to intercept the LLZ on a given radar heading. Previously the controller had told them that he was going to widen their flight out owing to cct traffic but he had then changed his mind and given them the intercept heading. The intercept heading given needed them to correct their heading in order to establish but once accomplished, at 2500ft flap 9 about 7-8nm out, they were alerted to a TCAS RA commanding a 'climb'. A max rate climb was actioned to approximately 3500ft on RW heading and ATC were advised of the manoeuvre who then issued vectors to reposition onto the ILS LLZ. The other ac was not seen visually. During this sequence the controller advised that he had mistaken cct traffic for transit traffic and had made an error.

THE PA31 PILOT reports flying VFR to Swansea at 165kt and in receipt of a RIS from Filton on 122·72MHZ squawking 4272 with Mode C. The visibility was >10km 1000ft below cloud in VMC whilst transiting the Filton ATZ. At the request of the controller she passed S of the RW – no distance was specified – as she believed that an A340 was doing LH ccts onto RW09. Once past the RW she was asked to turn L 10-20° which she complied with straight away. Shortly afterwards she was asked again to turn L another 10-20° and again this was actioned. She then heard another pilot on final 'going around' due to a TCAS RA. She did not see the other ac at all whilst following the ATC heading instructions. After landing at destination, she was told by Filton on the telephone that an Airprox had been filed.

ATSI reports that this Airprox occurred between a PA31 transiting S of Filton enroute Fairoaks to Swansea and a JS41 inbound to Filton from Hawarden and routing via CAS. The event occurred at 1210:30 approximately when the JS41 received a TCAS RA when establishing on the ILS LLZ for RW09 at Filton at 9·5nm range from touchdown.

The PA31 flight, operating VFR, made contact with Filton at 1203:30 'wearing' a Filton SSR squawk, which it is assumed was allocated by Filton during a prenote from Lyneham radar, and requested a RIS which was provided. Although a RIS was agreed following the request on first contact, the PA31 pilot was not told her ac was identified nor advised of her position. MATS Part 1, Chapter 5 Radar Operation, Para 8 Summary – Identification and Position Information, Sub Para 8.1 states: - *"As soon as a controller has identified an aircraft he is to inform the pilot, according to the circumstances;*

a) that his aircraft has been identified; and b) of the position of the aircraft."

After the PA31 pilot contacted Filton, the APR asked if radar vectors could be provided to ensure that Filton cct traffic was avoided. He further suggested that the alternative was for the PA31 to pass visually S of the airfield. At 1205 the PA31 pilot stated *"we can proceed visually to pass south of the airfield PA31 c/s"*. The JS41 flight established contact with Filton at 1205:30 and was given a radar heading for vectoring to the ILS RW09. A transfer of control was made to Filton in accordance with SOPs while the ac was in CAS; however the change to radar service was not specified at the time the JS41 left CAS.

At 1207:38 the radar recording shows the PA31 and one of the cct ac, a PA34, which was S of the airfield, pass very adjacent to each other and at this point the APR transposes SSR labels. This resulted in him assuming, as he vectored the JS41 towards the ILS, that the PA31 was an ac that would be staying in the vicinity of the cct.

[UKAB Note (1): The PA31 is seen at this time (1207:38) squawking 4272 1·2nm S of Filton tracking 280° at FL023 (2540ft QNH 1021mb) with the PA34 squawking 4250 in its 9 o'clock range 0·4nm in a LH orbit turning through heading 090° at FL015. The A340 is also seen squawking 2305 about 2nm final for RW09 descending through FL005 (740ft QNH) with the JS41 14·5nm NW of Filton tracking 170° descending through FL065. The A340 is seen for 2 further sweeps before fading when descending through FL003 (540ft QNH) reappearing at 1208:58 1·2nm E of Filton climbing through FL010 (1240ft QNH) with the PA34 still orbiting S of the aerodrome. Meanwhile the PA31 has continued on a steady 280° track at FL023 (2540ft QNH) to a position 3·9nm WSW of Filton, in the JS41's 10 o'clock at 8·5nm.]

Shortly after 1209 the JS41 flight was descended to altitude 2500ft to keep the ac clear of a S'bound transit at 1500ft that would pass under final approach 7nm W of the airfield. Just after 1209:30 the JS41 flight was advised by the APR that he would be vectored through the ILS for spacing in traffic. At this time the APR realised he had transposed SSR labels and transmitted, in what is assumed to be an attempt to provide separation, *"disregard that JS41 c/s turn left now onto er zero nine zero to establish on the ILS"* and then told the PA31 flight, just before 1210:00, *"PA31 c/s just wandering a bit north there could you turn left about twenty to take you south of final approach there's further traffic on the ILS"*. The PA31 pilot responded in the affirmative immediately and the turn can be seen on the radar recording. There is a continuous stream of RT as the APR vectors other traffic in the sequence and just before 1210:30 he asks the PA31 flight *"PA31 c/s make that er left thirty degrees please traffic is a Jetstream now in your right one o'clock at three miles same level but shortly descending on the ILS"*. The actual distance taken from the radar recording is 1·5nm. Again the PA31 pilot responded and made the turn. The APR then advised the JS41 crew *"JS41 c/s traffic in your one o'clock and two and a half miles er is the same level is turning left to pass south of you it's a Piper Navajo"*. This was acknowledged by the JS41 flight with *"okay I've got a TCAS climb JS41 c/s"*. At a little after 1211 the JS41 crew advised the APR *"JS41 c/s's now clear of that traffic"*. The APR apologised and after ascertaining that the JS41 flight was not able to continue with the ILS repositioned it for a further ILS. At 1212:45 the APR again apologised to the JS41 flight stating *"Sorry JS41 c/s I mistook erm transit traffic for traffic which was in the circuit so I missed up I messed up the ident and didn't spot it till the last minute"*. The radar recording shows, at 1210:34, the JS41 to be in the PA31's 2 o'clock at 0·8nm indicating FL025 and the PA31 is indicating FL023. The CPA is seen to be at 1210:42 when the JS41, turning onto the ILS, passes 0·7nm N abeam of the PA31 passing FL029 as he responds to the TCAS climb RA. The PA31 is observed to be maintaining FL023. The Filton QNH was 1021mb. The altitudes would be 240ft higher than the FLs and compatible with the altitudes being flown by the subject ac.

The minimum radar separation permitted under the Filton MATS Part 2 is 3nm between identified ac within 40nm of Filton. This procedure has been approved by CAA-SRG. The APR has been very open in his report. The Unit investigated the report, initiated remedial action and disseminated lessons learned to all Unit-based controllers.

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 praised the Filton APR's open and honest report. In an undoubtedly complex traffic scenario, he had initially provided traffic deconfliction between the PA31 and the A340. However, later on he had 'seen' what he thought was the PA34 in the visual cct, extending downwind for vortex wake spacing to turn in behind the A340 and he had told the JS41 crew that they would be vectored through the ILS LLZ for spacing to sequence the ac behind the PA34. The radar recording had shown the PA31 and PA34 passing close to each other S abeam of Filton but the PA34 had continued to orbit for spacing whilst the PA31 had continued on track slowly converging towards the FAT. After realising that the observed traffic to the SW of Filton was in fact the PA31, the APR then turned the JS41 L to establish on the ILS. This led Members to agree that the cause of the Airprox was that the Filton APR did not maintain radar identification on the PA31 and vectored the JS41 into conflict with it.

Members were clear that there had been alternative ways, much earlier, to deconflict the flight paths of the subject ac. The incident had occurred in Class G airspace, where 'see and avoid' prevails, but the APR had attempted to

resolve the deteriorating situation by issuing 2 L turn instructions and TI to the (VFR) PA31 flight which by now was close to the extended C/L of RW09. The PA31 pilot had complied with both L turns issued but had not seen the JS41. Meanwhile, whilst establishing on the LLZ the JS41 crew received a TCAS RA 'climb', which was promptly and robustly complied with, simultaneously with TI from ATC but also without the crew visually acquiring the PA31. Despite the non-sightings by both crews, the Board agreed that the actions taken by all parties, when combined, had been effective enough to ensure that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

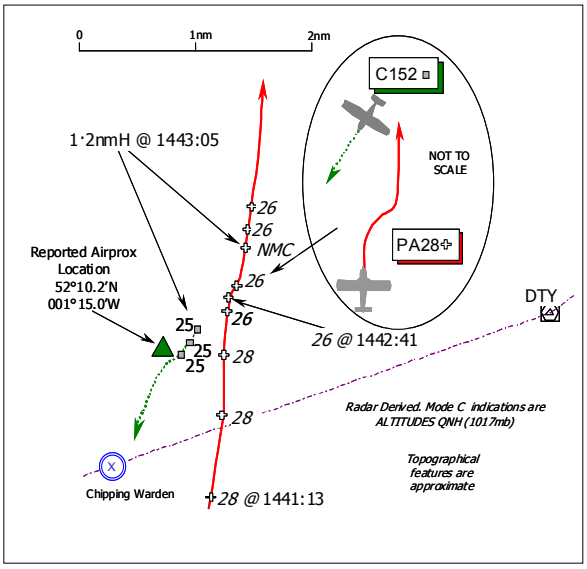
Cause: The Filton APR did not maintain radar identification on the PA31 and vectored the JS41 into conflict with it.

Degree of Risk: C.

AIRPROX REPORT No 092/06

AIRPROX REPORT NO 092/06

Date/Time:	23 Jun 1442	
Position:	5210N 00115W (2nm NE of Chipping Warden)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C152	PA28
Operator:	Civ Trg	Civ Trg
Alt/FL:	2500ft (QNH 1018mb)	2500ft (QNH)
Weather	VMC CLBC	VMC NR
Visibility:	40km+	NR
Reported Separation:	Nil ft V/250-300m H	Nil V/3-4nm H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT provided a very comprehensive account reporting that he was conducting a dual instructional NAVEX with a student pilot under VFR, routeing from Sywell to Benson via Chipping Warden, Charlbury and Welford. The planned altitude for the route was 2700ft but his student had 'lapsed' momentarily and allowed the ac to be at 2500ft QNH (1018mb). They were flying in VMC, >2000ft below cloud – there was no cloud at their altitude – with an in-flight visibility of 40km+. A squawk of A7000 was selected with Mode C.

At the time of the Airprox – 1442 - they were listening out on the BRIZE ZONE frequency of 119·0MHz. However they had not yet called ZONE, having only left Sywell INFORMATION 1min earlier. Following the tenet "Aviate, Navigate, Communicate", they had embarked on a discussion regarding a position fix with the intention of calling ZONE overhead Chipping Warden.

The flight had started out well but his student had mis-set the Directional Indicator (DI) 20° out (at about 059° DTY 9nm) the resulting track made good taking them to the S edge of Daventry where his student fixed their position and, following his advice, turned onto a heading of 210°M to rejoin their planned track at their next turning point of Chipping Warden. With 2½nm to run to Chipping Warden flying at 97kt, they were discussing features to back up the identification of the location: specifically the lake to their R some 1½nm N of Chipping Warden; the small built-up area on the road and the two small built-up areas. With the discussion he had raised his student's map up in front of the control column to avoid being 'heads down - eyes on knees' whereupon his student had briefly looked up and spotted the other ac. She alerted him to its presence and he had located the ac – a low-wing PA28 [the C152 instructor pilot accurately described the white/blue livery of the subject PA28] - some 400m away about 45° off to their L at the same altitude. Before they had time to initiate avoiding action the other ac turned R to avoid them (dropping slightly during the manoeuvre) as it passed 250-300m to port level with his ac and a *"medium"* risk of a collision. The PA28 was last seen heading away from them on a heading of 030°, some 100ft below them.

He added that he purposefully teaches his students to fly at odd x300ft or x700ft altitudes to avoid the commonly used 1000ft and 500ft multiples, to reduce the potential for this sort of incident. He made an RT report when communications were established with Brize ZONE. His ac has a white/blue livery,

THE PA28 PILOT, a flying instructor, reports that he was conducting a VFR pre-solo training flight with a student pilot whilst outbound to Leicester in VMC. They had just taken off from Oxford who had provided a FIS before switching to Coventry RADAR. A squawk of A7000 was selected with Mode C.

Flying level at 2500ft QNH about 4nm W of DTY heading 010° at 95kt, a high-wing Cessna ac was seen by both him and his student in front of them about 3nm away. Although this ac was not on a steady bearing, a R turn was

initiated to “guarantee safety and separation”; the other ac passed 3-4nm to port, with a ”low” risk of a collision. Although the Cessna pilot reported the occurrence it appeared he took no avoiding action at all.

In his view this was not an Airprox matter and considered that the extant separation did not warrant a report. Even if he had maintained his heading there would have been no compromise of safety as the C152 passed well clear to their L and behind. His ac has a blue and white livery.

ATSI reports that at the C152 pilot’s reported Airprox time of 1442, the PA28 crew was receiving a FIS from Oxford APPROACH prior to switching to Coventry APPROACH Radar at 1444. Reports were obtained from the respective controllers at both ATSUs but neither had any knowledge or recollection of the subject Airprox. Despite both Oxford and Coventry taking the correct tape impound action, both tapes were erroneously returned to service. Hence no RTF recordings were available from either unit. (This matter has been addressed both at Unit and CAA Regional ATS Inspectorate level.)

UKAB Note (1): Analysis of the Clee Hill radar recording is inconclusive as the C152 is shown at the time of the Airprox which seems to have occurred at about 1442:41, some 2nm NE of Chipping Warden disused aerodrome. The reporting pilot’s C152 is not shown until after the Airprox has occurred. However, the PA28 is shown clearly, transiting northbound through the area squawking A7000 initially at 2800ft unverified Mode C (1017mb). The PA28 passes 4nm W abeam DTY – the location of the Airprox reported by the PA28 pilot - now indicating 2600ft QNH unverified Mode C (1017mb). The reported R turn effected by the PA28 crew is reflected on the recording after the return timed at 1442:41, and indicative of the timing of the encounter. The PA28 turned R NE’ly then reversed back northbound maintaining 2600ft. Over 20sec elapsed before the C152 is first shown 1·2nm SW of the PA28, the former at 2500ft QNH unverified Mode C (1017mb), just to the NE of the position reported by the pilot, but actually some ½nm SW of the Airprox location. Consequently, neither the minimum vertical nor horizontal separation could be assessed. Nonetheless, if the C152 had been maintaining a steady course for the previous 30sec before it is shown on radar as the Airprox occurred, then by interpolation the minimum horizontal separation might well have been in the order of 100s of yd rather than nm.

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 authority.

It was evident from the comprehensive pilots’ reports provided that both ac were operating VFR in Class G airspace where ‘see and avoid’ prevails. As the C152 crew had not yet established RT contact with Brize ZONE, nor was the PA28 crew in receipt of a radar service, it remained entirely the responsibility of both instructors - and also their students – to spot other ac in sufficient time to ensure appropriate separation was maintained as necessary in accordance with the ‘Rules of the Air’. Here it was clear from his laudably frank account that the reporting C152 instructor had not spotted the other ac before his student drew his attention to it, but by then, he reports, the PA28 instructor had already initiated a R turn of his own volition to remain clear. It was unfortunate that the radar recording had not replicated the geometry of this Airprox but it had confirmed, in what was perceived to be a crossing situation, that the PA28 instructor had made a fairly sharp alteration of course to the R. This did not seem to accord with the PA28 instructor pilot’s estimate of the initial sighting range of 3nm, nor the minimum separation that pertained for if it had been the 3-4nm as he reported such a sharp turn might seem superfluous. The Board was briefed that further enquiries had been made with the PA28 instructor pilot who reaffirmed his account of the minimum separation. Furthermore, the PA28 pilot was adamant that, in his view, this was not a close encounter warranting an Airprox report. The Members were told that another ac was shown on the radar recording some distance to the NW and it was suggested to the PA28 instructor that he might not have seen the subject C152. But as he had identified the ac type and had reported turning to “guarantee safety and separation” it seemed to the Members that he had spotted and avoided this ac. Clearly the Board was unable to resolve this anomaly as the C152 was not shown on the radar recording at the critical moment and the actual separation could not be accurately assessed. Nonetheless, it seemed to the Members that this Airprox was a lot closer than the PA28 pilot had thought. Although the C152 instructor pilot had spotted the PA28 at a late stage himself – some 400m away to port after being alerted to it by his student - he believed it had passed some 250-300m to port at the closest point. In the Member’s view it seemed as if the PA28 instructor had spotted the C152 in time to ensure that the other ac was avoided by an adequate margin. Therefore, the Board agreed unanimously that this Airprox had resulted from a conflict in Class G airspace which had been resolved by the PA28 pilot and no risk of a collision had existed in these circumstances.

AIRPROX REPORT No 092/06

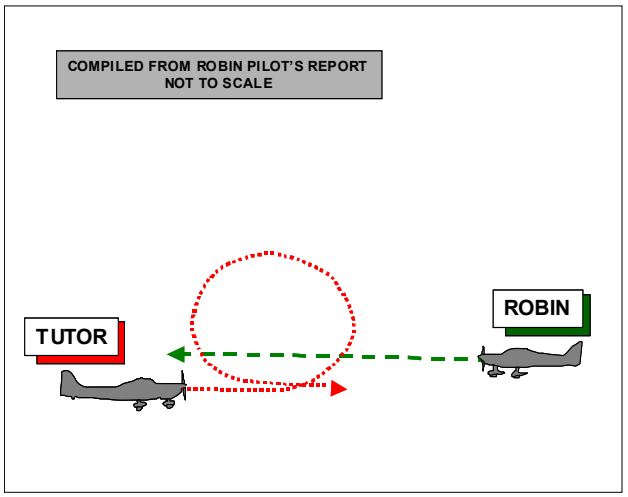
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the PA28 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 096/06

Date/Time:	18 Jun 1320 (Sunday)	
Position:	5216N 00010W (3nm S Huntingdon)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Robin 200/100	Grob Tutor
Operator:	Civ Pte	HQ PTC
Alt/FL:	3000ft (RPS 1007mb)	NR
Weather	VMC CAVOK	VMC
Visibility:	>30km	>10km
Reported Separation:	50-100ftV/>200mH	NR
Recorded Separation:	400ft V/0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ROBIN 200/100 PILOT reports flying a private flight with a passenger from Tibbenham to Gloucester in a white and red ac with strobes selected on, listening out with London Info and squawking 7000 with Mode C. He was heading 240° into sun at 90kt when a Grob Tutor ac was first seen 12.30/1 o'clock, pulling up through his level; it then passed down his starboard side by about 200ft in a nose-up attitude of about 60-70° and he watched it pass into his 5 o'clock completing a looping manoeuvre. It appeared to take no avoiding action and he was too stunned to take any himself. The only time the other pilot could have seen him would have been at the top of his loop as the Robin was flying away. He assessed the risk as being very high.

THE GROB TUTOR PILOT reports that he flew 8 air experience sorties with cadets on that day. He was in receipt of a FIS from Wyton APP/TWR and was squawking 7000. He carried out general handling up to about FL55 and up to 10nm to the S and W of Wyton on most of the sorties and most sorties included aerobatics. He saw numerous other light aircraft and gliders during the day, but none in close proximity. One of his sorties was at the time of the reported incident – take off 1303 and landing 1324.

UKAB Note (1): Both ac can be seen on the recording of the Debden radar. The incident occurs at 1320:03 as the Grob, squawking 7000/035 and heading NE, passes close down the right hand side of the Robin, squawking 7000/031, heading WSW.

HQ PTC comments that it was fortunate that the 2 flightpaths did not actually coincide since the pilot who saw the Airprox did not have time to react before it was all over. This Airprox, once again, emphasises the need for good lookout at all times, but especially during high-energy manoeuvres such as aerobatics.

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 Grob operating authority.

Members determined that since both ac had been operating under VFR in Class G airspace without the assistance of ATC or TCAS, the 'see and avoid principle' had been the sole means of collision avoidance. Under such circumstances, particularly when conducting manoeuvres that involve rapid changes of flightpath and especially when these are in the vertical plane, clearing turns followed by continuous lookout are vital. Since the two ac had initially been almost head-on to one another, the Grob had probably been obscured by the nose or coaming of the Robin and not visible to its pilot until the Grob commenced the pull-up for the loop. Notwithstanding this, since the forward visibility from a Robin 200/100 is reasonably good, Members considered that the (Robin) pilot had a shared lookout responsibility and the Grob should have been visible at an earlier stage.

Since in essence, neither pilot had been able to take any effective action to increase the separation and thus completely obviate any risk of collision, Members considered that there had been a degradation of normally accepted safety standards.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Tutor pilot and late sighting by the Robin pilot.

Degree of Risk: B.

Please Note:

At the time of publication of this book, action was not fully completed on Airprox 071/06. Details of that Airprox are to be found in Report No 17.

Conclusions regarding the overall picture, as presented in the statistics sections herein, are not materially affected.