UK AIRPROX BOARD

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Analysis of Airprox in UK Airspace

Report Number 15
July 2005 – December 2005

Fifteenth Report by the UK Airprox Board:

‘Analysis of Airprox in UK Airspace’

(July 2005 to December 2005)

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 fifteenth Report from the UK Airprox Board, is to promote air safety awareness and understanding of Airprox. “Book 15” covers the second half of 2005 in detail, containing findings on the Airprox which were reported as occurring within UK airspace in that period and which were fully investigated. Included in this Report is Airprox 008/05 which occurred in January 2005 and which was not able to be assessed by the Board until after the publication of *Analysis of Airprox in UK Airspace, Report Number 14*. In addition, this book contains a range of graphs and tables highlighting many of the key statistics from UK Airprox throughout the whole of 2005.

During 2005, a new Member was appointed to the Board, being a specialist in Gliding. Hugh Woodsend has enjoyed this sport for 30+ years, with 3,500hrs in his gliding logbook to date. In toto he has over 20,000 hours flight time on a wide range of aircraft types and is currently a test pilot on fast jets. The Board is pleased to welcome him. Also in 2005 and as explained on page 5, much was done during the year to improve the UKAB internet website which, it is hoped, is now a valuable resource for pilots, controllers and indeed all with an interest in Airprox flight safety.

The count of 96 incidents during the last six months of 2005 is eight less than the average of comparable figures in each of the previous five years. With regard to ‘risk’, the broad figures for the second six months of 2005 are very similar to those for the same period in each of the preceding two years. Although this Report is primarily intended for those who in one way or another are involved with aircraft and flying, it is understandable that people generally are interested in the safety of commercial air transport (CAT). The number of risk bearing (i.e. Risk A plus Risk B) Airprox involving CAT aircraft in 2005 is the same as that in 2004, the risk bearing incident rate dropping a shade due to an increase in flying hours year-on-year. Further information is given in the Commercial Air Transport section of this Report.

It has long been part of the aviation safety culture for people to report openly any safety-related incident. This openness facilitates safety improvement action and identifies valuable lessons for the benefit of others, reading about the unhappy situations in which people have found themselves.

If the collective effort helps to make flying safer – over the UK of course, and in other countries where this publication is also read – then all involved will have felt their efforts worthwhile. For that benefit to be realised, it is essential that this Report be made freely available, in particular to pilots and air traffic controllers. Please would you help the process along by ensuring that your crew room, club house or work place has available a copy of this book for people to read.

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. There are eight civilian and six military voting Members on the Board which is chaired by the Director UKAB who reports directly to the Chairman CAA and Chief of the Air Staff, Royal Air Force. Board Members together form a team of hands-on practitioners with first-hand civil and military 'know how' on:

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

UKAB's ROLE

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

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

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.

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

To begin this review, Figure 1 overleaf shows the cumulative distribution of Airprox that were reported in 2005 and which were subsequently opened for full investigation. Please note that some events reported as Airprox are subsequently withdrawn and are thus not subject to full investigation. Only the reporter can withdraw an Airprox.

Notes:

In the calculation of rates of occurrence:-

(1) CAT flying hour totals are supplied by the UK Civil Aviation Authority. Included are figures derived from Eurocontrol data on hours flown by commercial aircraft in transit through UK airspace as well as departures from and arrivals at UK destinations.

(2) GA flying hours are based on aircraft with less than 5,700Kg maximum take-off weight authorised. Gliders and microlights are included; gyroplanes, balloons and airships are excluded.

(3) Military flying hours are supplied by the Ministry of Defence and by US Air Forces Europe.

In this Report, numbers of 'Unknown' aircraft are added to 'Untraced' aircraft and weather balloons to produce the category, 'Other'.

SAFETY PROMOTION

Before turning to the statistical overview, a word about the safety promotion aspects of the Airprox Board's work. Whilst those involved in a given Airprox are informed as soon as practicable after the Board has made its assesment, a key UKAB objective is to communicate to all controllers and pilots the lessons identified from Airprox events. Bi-annual 'hardcopy' Reports have been the primary means of communication, supported by presentations at flight safety meetings, the UKAB website and CDs. Historically, as much as twelve or thirteen months could elapse from receipt of an incident report to the full publication of the Board's assessment in a hardcopy report. This was considered to be too long a time period so a better method of dissemination was sought.

November 2005 saw the re-launch of the UKAB internet website. A short while later, in February 2006, a significant enhancement was made to that website: Airprox Reports began to be 'uploaded' six-to-eight weeks after assessment by the Airprox Board. By publishing the assessments on the website as soon as possible after the Board, important flight safety information is now made available to the aviation community more quickly and, by using the Internet, to a much wider audience.

AIRPROX RESULTS FOR 2005

Numbers of Airprox - 2005

Figure 1 shows the cumulative distribution of Airprox by month during 2005 compared with a previous-five-year average of the progressive totals. From January to May 2005, Airprox numbers were in line with past history but thereafter slowly fell as the year progressed. The annual total for 2005 was 188 compared with the preceding-five-year average of 200 Airprox.

Thirty three reports were initially made but then subsequently withdrawn (by the reporter) after reflection and in the light of fuller information.

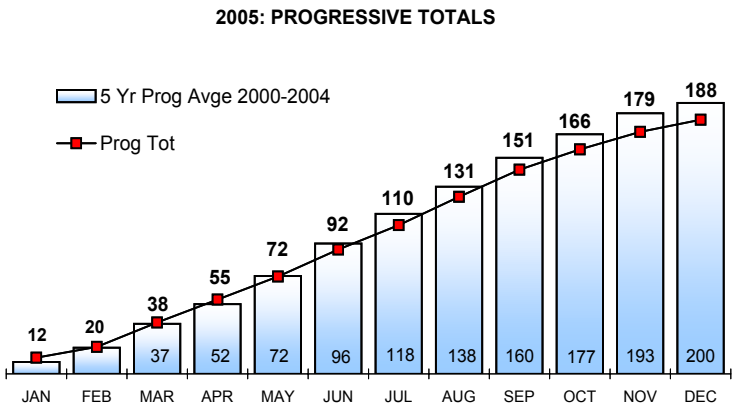


Figure 1: Numbers of Airprox during 2005

Trends by User Groups

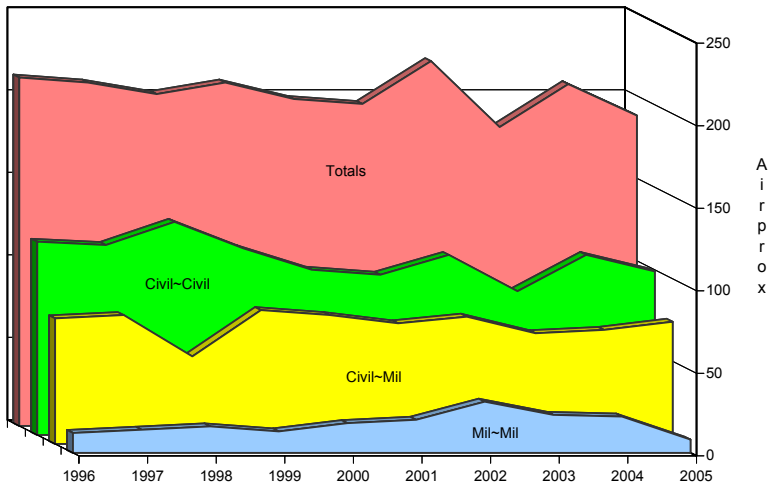


Figure 2: Airprox totals by main user groups

Airprox totals over the last ten years, by main 'user groups', are shown in Figure 2, the underlying data being in Table 1 below. The downward trend in the total number of Airprox continues. Of particular note in Figure 2 is that in 2005 the number of 'Military on Military' encounters dropped from a five-year average of 22 to eight.

The overview in Figure 2 does not bring out two of the features of Airprox data for 2005: increases in CAT~GA and CAT~MIL events. These aspects will be discussed in more detail later: suffice to note at this point that whilst overall numbers in these categories have increased, numbers of risk bearing events have not.

Table 1: Airprox totals by main user groups

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Civil~Civil	117	115	129	113	100	97	109	87	109	99
Civil~Mil	76	78	53	81	78	73	77	67	69	74
Mil~Mil	12	14	16	13	18	20	31	23	22	8
Other	6	1	3	1	2	5	4	4	7	7
Totals:	211	208	201	208	198	195	221	181	207	188

Airspace in which conflicts took place

Figure 3 shows the airspace types in which the various encounters took place. As in the past, most Airprox in 2005 occurred in Class G airspace: 72% of the total to be precise, a small rise. Whilst it is interesting to note the increase in the number of Airprox occurring in 'Control Zones and Areas', no particular geographical 'hot spot' was identified when the events were mapped.

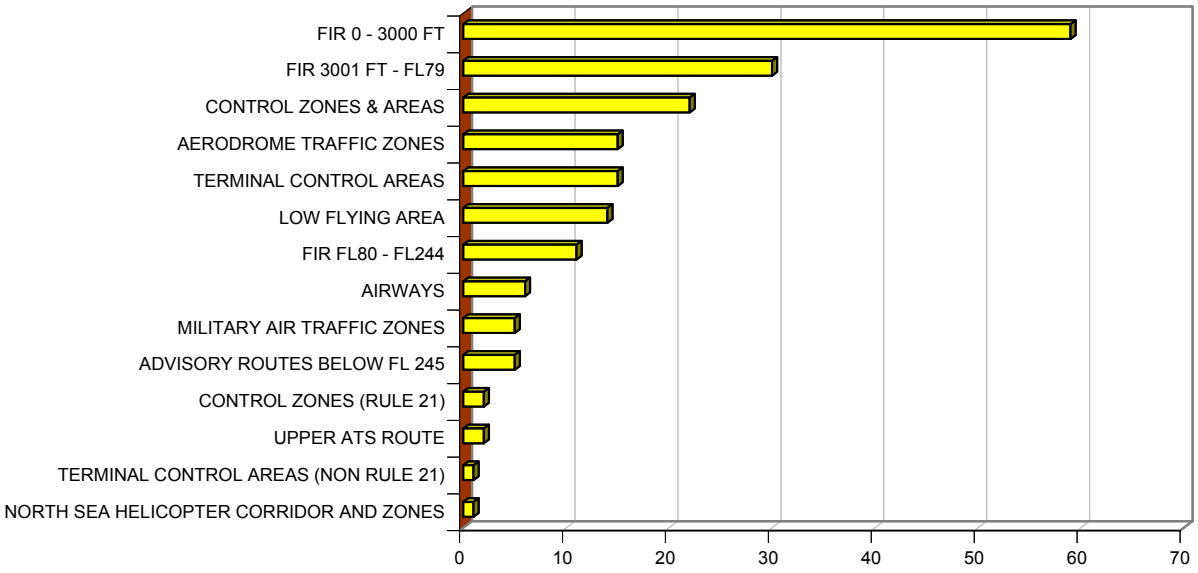


Figure 3: Types of airspace - all Airprox in 2005

COMMERCIAL AIR TRANSPORT (CAT) SECTION

CAT Risk Results

The data in Table 2 below and the associated plot in Figure 4 overleaf show the trends in Risk ratings for Airprox involving at least one CAT aircraft over the decade 1996-2005 inclusive. Also shown is data relating to CAT 'hours flown' in UK airspace from which it is evident that the rising trend in the first part of the decade is now firmly re-established.

CAT Risk	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CAT Risk A	6	9	1	4	6	0	1	0	1	1
CAT Risk B	24	20	14	12	8	14	7	12	7	7
CAT Risk C	75	67	82	83	85	65	70	54	67	78
CAT Risk D	2	0	1	0	1	4	4	0	4	1
CAT Total Airprox	107	96	98	99	100	83	82	66	79	87
Hours x 10K	111.8	117.9	125.9	133.2	138.9	139.5	136.6	139.7	148.5	154.6
All Airprox	211	208	201	208	198	195	221	181	207	188

Table 2: CAT Risk data 1996 - 2005

CAT Risk Results (cont.)

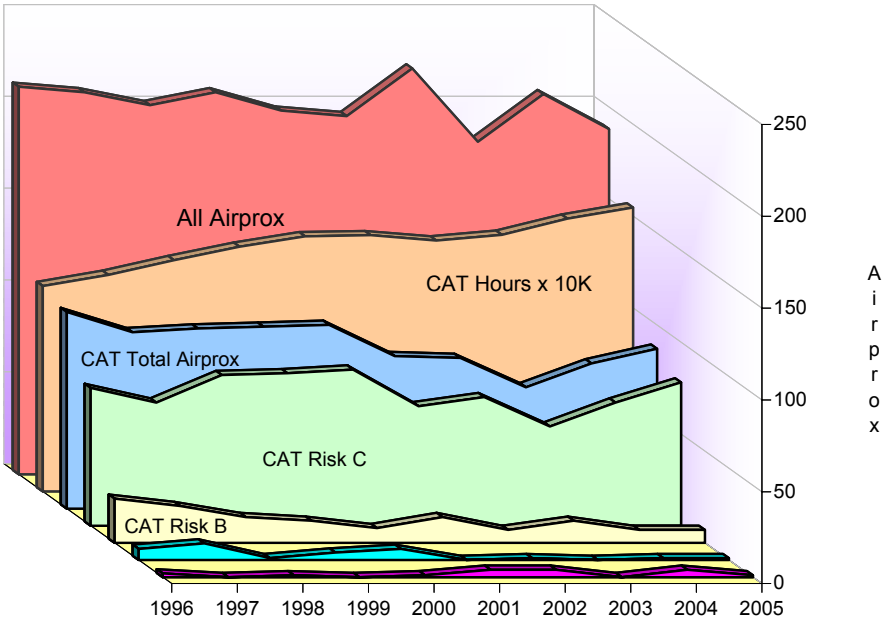


Figure 4: CAT Risk distribution 1996 - 2005

As regards the data, the overall conclusion is that whilst in 2005 the total number of Airprox involving at least one CAT aircraft is at a level comparable with figures at the beginning of the decade, having fallen over three years and then risen over the next two, the number of Risk Bearing Airprox is precisely the same as in 2004 and well in line with norms. The increase in total number of events in 2005 *vs* 2004 is thus accounted for by a rise in the number of Risk Category C Airprox. A more detailed examination of the two categories CAT~CIV and CAT~MIL was undertaken to see what conclusions could be drawn.

A map plotting all CAT~MIL Airprox for the three-year period 2002-2004 showed four small but identifiable 'clusters' - SW Scotland; E Scotland; East Anglia and SW Wales - in which areas there are no CAT~MIL Airprox at all in 2005. A similar exercise for CAT~CIV showed that whilst there were a number of Airprox in the region N England/S and C Scotland in the three-year period 2002-2004, there were virtually none in this area in 2005. On the other hand other small CAT~CIV 'clusters' appear in the 2005 data where there were relatively few Airprox in the preceding three years.

Another area of interest concerns the occasions when one aircraft flies in the vicinity of another in such a way as to trigger a TCAS alert in one or both aircraft. The equipment is performing its correct function. In 2005 there were approximately 10 more such events than in an average year. In good visual conditions, one of the pilots may well have judged that there was absolutely no safety risk yet the encounter causes a TCAS alert and concern to the other pilot. Such encounters are invariably assessed as Risk Category C and publicity has been given within both the military and civilian pilot communities, in essence asking pilots to give a wider berth than they otherwise might.

CAT Airprox Rates

Table 3 shows CAT Airprox rate information. Figures are derived by taking the 'raw data' in Table 2 and dividing by flying hours to obtain rates. This information is plotted in Figure 5 with (logarithmic) trend lines added. The 10% increase in the number of CAT Airprox reports in 2005, discussed above, leads to an 'above the trend' rate for 'all CAT Airprox'. The downward trend in the CAT risk bearing rate continues, albeit that the year-on-year improvement in 2005 is slight - 0.52 *vs* 0.54, the 'CAT Airprox Rate per 100,000hrs flown' in 2004.

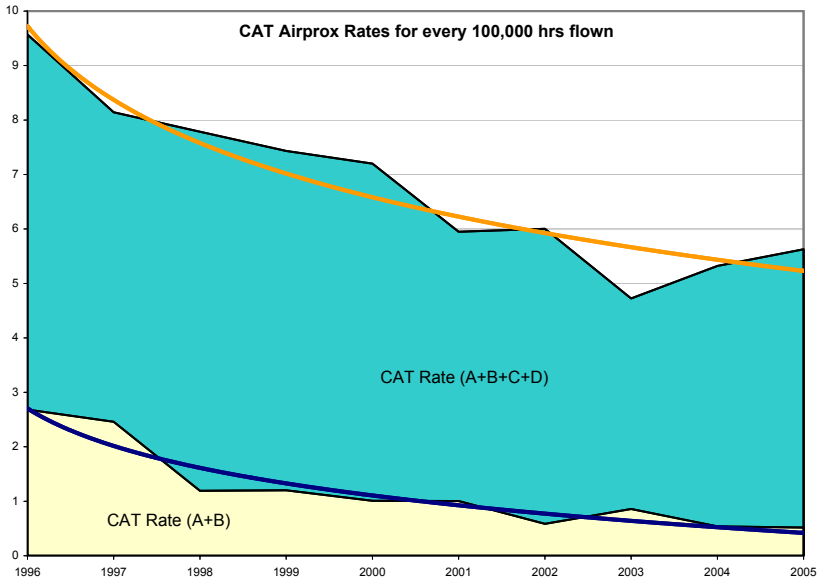


Figure 5: CAT Risk rates 1996 - 2005

Table 3: CAT Airprox Rates per 100,000 flying hours

CAT Rates	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CAT Rate (A+B)	2.68	2.46	1.19	1.20	1.01	1.00	0.59	0.86	0.54	0.52
CAT Rate (A+B+C+D)	9.57	8.14	7.78	7.43	7.20	5.95	6.00	4.72	5.32	5.63
Hours x K	1,118	1,179	1,259	1,332	1,389	1,395	1,366	1,397	1,485	1,546

CAT Causal Factors

Table 4 below lists the predominant Causes behind the 87 Airprox involving at least one CAT aircraft. One Airprox can have more than one causal factor, 162 such factors being allocated in toto to the 87 Airprox. Those causal factors assigned four or more times are listed in Table 4 below. It is of interest to note that "Sighting Report" is second on the list: an informal definition of this causal factor might be 'without the slightest doubt a Risk Category C Airprox'.

Table 4: Most common causal factors for CAT aircraft involvement in Airprox during 2005

Ser.	Cause	Totals	Attributed to
1	DID NOT SEPARATE/POOR JUDGEMENT	28	CONTROLLER
2	SIGHTING REPORT	13	OTHER
3	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	11	PILOT
4	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	8	PILOT
5	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	6	PILOT
6	MISINTERPRETATION OF ATC MESSAGE	6	PILOT
7	DID NOT SEE CONFLICTING TRAFFIC	5	PILOT
8	CONTROLLED AIRSPACE CONFLICT IN VMC	4	OTHER
9	UNDETECTED READBACK ERROR	4	CONTROLLER
10	INADEQUATE AVOIDING ACTION/LACK OF POSITIVE CONTROL	4	CONTROLLER
11	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	4	PILOT
12	INAPPROPRIATE ATC INSTRUCTIONS, USE OF INVALID FL	4	CONTROLLER
13	DID NOT ADHERE TO PRESCRIBED PROCEDURES	4	PILOT

GENERAL AVIATION (GA) SECTION

GA Risk Results

Figure 6 shows the Risk distribution for those Airprox in which at least one aircraft was categorised as GA. More often than not flying outside controlled airspace; in aircraft from the size of microlights through to sophisticated aeroplanes and helicopters; piloted by those 'just out of flight school' through to the very experienced professional pilots, this range of activities and experience levels makes it unsurprising that the largest proportion of Airprox in UK airspace involve GA pilots. As Figure 6 illustrates, whilst the 'All Airprox' trend is essentially downwards, the 'GA Totals' trend is flattening, about 70% of all Airprox in 2005 having a GA involvement.

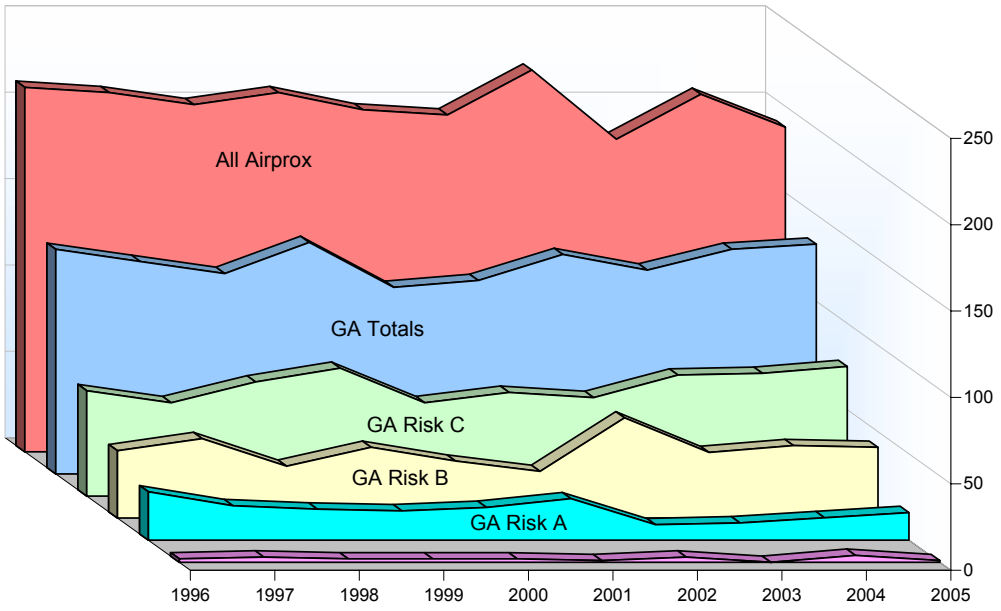


Figure 6: GA Risk distribution 1996 - 2005

Figure 6 is based on the data in Table 5 below. A few calculations on the numbers therein show that 'GA Risk A' Airprox as a proportion of the 'GA Totals' figure averages 14% over the decade, and again on average 46% of Airprox involving GA pilots are risk-bearing: virtually one in two. The corresponding figures for year 2005 are 12 and 43% respectively. Of the 16 Risk Category A events, four involved encounters with military aircraft whilst the balance of 12 were Airprox with other GA aircraft. Gliders - civilian and military - were involved in 31 Airprox during 2005, 20 of which were risk-bearing. The Board is pleased now to have a Member who is an expert on gliding matters. One of Hugh Woodsend's first tasks was to assume editorial control of the UKAB publication *Airprox in UK Airspace Involving General Aviation Pilots Book Number 12*, the emphasis of which was on Airprox involving a powered aircraft and at least one glider.

Table 5: GA Risk data 1996 - 2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GA Risk A	28	20	18	17	19	24	9	10	13	16
GA Risk B	39	46	30	41	33	27	58	38	42	41
GA Risk C	61	54	66	74	54	60	57	70	71	75
GA Risk D	2	3	2	2	2	1	3	0	4	1
GA Totals	130	123	116	134	108	112	127	118	130	133
All Airprox	211	208	201	208	198	195	221	181	207	188

GA Airprox Rates

The chart at Figure 7 and Table 6 give more information regarding GA Airprox, this time from the perspective of rates rather than absolute numbers. Flying hour figures are the best available at the time this Report is compiled. The estimate of hours flown in 2005 by the UK GA fleet is 1,355,000 hours. Using this and the numbers of Airprox in Table 5, rates have been calculated for Risk Bearing (i.e. Risk A plus Risk B) and for all GA Airprox. These rates are in Table 6 from which Figure 7 is plotted. Trend lines have been added from which it can be seen that the 10-year trend in rate per 100k hours flown is sloping (very) gently downwards for the two groups of events. Also note that the risk bearing rate is roughly half of that for all GA Airprox.

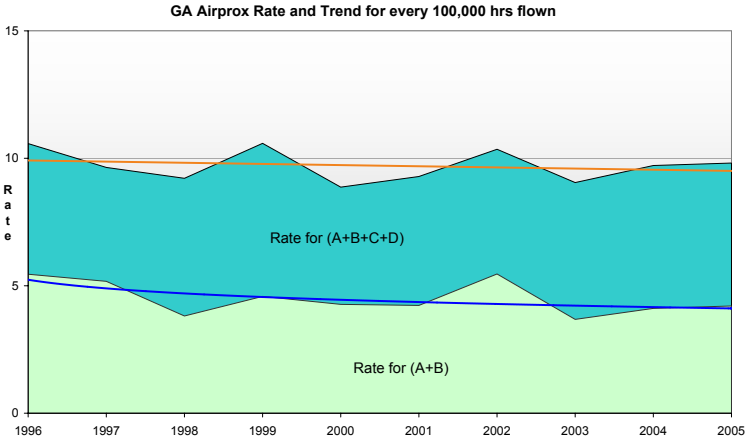


Figure 7: GA Risk rates 1996 - 2005

Table 6: GA Airprox Rates per 100,000 flying hours

GA Rates	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Rate for (A+B)	5.45	5.17	3.81	4.58	4.27	4.23	5.46	3.68	4.11	4.21
Rate for (A+B+C+D)	10.58	9.64	9.22	10.59	8.87	9.29	10.36	9.05	9.72	9.81
Hours flown in K	1,229	1,276	1,259	1,266	1,218	1,206	1,226	1,304	1,338	1,355

GA Causal Factors

Table 7 below gives the most common causal factors assigned to Airprox involving GA pilots. A total of 215 factors were assigned to the 133 'GA Airprox' - one Airprox event can have more than one cause. The 'top ten' factors are listed in Table 7. By far the largest numbers involve sighting issues as would be expected when so much GA flying is in the 'see and avoid' environment of Class G airspace. 'Did not see the conflicting traffic' was assigned 50 times in 2005, compared with the next Cause on the list, "Late sighting of conflicting traffic", which was assigned 28 times. These 78 assignments serve to emphasise the importance of good lookout.

Table 7: Most common causal factors for GA aircraft involvement in Airprox during 2005

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	50
2	LATE SIGHTING OF CONFLICTING TRAFFIC	28
3	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	19
4	SIGHTING REPORT	16
5	DID NOT SEPARATE/POOR JUDGEMENT	13
6	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	10
7	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	6
8	DID NOT ADHERE TO PRESCRIBED PROCEDURES	5
9	FLYING CLOSE TO/OVER GLIDER OR PARADROP SITE	5
10	CONFLICT ON BOUNDARY OF ATZ/CTR/CTA/SRZ/AAA	4

MILITARY (MIL) SECTION

Military Risk Results

The immediate conclusion from Figure 8 below (and Table 8, on which the Figure is based) is that the total number of Airprox in 2005 involving military pilots has remained substantially constant. As was noted in Table 1, the number of Mil~Mil Airprox is significantly down when year 2005 data is compared with that for earlier years: eight as opposed to 22 in the previous year, for example. Of the 10 Risk category A events in 2005, one involved a CAT aircraft and a Foreign Military aeroplane whilst the other nine encounters were either MIL~MIL or MIL~GA. Two of the Risk category B events involved CAT aircraft and again the remainder were MIL~MIL or MIL~GA.

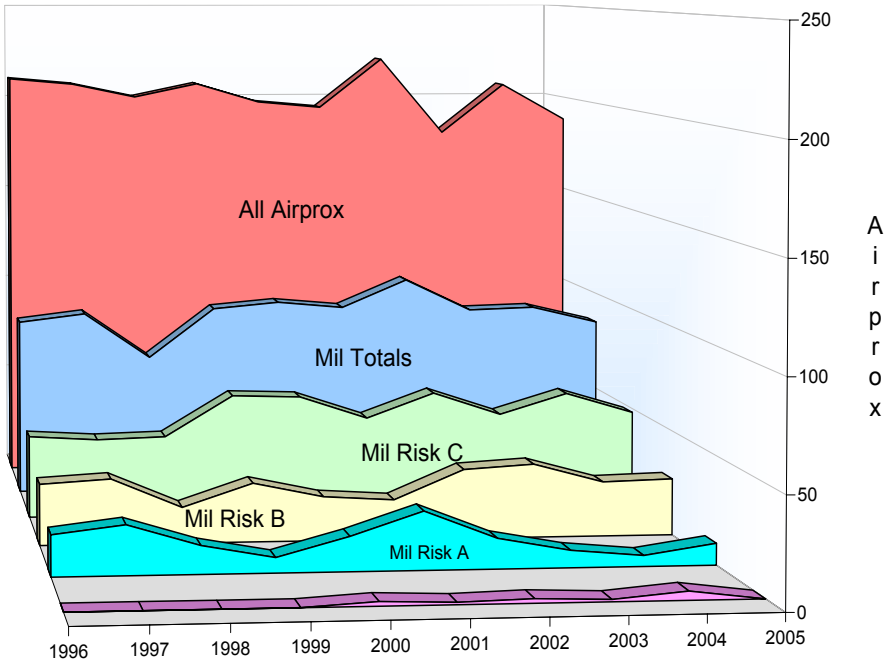


Figure 8: Military Risk distribution 1996 - 2005

Table 8: Military Risk data 1996 - 2006

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Mil Risk A	19	23	13	7	16	27	14	8	5	10
Mil Risk B	29	31	17	28	21	19	33	35	26	27
Mil Risk C	40	38	39	59	58	47	59	48	58	48
Mil Risk D	0	0	0	0	2	1	2	1	4	0
Mil Totals	88	92	69	94	97	94	108	92	93	85
All Airprox	211	208	201	208	198	195	221	181	207	188

MIL Airprox Rates

As with the CAT and GA information earlier in this Report, rates have been calculated both for all Airprox involving at least one military aircraft and for risk bearing events. Figure 9 and Table 9 overleaf present the results, based on flying hours for 2005.

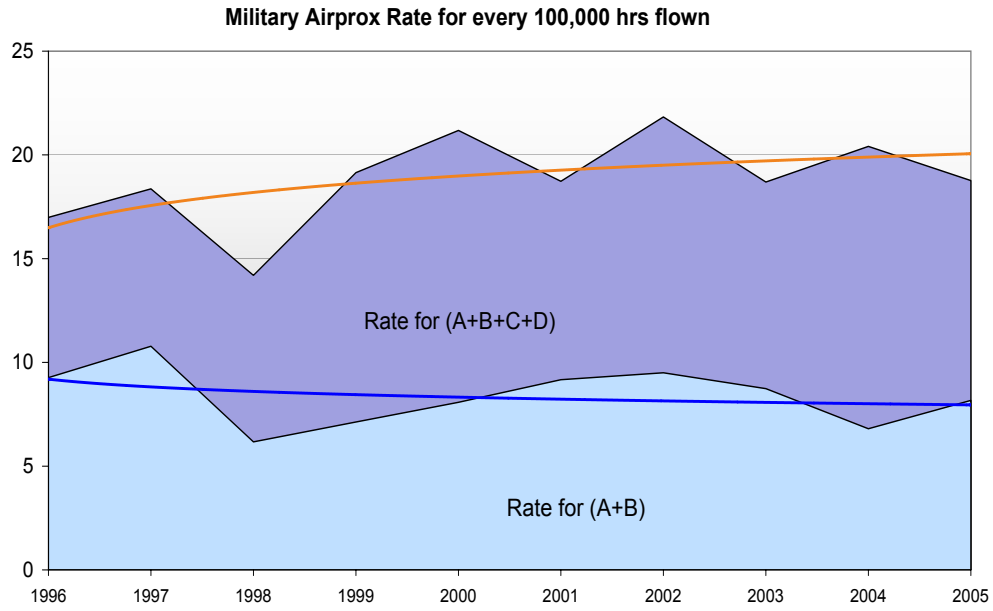


Figure 9: MIL Risk rates 1996 - 2005

Table 9: MIL Airprox Rates per 100,000 flying hours

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Rate for (A+B)	9.27	10.78	6.17	7.13	8.08	9.16	9.50	8.74	6.80	8.17
Rate for (A+B+C+D)	16.99	18.36	14.20	19.14	21.18	18.73	21.83	18.69	20.41	18.76
Hours flown in K	518	501	486	491	458	502	495	492	456	453

MIL Causal Factors

A look at Table 10 shows that the main causal factors assigned to the set of risk bearing military Airprox in 2005 relate predominantly to sighting issues. This is unsurprising given that as with GA much of the military activity takes place in Class G 'see and avoid' airspace. TCAS is being fitted to some of the military aircraft types which do not have the equipment and the project to extend the fitment programme to include fast jets continues. The technical complexity of such a project is not underestimated.

Table 10: Most common causal factors for MIL aircraft involvement in Airprox during 2005

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	33
2	LATE SIGHTING OF CONFLICTING TRAFFIC	17
3	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	15
4	DID NOT SEPARATE/POOR JUDGEMENT	5
5	MISINTERPRETATION OF ATC MESSAGE	5
6	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	5
7	SIGHTING REPORT	5
8	OTHER CAUSE	5
9	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	4
10	DID NOT ADHERE TO PRESCRIBED PROCEDURES	4

Airprox Trends

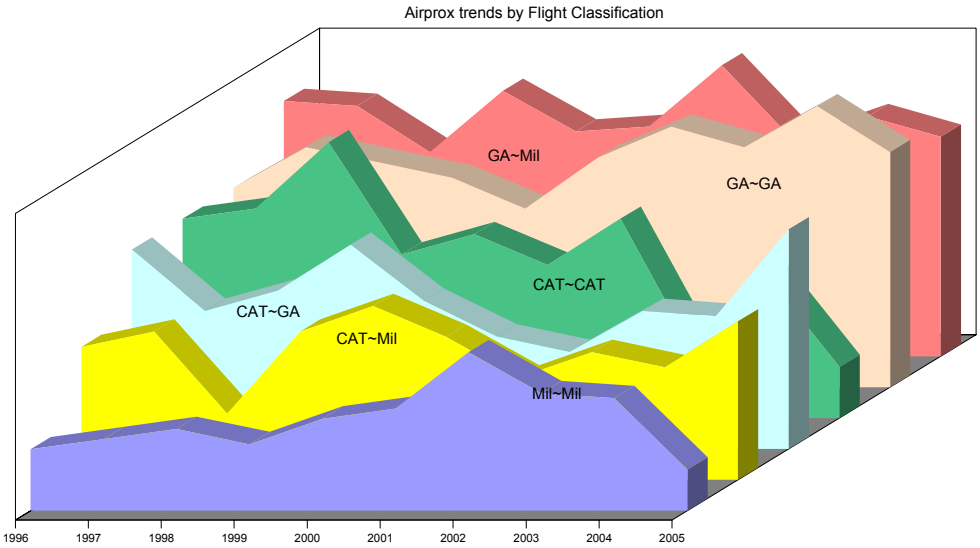


Figure 10: Airprox trends by Flight Classification

In seven of the ten years from 1996 to 2005, encounters between GA and Military aircraft were the most prolific: in a different seven years, Military ~ Military produced the lowest numbers. Given the relative numbers of aircraft 'in the system', this is probably not surprising. Because all of the numbers are relatively small, it is unrealistic to expect to be able to draw statistically sound conclusions from the data. Where the table and figure score, however, is in the ease with which overall trends can be assessed. In this regard and as has been covered earlier in this Report, CAT~GA and CAT~MIL numbers are up, year on year, in 2005 albeit with no change in the number of risk bearing events. Numbers of CAT~CAT events continue on a downward trend; GA~GA numbers appear to be levelling off whilst MIL~MIL Airprox numbers have continued sharply down to their lowest value in the 10-year period.

Table 11: Airprox trends - annual encounters involving CAT, GA and Military pilots

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GA~Mil	50	49	40	52	44	45	57	42	47	43
GA~GA	39	47	44	41	35	45	51	47	55	46
CAT~CAT	39	41	54	32	36	30	39	13	28	10
CAT~GA	39	27	31	40	29	22	19	27	26	43
CAT~Mil	26	29	13	29	34	28	20	25	22	31
Mil~Mil	12	14	16	13	18	20	31	23	22	8

UKAB SAFETY RECOMMENDATIONS

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

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

RECOMMENDATION: That the CAA and the MOD review 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 MAY 2006: The CAA and MOD initial review was completed on schedule. The MOD and CAA continue to work towards a mutually acceptable solution while retaining compatibility with operational training requirements.

STATUS - ACCEPTED – OPEN

018/04 4 Mar 04 involving a Gulfstream 41 and an F16 Risk C

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

ACTION: The MOD accepts this Recommendation. Following an in-depth review of safety arrangements to establish the potential requirement for Air Safety Cells for major air exercises and following detailed consideration of the nineteen incidents that were reported as occurring during such exercises in the five-year period 2000-2004, it is considered that mandating Air Safety Cells for such exercises is not justified. Work continued to establish if any additional briefing or direction was needed to crews participating in major air exercises. The conclusion of this work was that all relevant specialists are involved in the design of air exercises (major or minor) in United Kingdom airspace and that participating aircrew receive extensive and comprehensive briefs which provide all the information necessary for the safe conduct of flight and the avoidance of controlled airspace.

STATUS – ACCEPTED – CLOSED

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.

STATUS – ACCEPTED – OPEN

072/05 18 May 05 involving a SAAB 340 and a Tornado F3 Risk C

RECOMMENDATION: The MoD should review VID procedures taking into account their influence on ACAS equipment.ACTION: The MoD accepts this Recommendation. A comprehensive review was conducted of VID procedures taking into account their influence on ACAS equipment. A range of possible actions was considered, the review concluding that any change to the fast jet flight profile would not benefit all airspace users. One of the key factors in this Airprox was the original tracking of the Saab as an unknown evaluated contact: had it been identified as 'friendly' the subsequent VID would not have been conducted. Accurate and correct initial identification will do most to reduce to the minimum the possibilities of VID being conducted against civil aircraft transiting notified exercise areas. The significance of this has been recognised and the issue has been highlighted to all military crews to reduce the risk of recurrence. It is considered that the necessary action has been completed to ensure best practice is followed such that the likelihood of events such as Airprox are reduced to a minimum.

STATUS – ACCEPTED – CLOSED

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 "…the 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.

STATUS – ACCEPTED – OPEN

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 BGA accepts 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 MAY 2006: The BGA and HQ STC have started work on this issue. The BGA have a 'roadshow' which they are taking around to increase the knowledge about where to find gliders and in what conditions. HQ STC are investigating a simple CANP type system through the Low Flying Booking Cell indicating where gliding conditions have resulted in a concentration of aircraft.

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.

STATUS – ACCEPTED - OPEN

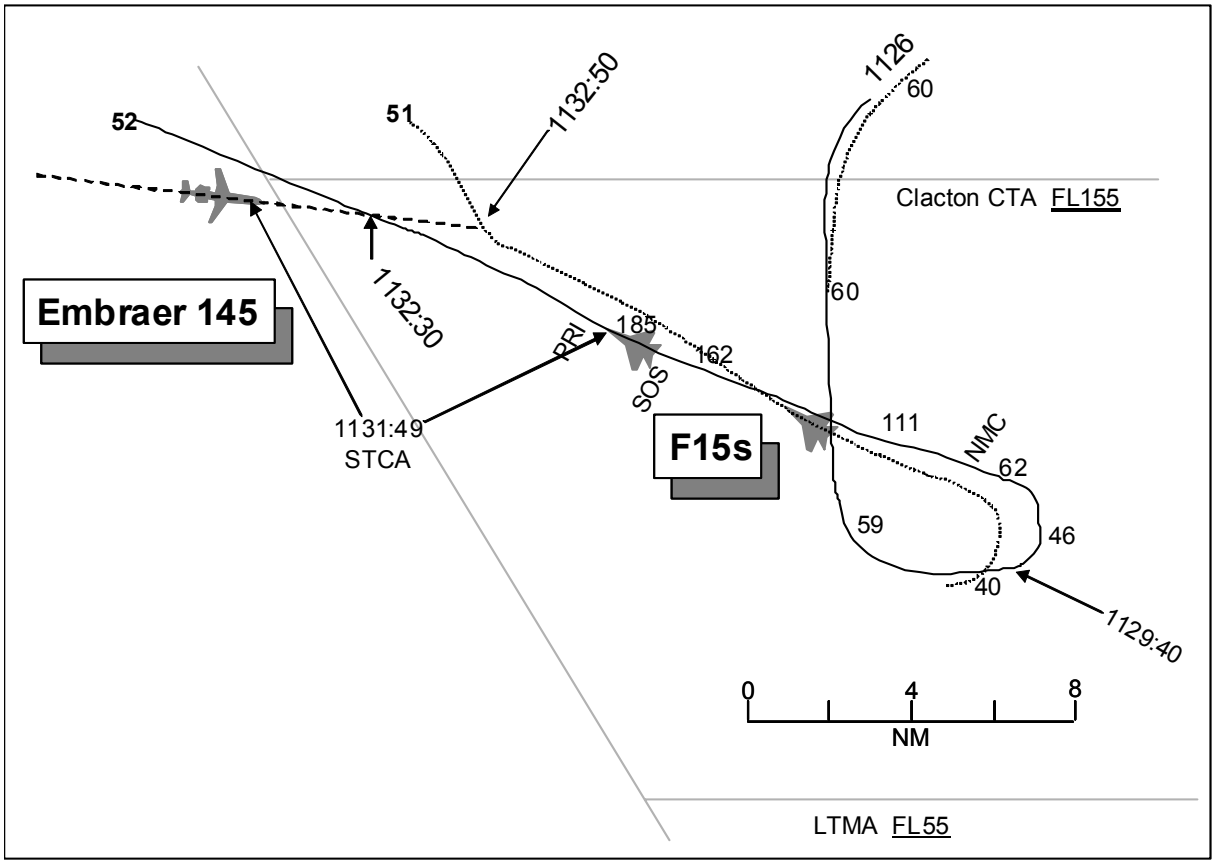
List of Abbreviations

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 008/05

Date/Time:	27 Jan 1132	*Position:*	5225N 00031W (15nm SW Peterborough)
Airspace:	Airway P155	(Class: A)	
	Reporting Ac	*Reported Ac*	
Type:	EMB 145	F15E	
Operator:	CAT	Foreign Mil	
Alt/FL:	FL210	FL200-240	
Weather	VMC	VMC	
Visibility:	10km		
Reported Separation:			
	200m H/100 ft V	1000 V/>1nm H	
Recorded Separation:			
	NK		



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER 145 PILOT reports heading 090° at 290kt on an easterly heading when a conflicting grey F15 was seen at his 1230 crossing R to L and descending. Its range when passing ahead was estimated at 200m, and 100ft below as it passed down the LHS. No TCAS return was received until it was in his 4 o'clock, range 2nm and [as best as he could recall] showing +04. The sighting lasted about 4 seconds. He was given no avoiding action and the risk of collision was assessed as high.

THE F15E PILOT reports heading north at 400kt. They were two ac on a weather diversion from RAF Lakenheath to RAF Valley; the No 2 was 10-15nm to the NW of the leader and leading the diversion because he had least fuel. They were in communication with London Mil. A low wing twin-jet was seen by the leader at 2-3nm which passed 1nm away and 1000ft below.

AIRPROX REPORT No 008/05

THE AAIB reports that the two F15E 'Eagle' ac, c/s 51 and 52, departed in formation from RAF Lakenheath at 0948Z for a close air support training sortie at Otterburn Range. The nominated weather diversion was RAF Valley. "BINGO" fuel, the load required to return to base from the range and if necessary divert, was 10,000lb.

About 25 minutes into the task, 52 informed the formation commander (51) that he was approaching "BINGO". The commander decided to reduce "BINGO" fuel to 9000 lb as he considered that both ac still had sufficient fuel remaining to complete one more run at 20,000ft during the climb to their cruising altitude for their transit back to Lakenheath. About 10nm from the target, 52 called the new "BINGO" fuel level. The formation commander decided to complete the run as he estimated that to do so would only burn an additional 200-300lb in fuel.

The formation commander wished to remain at the range as long as possible to make use of the unusual opportunity presented by the presence of ground controllers at the range. Once 52 called "BINGO" on the second occasion, 51 re-calculated the minimum fuel required in the light of a fuel-saving 40-50 kt tail wind on their return leg and a minimum thrust descent. He was, however, unaware that there would be a problem with the weather on their return or that they would be delayed by other ac trying to land.

During the return, 52 requested they slow down to conserve fuel as his FMS was indicating that he would arrive at Lakenheath with 5800lb of fuel, the calculated diversion fuel being 6900lb. The formation commander judged that by carrying out a minimum power descent they would arrive at Lakenheath with sufficient fuel to divert. He also rejected the request to slow down because he was concerned that a late arrival would disrupt the remaining flying program by cutting short another pilot's sortie, or his own since he was due to fly again that day. His reason for remaining at FL 240 on the return leg was that the vectoring likely in Class B airspace would outweigh any fuel saved by flying higher.

UKAB Note (1): Further information from the AAIB report is included chronologically in the following reports, enclosed in **[ ],** where it adds to information in the reports.

MIL ATC OPS reports that 51 & 52 contacted Lakenheath Approach (APP) at 1116:06 for recovery to Lakenheath. APP identified the pair at 1116:15 and placed them under a RIS. During the descent it was evident that the F15 crews found the recovery traffic busier and the weather worse than expected. They were flying 2nm in trail: 52 - with the lowest fuel - was in front.

At 1121:08, APP advised the F15 crews that "*arrival is… busy*". 51 requested the expected delay and were advised by APP "*negative delay*". APP informed the F15 crews they were "*number 4 to land...you're on base leg*" and "*expect turn into the field in about 5 miles".* At 1127:59, the F15 formation was transferred to Lakenheath Arrivals (ARR). The F15 formation called ARR at 1128:03, "*checking in 6000ft requesting a turn to final to runway 06 full stop".* ARR identified the F15s under RIS and instructed them to "*turn left heading 090º, descend and maintain 3000, standby altimeter".* **[**51 decided to continue the approach; both ac were now below the Valley diversion fuel state. 52, with the least fuel, had taken the lead and, without discussion with 51, the RT. ATC consequently advised him to adopt the formation's squawk and 51 to squawk standby. They were then advised of a pilot-reported cloudbase of 3-500 ft aal. Finding themselves 30nm downwind, 51 again questioned the expected delay at 1127:51, mentioning for the first time to ATC the possibility of diverting to Valley: "*what's your expected delay to take us in, you got us…30 miles away from the field here at…awaiting to get back into the field right now or we need to divert to Valley*". After turning inbound 51 became aware that traffic was congested ahead, with ac going around due to weather and others likely to because of incorrect spacing. It seemed ATC was under pressure so he called the Flying Supervisor who advised the cloudbase was 300ft and lowering and who recommended they divert to Valley.**]** At 1129:47, 51 reported to ARR "*Approach..(stepped on for 2 sec) diverting to Valley at this time we are turning left to a heading of 291º*". ARR did not hear this transmission and asked the F15's crew to "*say again*". At 1130:06 ARR told the F15s' crews to standby and at 1130:14 instructed the F15s: "*C/S…climb and maintain FL230, standby for co-ordination*". ARR rang LATCC(Mil) for handover at 1130:16 and was asked to stand by.

At 1130:27, 51 reported "*Arrival, would you pass to London that we're going to be climbing to FL300 requesting to cross the ambers at FL300*". ARR replied, at 1130:35, "*F15s C/S, correction maintain FL150 expect higher with London*". At 1130:40, 51 responded "*Roger, would you pass that message to London please*" which was acknowledged by ARR.

LATCC(Mil) allocated Controller 14 (CON14) for the F15s and the handover was started at 1130:37 by the Lakenheath co-ordinator (CI):

CI*Handover on (c/s) 51.*

CON14*(c/s) 51.*

CI*Flight of 2 F15s currently ummm west of Lakenheath uh…28 miles . . squawking 0407.*

CON14*Contact, squawk 6143.*

CI*6143 coming on he's out of 130 now, maintaining 150 until clear of controlled airspace, looking for 300.*

CON 14*Fifteen looking for 300*

CI*And going to…diverting to Valley*

CON14*Diverting to Valley roger, turn right to north please contact London Mil 2…254.82.*

CI*254.82.*

The handover was interrupted at 1131:08 by 51 crew stating "*Arrival (c/s) handoff to uh…London uh…right now if you can work that".* ARR told 51 to standby. At 1131:17, ARR instructed the F15s to "*turn right heading 360° London Mil assigned*". 51 crew acknowledged this and replied *"Understand right to 360. I need a handoff to London Mil now*". ARR transferred the F15s to CON 14 at 1131:33, correctly passing the Lon Mil frequency which was correctly read back by 51. However, ARR did not pass the London Mil squawk of 6143 to the F15s. 51 then called the formation frequency change to *"Two five four point eight two five*" but this was not acknowledged. **[**51 then called 52 on the ac auxiliary radio to change to 254·025. None of the crew in either ac spotted the mistake and the formation commander attempted to make contact with London Military on the incorrect frequency. Radar records show that at this time the Mode C squawk being transmitted by 52 for the formation disappeared. Furthermore, none of the replies to these transmissions included the cleared level in the read back, a fact that went unchallenged. Despite replying to the transmission correcting their cleared level to FL150, by the time the ac were handed over to London Military 52 was already passing FL160 in the climb and both ac continued until level at FL230, suggesting the clearance was either misunderstood or ignored.**]**

At 1132:15, 45 secs after the completion of the handover, the F15 formation checked in on the LATCC(Mil)(EAST) Initial Contact frequency (ICF), 299.975 MHz, and reported to the Allocator (ALLOC)*"…roger ma'am, we are fuel divert off of Lakenheath, direct to Valley, I need a climb up to FL 300 or FL310 direct to Valley for fuel*". ALLOC asked the F15 formation to confirm their level passing and this is reported as "*I am at 207 and err like to climb up to FL300".* ALLOC passed at 1132:40 "*51 avoiding action, turn right heading north, traffic believed to be you has traffic east, 3 miles at FL210*". (It is probable that ALLOC was looking at 52, believing it to be the leader, which had by then just passed the EMB145.) 51 replied "*Roger I believe . . I've got my wingman with me as well, you might see him*". ALLOC passed the F15s a squawk and asked what type of service they required. 51 advised they would "*like radar control, but we saw the civil traffic go past, he's..(unreadable)..now we like to climb up to 300*". ALLOC instructed 51 "negative, *maintain your level until identified*". At 1133:12, 51 declared "*51 is going to squawk emergency ma'am we have an emergency fuel divert for 52 who is with us we need to climb to 300, if that would help you better we'd like to go and squawk emergency now".* ALLOC instructed the F15s to squawk emergency. **[**The time of this transmission coincides with the reappearance of secondary data on radar for both F15s with 51 positioned some 10nm E of 52, flying on a divergent track. Both ac then levelled at FL230. 51 made enquiries about weather at Cottesmore and Waddington with a view to diverting there and a further request to climb was denied due to conflicting coordinated civil traffic.

Eventually ALLOC transferred the F15s to Swanwick (Mil) at 1135:39. The F15s were then cleared to FL310 and continued to Valley where 52 and 51 landed with 1100 and 2000 lb fuel respectively. The SOP minimum landing fuel is 1200 lb; an emergency has to be declared if predicted landing fuel is <800 lb.**]**

Debden Radar shows the F15 formation 10nm NNW of Cambridge: 51, who is 2nm in trail of 52, is squawking 0407 and indicating FL63 and both ac are in a left turn. At 1126:19, 52 starts to squawk Mode A 0407 and indicate FL60: 51's Mode A & C disappear at 1127:19. The F15 formation steadies onto a southerly heading at 1127:03. At 1128:26, 52 initiates a left turn onto 090º with 51 2nm in trail. 52's Mode C begins a descent from FL60 at 1128:31. At 1129:41, the F15 formation commences a further left turn onto a north westerly track whilst 52's Mode

C indicates FL45. 52's Mode C shows a climb to FL46 at 1129:52 and then disappears at 1130:24 having shown an indication of FL62 the previous sweep. At 1130:43, 52's Mode C reappears for one sweep indicating FL111 before disappearing for 10 secs and then showing FL130. At this stage 51 is 3nm in trail. The F15 formation maintains a north westerly track and at 1131:13, the conflicting E145 is in 52's left 11 o'clock, 20nm, tracking 100º and indicating FL192 climbing; the lateral separation between the F15s is 3¾nm. The next sweep shows the lateral separation between the E145 and 52 has reduced to 16½nm with 52 now indicating an SOS squawk with Mode C FL168 indicated. The next 3 sweeps show 52 climbing at a rate of 500ft per sweep until indicating FL185 with 51 now 5nm in trail. At 1131:50, 52's SOS Mode A & C indications disappear; the E145 is in 52's 12 o'clock, 10nm indicating FL202 climbing. STCA momentarily activates at 1131:50. At 1132:23, the lateral separation between 52 and the E145 is 2·5nm, 51 being 6nm in trail of 52. The next sweep shows the lateral separation reduced to ¾nm between 52 and the E145 whose Mode C is indicating FL210; the F15s are 6¾nm separated. The next sweep shows 52 having passed through the path of the E145 but 51 is in the E145's right one o'clock, 6nm. The next sweeps show the lateral separation reducing to 1·2nm. 1133:03 sees 51 having passed through the flight path of the E145 and initiating a right hand turn.

The F15 formation, apparently distracted by their fuel state, followed standard ATC practice until 1130:30 when APP commenced a handover to CON 14. ARR had correctly instructed the F15s to stop climb at FL150 due to the proximity of CAS and initiated the handover to CON14. Whether this stop off was acknowledged by the crews is questionable as although 51 replies "*roger*" no readback of the restricted level is given. By the end of the handover the F15s are 5nm in trail and 52 is indicating FL131. The right turn, passed on handover and acknowledged by 51, is not taken. The F15s do not contact CON 14 and 43 secs later freecall the ALLOC reporting *"…climbing to FL300 or FL310 direct Valley for fuel".* Although ALLOC had no details on the formation she immediately had the forethought to obtain the F15s' level passing. 51 reported passing FL 207 and ALLOC passed avoiding action: however, the F15s were 6·5nm in trail at this stage with 52 already having passed the E145 and 51 in the E145's 12 o'clock 5nm. The Airprox had occurred shortly after the F15s contacted ALLOC due to the formation having already climbed through their cleared level of FL150. 52 did squawk emergency briefly prior to the Airprox but the loss of Mode A & C information from both F15s for the period immediately before and after the Airprox is a significant factor as this negated any STCA and TCAS alerts. The Mode A and C information disappeared from the F15s on more than one radar head recording. ARR correctly applied a stop-off level to the F15 formation to remain clear of CAS and ALLOC reacted in a timely manner to the F15s freecall but unfortunately the Airprox had already occurred before she could take any positive action.

UKAB Note (2): The basic rules for formation spacing and squawking in CAS, as relevant to this incident, are as follows: All ac in a formation are to fly within one nm of each other at the same level or altitude by visual means or by use of airborne radar, and the leader of a formation will be assigned an SSR code with Mode C. Where this not possible, formations are to be split into elements separated by the prescribed ATC separation minima before entering CAS, each element is to be assigned a discrete SSR code with Mode C.

ATSI reports that the E145 was routeing eastbound along airway P155 from Birmingham to Hannover. The E145 called the Sector 12 Tactical controller at 1131:00, climbing to FL210. At that time the ac was outside the displayed range of the Tactical and Planner's workstations. This is common practice especially with outbounds from Birmingham and East Midlands when such ac are transferred outside the displayed range of the Tactical's display and so the Planner's radar is used for initial identification. The Planner wound out the range of her radar to show the E145. A squawk was visible, now known to be one of the F15s, about 15nm from the E145 and indicating FL168.

At 1131:32, the F15's SSR code changed to 7700 and STCA activated against the E145. The Planner telephoned Sector 28/34 Planner to coordinate climb on the E145 and during this call, she noticed the 7700 squawk. The height readout from the F15 showed FL184 before both the Mode A and C returns disappeared. By 1132:08, the F15 was not visible on the Planner's display.

Meanwhile, S12 Tactical was concentrating on other tasks within his sector. He had identified the E145 from the adjacent Planner's display and did not notice any conflicting traffic. The Planner advised that climb had been coordinated for the E145 but did not mention the 7700 squawk. At 1132:45, the Tactical instructed the E145 crew to climb to FL310 which was acknowledged. The Tactical then asked the crew for their requested level to which the pilot replied "*Standby we've just had an F15 go past on the nose, probably about a hundred feet below, standby on the level.*"

Just before the E145 crew reported this, the Planner had pressed the 'show all' key which revealed two primary returns, one ahead and one behind the E145. She pressed the key again when she heard the report, which now showed the second F15 merging with the E145. The pilot of the E145 confirmed that a single F15 had passed a hundred feet below and no more than about 200 yards ahead. Both the E145 and the F15 were outside the displayed range of the Tactical's display throughout the incident.

The Planner later explained that she did not mention the 7700 squawk to the Tactical as there was nothing to suggest that the 7700 would climb into conflict with their traffic. At the time, both the F15s and the E145 were within TC Midlands airspace and there was no reason to believe that the 7700 was not known traffic to them. Furthermore, it was not uncommon to see emergency squawks in that area as they recycled their Mode A codes on handover between units.

Later checks revealed that the 'Remove Primaries' had been selected on the Planner's display and there is no clear warning to controllers when this is selected. The current Method of Operations (MOPS) do not stipulate a requirement for either the Planner or the Tactical displays to display primary only returns. However, there is a requirement that when the 'Remove Primaries' is selected this fact is handed over to the oncoming controller which did not happen in this case.

Regardless of the selection of 'Remove Primaries' it is unlikely that the sector team would have been able to resolve the confliction. The short-term loss of the SSR from the second F15 removed the safety net of TCAS. As both F15s had entered controlled airspace without an ATC clearance it is concluded that there are no prime civil ATC causal factors.

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 assumed that the serious lapses of leadership, airmanship and CRM demonstrated by the F15 crews and any shortcomings in the supervisory chain would be addressed by the appropriate military authorities. The Board therefore limited its discussions of these aspects to an expression of understanding the predicament of the pilot of 52 and the pressures on him not to break formation and initiate a diversion much earlier, which would have been entirely justified. The relevance of these aspects to the Airprox had been brought out in the associated AAIB report: in summary, both crews became so completely preoccupied by their fuel state that they lost concentration almost entirely on everything else, especially on the requirements for negotiating Class A/B airspace safely and on their airborne radars which might have alerted them to the presence of the E145.

The Board quickly concluded that the primary cause of the Airprox was that the F15 crews did not follow the correct procedures for entering controlled airspace in that they entered before they had been identified and cleared by London Mil; did not adopt either the correct SSR procedures for crossing as a formation or as singletons and did not comply with heading and height instructions passed to them by Lakenheath or London Mil. While they may have been driven by desperation to ignore these instructions, they did not squawk Emergency from the start, or continuously, which would have helped the civil controllers involved; indeed they did not squawk anything continuously, with Mode C, which negated the E145's TCAS and the controllers' STCA. Furthermore, having separated into singletons, they should both have been squawking.

The Board also agreed that the performance of Lakenheath ATC contributed to the Airprox in that they did not insist on proper acknowledgements of their flight level instructions. This left the possibility that the aircrew had not understood them: indeed, such an instruction is deemed not to have been issued until it has been properly read back. But the main shortcoming was that Lakenheath ATC did not pass on to the F15s the 6153 squawk given to them by London Mil. Had this been passed, there would have been a distinct possibility that the F15 crews would, at the least, have had the importance of squawking in controlled airspace raised in their consciousness. The lack of a squawk was the main factor affecting the high risk level of the incident.

The Board considered whether or not the civil controllers could have done more to avert the incident. The appearance of an emergency squawk should have alerted them to a problem requiring attention but it only appeared for 3 radar sweeps. Members were advised that momentary emergency squawks appeared frequently

as SSR codes were recycled. It seemed reasonable for the Planner to have assumed that this was one such occurrence but, as it was showing inside CAS, ATCO Members considered that the Planner should have drawn the Tactical controller's attention to the 7700 squawk and selected 'show all' straight away. Notwithstanding, there was by then very little time for the control team to have assessed the situation and passed any useful traffic information or avoiding action to the E145 pilot.

Members agreed that the London Mil ALLOC did not have the time or radar information to have issued useful instructions before the Airprox occurred.

In assessing the risk level, the Board assumed from the sequence of sightings and transmissions, set out in the ATSI report, that it was the first F15 (52) that was reported by the E145 pilot. The F15 pilots' report indicated that it was the leader (51) who saw the E145 and took avoiding action and that 52 passed without seeing the airliner in time to take any action. This alone indicated a high risk level but the fact that the F15s were not squawking, and therefore the E145's TCAS and LACC's STCA were ineffective, made the fortunate outcome of this incident a matter of luck. Members concluded their discussion by observing that had the F15 crews, in their extreme concern about their fuel state, simply squawked Emergency with Mode C, their non-compliance with heading and height instructions would not have had nearly such a serious outcome.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The F15 crews did not follow correct CAS entry procedures and climbed above their cleared level into conflict with the EMB145.

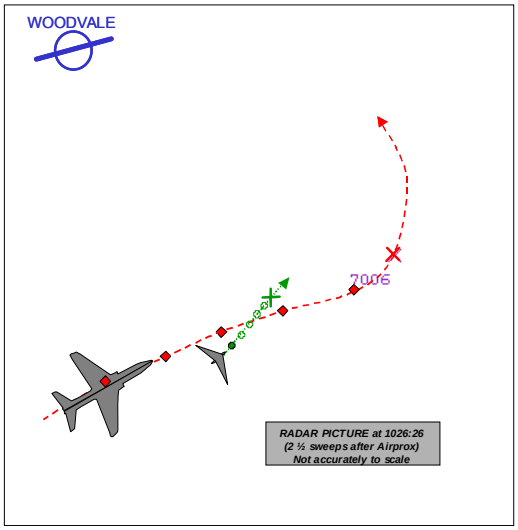
Degree of Risk: A.

Contributory Factors:

1. The F15 crews did not correctly acknowledge or comply with ATC instructions;
2. The Lakenheath APR did not challenge the lack of a readback of the level clearance by the F15 pilot;
3. Neither F15 was squawking at the time of the Airprox.

AIRPROX REPORT NO 099/05

Date/Time:	1 Jul 1020	
Position:	5331 00300W (1nm SE Ince - elev 10ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Flexwing Microlight	Hawk
Operator:	Civ Trg	HQ PTC
Alt/FL:	1500ft	1000ft (QFE 1010 mb)
Weather	VMC CLBC	VMC CAVOK
Visibility:	>30km	>10km
Reported Separation:	50ft V/ 0H	350ft V/100yds H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FLEXWING MICROLIGHT PILOT reports flying a local training sortie from Ince Airfield in a yellow ac in contact with Ince A/G. While heading NE out of sun back to Ince Airfield in good conditions at 55kt and 1500ft, an

RAF Hawk Trainer flew directly under his ac from behind. The Hawk was then seen to complete a low pass over RAF Woodvale before heading back towards RAF Valley. He thought that the Hawk pilot had not seen his microlight even though he would have been in a good position to do so. They were so close that the air beneath his ac was shimmering from the heat of the Hawk's engine. He commenced a full power climb to increase separation from the wake after the ac had passed and assessed the risk of collision as being very high.

THE HAWK PILOT reports flying an Staff Continuation Training (SCT) sortie with a passenger in the rear seat in a black ac with HISLs and anti-colls on, squawking 7000 [he thought] in receipt of a FIS from Woodvale shortly after leaving Liverpool APP. While heading 080° at 310kt and positioning for initials RW26 Woodvale at 1000ft on the Woodvale QFE, he saw a high-wing microlight about 1nm away and slightly above them, crossing from R to L heading about 090°. Although he was visual with the microlight throughout, he bunted gently to avoid it because he did not want to alarm the microlight pilot. He assessed the risk of collision as being nil and he continued with his sortie.

UKAB Note (1): The recording of the St Annes radar shows the Hawk throughout, squawking 7006 (unallocated); there is no Mode C indication. The Hawk Mode C disappears after the ac changes from a Liverpool Squawk to 7006 a few minutes before the incident. The microlight paints as a primary contact on two occasions only, one 3 sweeps before and one 2 sweeps after the incident

HQ PTC comments that again this highlights the need for an effective lookout and the difficulty of seeing small slow moving ac.

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 Hawk operating authorities.

The Board was aware of the difficulty of visually acquiring a slow moving microlight against a similarly coloured background. Nonetheless since the Hawk had approached the microlight from the rear, the majority of the responsibility for collision avoidance lay with the Hawk pilot. Although he did see the microlight in sufficient time (just over 10sec) to initiate avoiding action by descending, the Board considered that some lateral as well as vertical separation would have been more appropriate and would have caused the microlight pilot much less concern.

The HQ PTC Member briefed the Board on the basis of his personal experience that when flying the ac visually at low level the positioning of the IFF control panel and switches in the Hawk cockpit necessitates making some selections by touch. Because this can lead to mistakes, HQ PTC is very aware of the problem and the potentially serious consequences, publicising it to their aircrew. The issue will be been rectified in the Hawk 128.

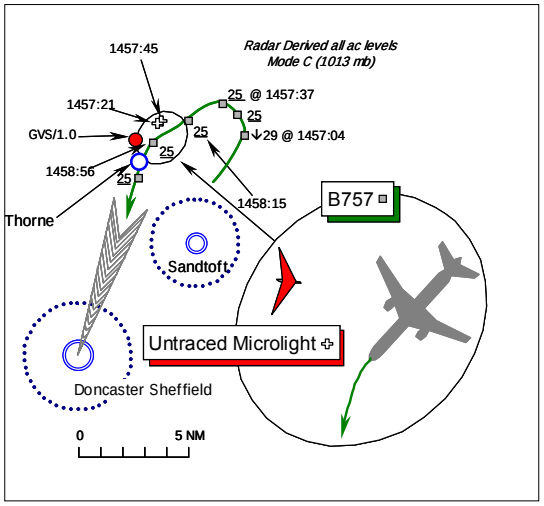
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Having seen the microlight at 1nm, the Hawk pilot flew close enough to cause the microlight pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 101/05

Date/Time:	3 Jul 1457 (Sunday)	
Position:	5338N 00055W (10nm NE Doncaster Sheffield Airport - elev 55ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B757-200	Untraced M/L
Operator:	CAT	NK
Alt/FL:	2500ft (N/K)	NR
Weather	VMC CAVOK	NR
Visibility:	>10km	NR
Reported Separation:	Nil V/¼nm H	NR
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757-200 PILOT reports he was inbound to Doncaster Sheffield Airport (DSA) at 170kt in CAVOK conditions at an altitude of 2500ft and in communication with DSA TOWER. Approaching a position 10nm NE of the airport whilst on the base turn L through 190° for the ILS DME procedure to RW20 with autopilot and auto throttle selected, he spotted what appeared to be a microlight (ML) as it passed about ¼nm to starboard of his B757 at a similar altitude. As they were already in a L turn taking them away from the microlight no further avoiding action was taken and the approach was continued. He assessed the risk as "low" and reported the Airprox to ATC after landing.

THE RADAR ANALYSIS CELL (RAC) AT LATCC (MIL) reports that a replay of the Clee Hill Radar recording is inconclusive: a primary contact which may or may not be the reported microlight is shown for barely 2 sweeps over ½min. Exhaustive enquiries through known operators and local clubs in the area have proved fruitless. Despite the assistance of the British Microlight Association, it has not been possible to identify the reported microlight, which therefore remains untraced.

UKAB Note (1): The 1450UTC DSA Weather was reported as: Surface Wind: 210°/10kt vrb 160°-240°; Visibility 28km in CAVOK; QNH1014mb. BARNSLEY RPS: 1009mb.

ATSI reports that there are no apparent ATC causal factors. The inbound B757 crew was in receipt of an APPROACH Control Service from DSA TOWER and was cleared for a procedural ILS approach to RW20. The microlight pilot had not called on the frequency and, consequently, was unknown to the controller. It was only as the B757 was taxying in that the pilot reported his intention to file an Airprox which he stated at the time as being with a hang glider on his R as he turned onto the LLZ at 2500ft.

UKAB Note (2): The geometry of this Airprox is not illustrated clearly on the LATCC (Mil) radar recordings although the track of the B757 is shown on both the Great Dun Fell and the Clee Hill sources, the latter occasionally missing returns. The B757 is shown turning inbound at 2500ft Mode C (1013mb) at 1457:37, whereupon the contact is lost for several sweeps. Meanwhile, a contact which may or may not be the microlight is shown only on the Clee Hill recording for 2 sweeps, in a direction relative to the B757 which accords with the reporting pilots account. However, the intermittent nature of the returns does not permit the minimum separation to be determined.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report solely from the pilot of the B757 and a report from the ATC authority. It was unfortunate that despite the best efforts of the RAC and the British Microlight Association, the identity of the microlight pilot could not be ascertained and hence no report was available giving his/her perspective on this

Airprox. Consequently, it was difficult to draw meaningful conclusions on the limited information available regarding this encounter in Class G airspace some 10nm NE of DSA in the vicinity of the RW20 FAT.

Clearly the microlight pilot was legitimately entitled to be flying here in the 'Open FIR' where see and avoid prevails under the 'Rules of the Air'. But it seemed from the B757 pilot's account that the small microlight was apparently approaching at a head-on aspect thereby defeating earlier visual detection from the B757's flight deck. There was little more to be said on the topic and the Board could only conclude, somewhat unsatisfactorily given the paucity of information, that this was a sighting of an untraced microlight by the B757 pilot.

Regarding the inherent risk, it was not feasible to determine with absolute certainty the separation that pertained here because of the intermittent nature of the recorded radar data. Given that the B757 pilot was already turning away from the microlight when it was seen ¼nm away there seemed to be little inherent risk of a collision. Albeit that there might well have been some potential for the wake turbulence associated with this large jet to cause the microlight pilot some considerable difficulties after the B757 had passed by. Nevertheless, the B757 pilot had reported that no further avoiding action was necessary as they turned onto finals leading the Board to conclude that no risk of a collision had existed.

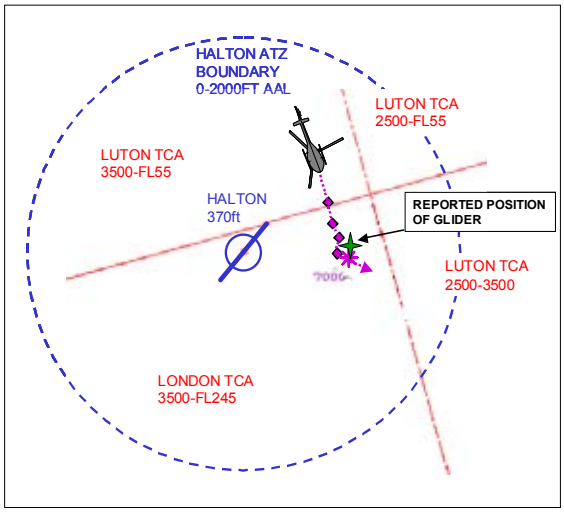
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A sighting of an untraced microlight by the B757 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 106/05

Date/Time:	9 Jul 1131 (Saturday)	
Position:	5147N 00044W (1nm E Halton-elev 370ft)	
Airspace:	Halton ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	K-18 Glider	Squirrel AS 350B
Operator:	Civ Club	Civ Pte
Alt/FL:	1000ft (QFE 1013mb)	1200ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	6km	NR
Reported Separation:	50ft V/100m H	200ft V/300m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE K-18 GLIDER PILOT reports flying solo in a white and orange glider and was ridge soaring, heading 020° at 45kt, immediately following a winch launch to 1300ft AGL. He was sustaining a height of 1000ft QFE in weak lift over the N facing ridge to the E of Halton Airfield. He then made a 360° thermalling turn to the L and as he came round scanning ahead of his L wing he saw a dark single rotor 4/6 seat helicopter 150m away turning away to his left so he tightened his L turn to increase separation. He did not hear any call to Halton from the helicopter which appeared to be transiting through the Halton ATZ. He thought that both pilots had seen each other late and the helicopter had also taken avoiding action. He did not assess the risk of collision.

THE SQUIRREL AS 350B PILOT reports flying a dark blue helicopter with strobes and nav lights selected on flying from Silverstone to an hotel near Watford, squawking 7000 with Mode C and initially in receipt of a FIS from Luton.

AIRPROX REPORT No 106/05

He was heading SE at 90-100kt in transit at 1200ft on the Luton QNH when he called Halton Radio on 130·42MHz to advise them of his presence but he received no reply as had been the case when he called on a previous flight 30min earlier. When NE of Halton he began to encounter reduced horizontal visibility so he turned onto a more southerly heading. He was aware that he was close to the ATZ but considered that he had not infringed it. He was also aware of a glider to his right in about his one o'clock position and at a lower altitude, but even though he considered it not to be in conflict, he altered course slightly to avoid it. He considered that there was never any risk of collision and continued towards his landing site.

As a point of note on his final sector back to Oxford he did make contact with Halton Radio advising them of his route, that time he had been to the S of the ATZ.

UKAB Note (1): The recording of the Heathrow radar shows the helicopter squawking 7000NMC throughout but the glider does not paint until well after the event. The helicopter flies about 1nm to the E of Halton (the position reported by the glider) inside the ATZ as shown above.

UKAB Note (2): The METAR for Luton at 1120 was:

091120Z 02008KT 4500 BR SCT002 BKN003 14/13 Q1025=.

The London QNH was 1024mb.

THE LTCC controller comments that he was advised of the incident one month after it occurred and had little recollection of the event.

HQ PTC comments that they are satisfied that the Halton A/G station was manned at the time of this incident. Moreover, that there is a robust procedure to ensure that the transfer of responsibility for the A/G station between flying units is properly recorded. The frequency is not tape-recorded. Neither the duty A/G Operator nor the glider concerned nor any other airborne ac heard the Squirrel call Halton.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings and reports from the RAF Halton operating authorities.

The Board noted that this incident had taken place in poor weather which caused the Squirrel pilot to deviate from his planned and intended track. Members accepted that he had tried to call Halton; that the RT frequency was serviceable and manned at the time of the incident but suggested that there may be some technical explanation, such as terrain blanking, as to why the Squirrel pilot's calls were not heard by Halton.

Halton is a very busy and frequently infringed ATZ; GA specialist Board Members suggested that GA pilots would be wise to keep well clear of it. The HQ PTC Member restated that they were monitoring closely the number of incidents in the Halton area and are most concerned at the situation.

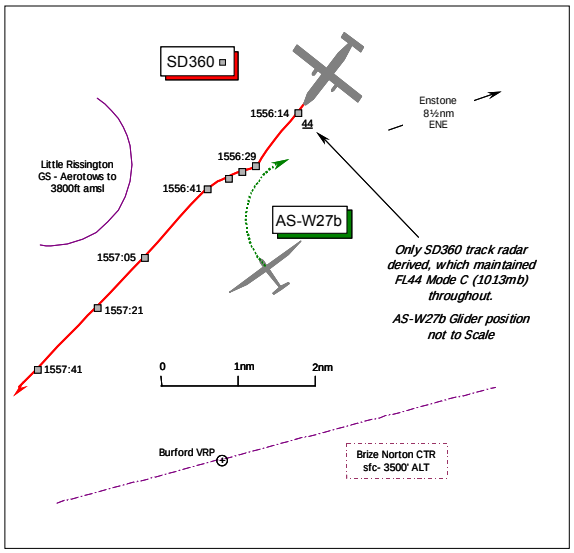
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Squirrel pilot entered the Halton ATZ without receiving a response to his call to Halton A/G as required by the Rules of the Air Rule 39 (2) and flew into conflict with the glider.

Degree of Risk: C.

AIRPROX REPORT NO 109/05

Date/Time:	10 Jul 1557 (Sunday)	
Position:	5152N 00137W (2½nm E of Little Rissington - elev 730ft)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	AS-W 27b Glider	Shorts 360
Operator:	Civ Pte	CAT (Freight)
Alt/FL:	5170ft (N/K)	FL45
Weather	VMC CLBC	VMC CAVOK
Visibility:	15-20nm	>10km
Reported Separation:	<50ft V/250m H	500ft V/¼nm H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS-W 27B GLIDER PILOT provided a very comprehensive account reporting that he had winch-launched from Nympsfield at 1208UTC and flown a triangular cross-country course via turning points at Westbury and Membury, before returning to Nympsfield. That task was completed at 1442UTC and as it was good soaring weather he decided to remain airborne and execute a leg out to Enstone and back. The Airprox occurred on the return leg from Enstone, a few miles E of Little Rissington whilst he was monitoring 130·125MHz [a glider frequency].

He was climbing in a thermal some 600ft below cumulus in clear air in a right hand turn through approximately 330° at about 50kt when he first spotted the other ac in his 2 o'clock about 300m away crossing rapidly from R - L. The other ac – he recognised it as a high-wing Shorts 360 (SD360) - was descending he thought very slightly and banking away from him slightly. It was immediately apparent that his thermalling turn would result in his glider "missing" the Shorts 360, but he was shocked that such a large ac could have got so close without him having seen it beforehand. He estimated that the SD360 passed about 250m away at the closest point as it crossed ahead and very slightly - <50ft – higher than his glider. After completing a further ¾ of a full turn he thought that the SD360 was continuing to descend slightly and had opened a gap of about 1nm on a heading of about 240°.

Although he assessed the risk as "low" his immediate reaction was that collision had been imminent and added that this was the closest view of a commercial ac he had had in nearly 5000hr of flying. Having completed the climb to within a few hundred feet of the cloud base and started his final glide for Nympsfield he changed frequency to Brize RADAR on 119·00MHz and attempted to report the incident. However, it seems that they were busy and having difficulty hearing his transmissions and Brize suggested he report by landline later, which he did that evening. Whilst at the instant of the Airprox he had feared that collision had been a real risk, in retrospect he doubts that this was the case unless the other ac's slight bank away from his glider was an evasive manoeuvre. Concerned that he did not spot the SD360 earlier, he adjudged that it should have been visible on both the previous turns but given his glider's climb it is possible that he might have missed it against the background cloudscape. He stressed that he was not under a particularly high workload, chiefly listening to the audio variometer and constantly adjusting the turn to make best use of the lift.

UKAB Note (1). The reporting pilot's attempt to report the Airprox to Brize RADAR on RT was at 1557:45, when the SD360 crew was still on the frequency but the glider pilot's radio transmissions were apparently unreadable to the controller, although they have been subsequently transcribed satisfactorily. Further details were then passed to the on watch APPROACH controller in a telephone conversation with the reporting AS-W27b pilot at 1857UTC that evening.

AIRPROX REPORT No 109/05

THE SHORTS 360 (SD360) PILOT reports his ac has a white/blue livery and the HISLs were on whilst in transit from Coventry to Exeter and in receipt of a FIS from Brize RADAR. A squawk of A7000 was selected with Mode C. TCAS is not fitted. An IFR FPL had been filed to Exeter.

Flying in a level cruise at FL45 in CAVOK conditions heading 240° at 150kt, the glider was first sighted 2nm away in their 10 o'clock by the PIC seated in the LHS. The glider was turning and climbing, so he turned his SD360 R onto 270° "to avoid a conflict with the glider", which passed about ¼ nm to port and 500ft below his airliner. He assessed the risk as *"slight because of good VMC"*

He explained that this route to Exeter should have involved a CPT SID from Coventry, but his Company Ops had filed them direct CHELT - a non-standard routeing through the Birmingham CTR who had declined to provide a 'transit' ATS. Normally, Company ac call Birmingham ATC on 118·05MHz, but Coventry ATC did not pass them on this frequency and suggested a heading of 220° climbing to FL45 to keep clear of CAS, *"as if VFR"*. Because of the density of traffic in Class G airspace this was ill-advised.

UKAB Note (2): The 1550UTC Brize Norton Weather was: Surface Wind: 060/11kt; CAVOK; QNH1029mb; CC BLUE NOSIG. COTSWOLD RPS: 1025mb.

UKAB Note (3): The reporting AS-W27b pilot's comprehensive account reported the time of the Airprox as 1557:31 and the location as a few miles E of Little Rissington at 51°52'53"N 001°37'57"W.

The time and position of the incident was his best estimate from the record of his GPS Logger carried, but he added that the timing error was probably <1min. Height indicated at Nympsfield - elev 700ft asml – after landing was 764ft, suggesting a 64ft variation over the approximately 4hour period that he was airborne.

Although the radar recording of the 10cm Heathrow source does show occasional primary returns, which might be gliders, none is shown in the vicinity of the location of the Airprox, which is believed to have occurred some 2½nm E of Little Rissington at about 1556:29. This is when the SD360 - shown squawking A3713 and maintaining FL44 (1013mb) throughout (about 4980ft amsl Brize QNH (1029mb) - approaches the reported location and makes a sharp alteration of course westerly for a short distance before returning to a steady course. This is potentially indicative of the SD360 pilot's reported avoiding action turn onto 270° "to avoid a conflict with the glider". Consequently, as the glider is not shown on the radar recording the relative geometry and minimum separation that pertained cannot be ascertained independently.

THE BRIZE NORTON LARS CONTROLLER (BRIZE RADAR) reports 18 days after the Airprox occurred that it was a very busy weekend with multiple ac on frequency at all times. The SD360 was assigned a squawk of A3713 and provided with a FIS at FL45 whilst in transit, but the crew did not report any incident whilst on frequency.

UKAB Note (4): In the absence of a Mil ATC Ops report analysis of the Brize RADAR RT transcript of 124·27MHz reveals that at 1551:52, the SD360 crew called Brize RADAR stating *"…transiting from Coventry to Exeter 4500 feet…1013…heading…200 we got airborne expecting an IFR flight plan and we've been informed by Coventry that no such thing* [FPL] *exists we need to go direct Exeter wonder if you can give us a RIS?"* The controller responded, "[C/S] *will be a FIS unit currently working to capacity"* which was acknowledged by the SD360 crew. Subsequently a squawk of A3713 was allocated to the flight. At 1555:57, the SD360 crew enquired, *"…confirm we're clear to transit your Zone at FL45"*, to which the controller responded *"affirm that's approved maintain clear of South Cerney that is active with para dropping".* (The upper level of the Brize Norton CTR is 3500ft amsl) The controller proffered advice for the avoidance of the para dropping at South Cerney with a vector onto W issued at 1559:49. However, the SD360 crew made no mention of any encounter with a glider nor was any other information proffered by RADAR. The SD360 crew switched to Bristol for a radar service at 1606:09.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies and radar video recordings.

The glider pilot Member – also a highly experience fixed–wing pilot - highlighted to the Board the broad diversity of aviation activity that regularly takes place in this vicinity. Here on a weekend afternoon in the Summer, the presence of it at least 100 gliders is commonplace, their pilots all searching for areas where there was the best lift.

Add to that microlights, paragliding, sport parachuting and GA ac, these all contribute to a dense traffic scenario with many pilots vying for passage through the very limited Class G airspace available at the lower levels. The gliding Member advised that to reduce the potential for encounters such as these with gliders whilst in transit through the lower airspace, CAT pilots might - where their flight permits – do better to fly above the cloudbase where gliders are not so prevalent because the lift is not as advantageous. For example here it might have been preferable for the SD360 to transit at an appropriate quadrantal level above FL60. That was not intended to imply any criticism of the SD360 pilot who was legitimately entitled to route through this airspace, VFR, at a non–quadrantal level if he chose. But, all things being equal the Member suggested, if it was feasible to transit higher it might well reduce the potential for such an encounter as reported here.

The SD360 pilot had wisely endeavoured to obtain a radar service from Brize Norton, which unfortunately was not available as the ATSU was apparently very busy and already working at capacity. Civilian pilots should be aware that the capacity of military ATSUs to provide a radar service to transit traffic at weekends and public holidays might be very limited indeed. Hence, the Board was not surprised that Brize Norton was unable to formally offer the SD360 crew such a service, when as a result of the non-standard routeing filed by their company, their preferred routeing through CAS was unexpectedly denied. Nevertheless, even without the added benefit of a radar service it is clear that the SD360 pilot had spotted the glider – he reported 2nm away – in reasonable time and turned to "avoid a conflict" he said. Whilst a Member questioned whether the SD360 pilot had seen the actual glider flown by the reporting pilot, from the comprehensive positional information provided by the latter, the location given fitted with the observed avoiding action turn seen on the radar recording. CAT pilot Members observed that the SD360 is not that small an ac [the wingspan is only 6m shorter than a B737] and so for those not used to seeing such ac regularly it was possible that the glider pilot might feasibly have misjudged the separation especially as both ac were in opposite banked turns. Similarly, the SD360 pilot might have been mistaken about the size of the glider. However, without radar data showing both ac at the CPA it was not possible to resolve the anomaly of the widely differing views of the minimum separation reported here. In the event, the SD360 pilot turned R in avoidance and before his ac was spotted by the glider pilot, who first saw the other ac banking away from his glider to the R. Consequently, the Board agreed that the cause of this Airprox was a conflict in the Oxford AIAA resolved by the SD360 pilot. The glider pilot had himself reported that his thermalling R turn was taking him clear of the SD360 anyway. This coupled with the earlier sighting and avoiding action turn of the SD360 pilot convinced the Board that no risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

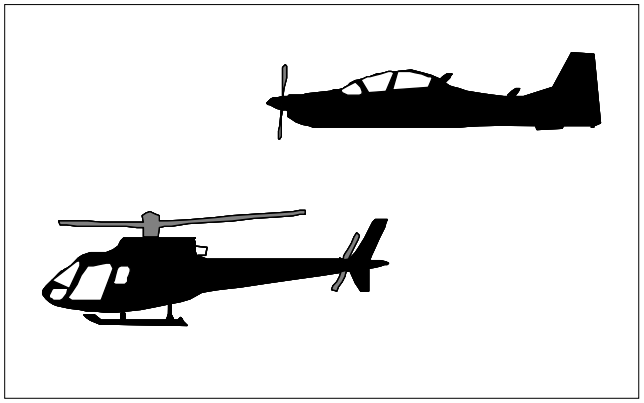
Cause: Conflict in the Oxford AIAA resolved by the SD360 pilot.

Degree of Risk: C.

AIRPROX REPORT No 110/05

AIRPROX REPORT NO 110/05

Date/Time:	14 Jul 1300	
Position:	5415N 00108W (2nm S Rievaux Abbey)	
Airspace:	UKDLFS LFA 11	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Squirrel	Tucano
Operator:	HQ PTC	HQ PTC
Alt/FL:	210ft (agl)	250ft (agl)
Weather	VMC CAVOK	VMC CLBC
Visibility:	10km	30km
Reported Separation:	10ft V/0H	Not seen
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL PILOT reports flying a yellow and black ac with a student on a low level navigation instructional sortie from RAF Leeming to RAF Shawbury and squawking 7000 with Mode C. While teaching low-level techniques heading approximately SE at 200ft agl down Ryedale Valley towards Riveaux Abbey and just after turning to follow the valley floor, a black shadow passed over his cockpit. He looked up immediately and saw a Tucano wing tip pass approximately 10ft above his rotor disk as it overtook them, also flying down the valley. The Tucano was in a steep turn then rolled level in front of them to continue following the terrain. He estimated that the Tucano was flying at 250ft agl and considered that the risk was very high.

THE TUCANO PILOT reports that he was flying with a passenger [prospective pilot] and at the time of the incident was heading 160° at 240kt and low level down a tight valley which required a good deal of rolling manoeuvre to remain in it. He was sitting in the rear seat and did not see the reporting ac.

UKAB Note (1): Although both ac paint intermittently on the recording of the Great Dun Fell radar, the incident is not recorded

THE SQUIRREL STATION comments that by the time the Squirrel crew were aware of the proximity of the Tucano the danger had already passed. The Tucano crew were unaware of the presence of the Squirrel. Both crews appear to have been operating within their authorised limits and just happened to be at the same place at the same time.

DHFS are reviewing their flying training syllabus with respect to the teaching of low level navigation at 200ft AGL outside the LFA 9 Dedicated User Area.

THE TUCANO STATION comments that according to the information provided by the reporting pilot this was an extremely close encounter. Indeed only good fortune had prevented it from being a mid-air collision. Rotary traffic can be very difficult to acquire visually in the low level environment, particularly when in an overall colour scheme of black. The Tucano is currently being fitted with TCAS 1; its fleet embodiment cannot come soon enough. A TCAS TA would almost certainly have averted this very near miss.

HQ PTC endorses the stations' comments.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included only reports from the pilots of both ac and reports from the operating authority.

The Board was informed that both ac had been operating legitimately in the LFS, fortunately to different minimum authorised heights; that being the case see and avoid was the sole means of collision avoidance. Both ac had been flying down a valley with the Squirrel below and ahead of the Tucano, but at a much lower speed. Despite the 'high visibility' black and yellow colour scheme (it did not have coloured rotor blades) the helicopter was tail-on in aspect and presented a very small target to acquire visually and it would have blended in against dark background of trees and moorland and further would have had very little relative motion when viewed from the Tucano cockpit.

The Board however, considered the single biggest factor contributing to the Tucano pilot not seeing the Squirrel was that the former ac was being flown from the rear seat with the front seat occupant being an inexperienced passenger. The Board was informed by an expert familiar with the Tucano that although the visibility directly ahead is unrestricted, there is restricted vision below the horizon. Several pilot Members commented on the advisability of operating the ac at low-level in such a crew configuration but the Board accepted an assurance from the HQ PTC Member that appropriate follow-up action had already been taken.

When considering the degree of risk Members noted that the information available to them, albeit scant, pointed to the ac passing very close indeed. They accepted however, that had there been an actual risk of collision the ac would have had to be on conflicting flight paths (at the same height) and had that been the case the Tucano pilot would almost certainly seen the Squirrel in his line of vision.

Notwithstanding that there had not been an actual collision risk, since the Tucano pilot did not see the Squirrel at any stage, Members considered that there had clearly been a compromise to the safety of both ac.

PART C: ASSESSMENT OF CAUSE AND RISK

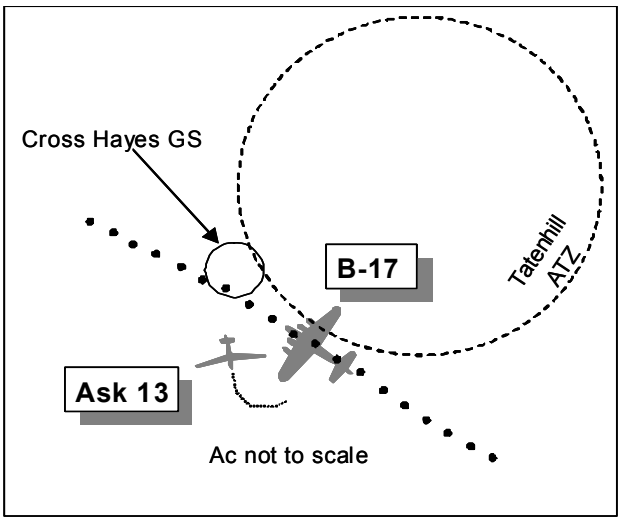
Cause: Non-sighting by the Tucano instructor.

Degree of Risk: B.

Contributory Factor: The pilot was flying the ac at low-level from the rear seat.

AIRPROX REPORT NO 111/05

Date/Time:	16 July 1219 (Saturday)	
Position:	5247N 0147W (0.5nm SE Cross Hayes Gliding Site - elev 320ft)	
Airspace:	LFIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	K13 Glider	B17G
Operator:	Civ Club	Civ Pte
Alt/FL:	~2000ft (QFE)	2500ft (QNH)
Weather	VMC 2/8 CU	CLBC
Visibility:	>10km	>10km
Reported Separation:	0ft V/150ft H	NK
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE K13 GLIDER PILOT reports circling at 45kt, he sighted the B17G 5-6nm out whilst thermalling at about 2000ft off to the SE of the Cross Hayes field. On the next turn the B17G was on the same heading set to overfly the site

at 2000ft QFE. He presented his wing profile to the B17 pilot in two high bank turns; the B17G maintained heading. To avoid a collision he dived to clear its port wing by about 150ft. A second glider within 200ft-300ft of him also took avoiding action. He assumed the B17G pilot saw neither glider. About 2 hours later, while on the ground, he saw the B17G return on a reciprocal heading and 2 other gliders at similar height found it necessary to take avoiding action whilst thermalling. Again the B17G pilot maintained heading as if he had not seen the other ac.

THE B17G PILOT reports heading 300° at 140kt on a sortie from and to Duxford, at 2500ft QNH. In the area of the reported Airprox he was in communication with Tatenhill AG. During the sortie he saw numerous gliders, but none was close enough for him to consider there had been an Airprox.

UKAB Note: Radar recordings show a 7000 squawk with Mode C following the B17's reported track and time which is as shown on the diagram. There are no returns near the time and place of the Airprox which could have been the glider.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Some Members thought that having seen the B17 in good time the K13 pilot should have flown away from its track but Members with gliding experience advised that the K13 does not have the speed to make much difference by turning away in such circumstances. Since the K13 is a more visible glider than more modern types, Members considered that what the pilot did was sensible.

The Board was divided as to whether the B17 pilot ever saw this glider. While it appeared not from his lack of avoiding action, some Members argued that he may have seen it as it was passing and considered it was no longer a risk. There was insufficient evidence available for the Board to conclude other than that this was a confliction of flightpaths in Class G airspace which was resolved by the glider pilot. Members agreed that the glider pilot had seen the B17 in time to remove the risk of actually colliding with it.

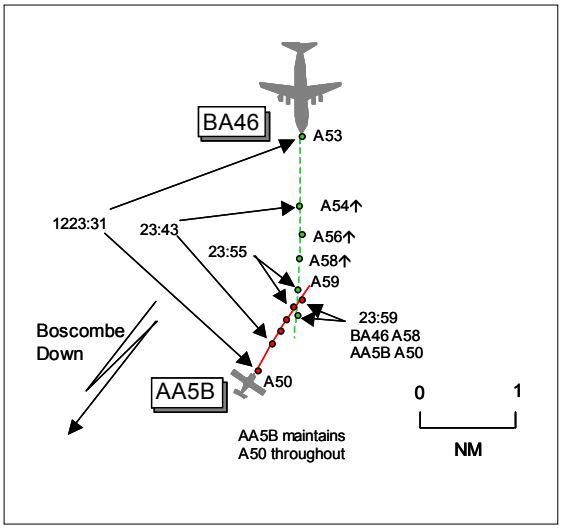
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G resolved by the glider pilot.

Degree of Risk: C.

AIRPROX REPORT NO 112/05

Date/Time:	13 Jul 1224	
Position:	5120N 00127W (15nm NE Boscombe Down - elev 407ft)	
Airspace:	FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BA46	AA5B
Operator:	Civ Comm	Civ Pte
Alt/FL:	FL50	5000ft (QFE)
Weather	IMC KLWD	IMC CLBL
Visibility:	Nil	2000m
Reported Separation:	700ft V/nil H	100ft V/100ft H
Recorded Separation:	800ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BA46 PILOT reports heading 180° at 230kt and FL50 on a local sortie from Cranfield to the Boscombe Down area IFR in a white coloured ac with strobe lights on. After working Brize Radar under a RAS during their transit enroute, they were handed over to Boscombe Down and were told that they were under a RIS and that there was crossing traffic L to R, he thought, at 5000ft on QNH 1021mb. During this transmission they received a TCAS TA at range 4nm followed by an RA 'climb' at range 1·5nm with the other ac about 200ft below. The RA guidance was followed and ATC were informed of the manoeuvre, passing O/H the other ac by about 700ft. At the time they were flying in cloud in IMC so the other ac was not seen visually. He assessed that they would have passed within 200ft of the other ac if no climb had been taken.

UKAB Note (1): The BA46 Captain was contacted 5 months post incident to clarify the geometry of the encounter. Owing to the elapsed time since this incident occurred, the details were difficult to recall but he thought that, at the time, the crossing traffic was L to R, TCAS showing the traffic ahead, but he could not remember if ATC's TI message agreed with his perception - the radar shows the AA5B crossing R to L.

THE AA5B PILOT reports heading 050° at 120kt enroute IFR from Compton Abbas to Elstree and in receipt of a RAS, he thought, from Boscombe Down on 126·7MHz squawking an assigned code with Mode C. The visibility was generally 2000m flying 500ft above and 1000m clear of cloud but at the time of the Airprox he was in and out of cloud in IMC and the ac was coloured white/blue [no lighting was mentioned]. Cruising at 5000ft QFE, he thought, as instructed by Boscombe Down, he heard another pilot report a TCAS warning and that he was climbing to avoid traffic. Shortly thereafter, he caught a glimpse of a high-winged 4 engined ac about 500m ahead on a converging, almost head on, track. No avoiding action was taken as the other was climbing. It quickly passed about 100ft ahead and above and he assessed the risk as medium.

MIL ATC OPS reports that all timings in this report are UTC. The timings at Brize Norton were found to be 20sec slow: the report shows adjusted timings.

The BA46 was routeing from Cranfield to Boscombe Down at FL50 under a RAS from Brize Norton Lower Airspace Radar Service (LARS) controller. At 1206:44 LARS informed the BA46 crew "*BA46 c/s, limited traffic information from all around as you approach an area of high traffic density. Standard separation will not be achieved*" and continued to pass avoiding action against conflicting traffic. LARS requested the BA46 crew's flight conditions at 1208:21 which were reported as VMC by the crew. In response to this information LARS asked the BA46 crew "*will you accept a radar information*". The BA46 crew accepted the downgrade of service and were placed under their own navigation. During the period 1209:27 until 1214:23, LARS passed multiple pieces of TI to the BA46 crew, none of which were involving the subject AA5B. At 1216:31, LARS Assistant prenoted the BA46's transit to Boscombe Radar. Boscombe issued a Mode A of 2652. At 1217:52, LARS once again limited TI to the BA46

crew: "*from ahead and from the right for the next five miles as you pass close to the Brize radar overhead*". At 1221:43, LARS instructed the BA46 crew to recycle Mode A 2652 and commenced a radar handover to Boscombe Down Zone (ZONE). The handover was very protracted owing to RT transmissions to both agencies. TI is passed to the BA46 crew during the handover as "*BA46 c/s, traffic right one o'clock, 8 miles, manoeuvring, no height information*". At 1222:12, the BA46 crew reports "*now becoming IMC*" which is acknowledged by LARS and further TI is passed "*traffic left eleven o'clock 4 miles crossing right to left indicating 2000ft below".* The handover was completed and the BA46 transferred frequency to Boscombe ZONE at 1222:38.

The BA46 flight contacted ZONE at 1223:34 and was identified and placed under a RIS at FL 50. Traffic was immediately called "*12 o'clock 3 miles crossing right left under my control at 5000ft on the Portland pressure 1021*" – this was the subject AA5B. At 1223:53, the BA46 crew reported "*IMC radar TCAS climb, TCAS climb*". At 1224:20 the BA46 crew called "*clear of conflict resuming FL50*". Simultaneously, the AA5B was routeing from Compton Abbas to Elstree at 5000ft on the RPS under a RIS. No transmissions were made to the AA5B pilot regarding TI on the BA46.

[UKAB Note (2): Radar analysis of the Heathrow Radar shows the BA46 overhead KENET, tracking S squawking 3607 and indicating altitude 5300ft London QNH 1024mb (FL050). The AA5B is 16nm SSW KENET tracking 070° squawking 2651 and indicating 5000ft QNH (4900ft RPS 1021mb). The Mode A selection on the BA46 changes to the Boscombe allocated squawk 2652 at 1221:46. The ac continue on converging tracks with no changes in level until 1223:45 when the BA46 is seen to initiate a climb to 5400ft with a lateral separation of 1·4nm. The next 2 sweeps show the BA46 climbing 200ft per sweep until 1223:55 when the BA46 indicates 5900ft Mode C, 0·2nm N of the AA5B. The next sweep at 1223:59 shows the BA46 at 5800ft and now 0·2 nm S of the AA5B with the subject ac having passed. At the CPA, which occurs between these 2 sweeps, it is estimated that the ac cross almost exactly coincident with a minimum of 800ft vertical separation. Thereafter the ac continue to diverge.]

The BA46 crew were transiting under a RIS, from Brize Norton LARS, through an extremely busy portion of airspace. LARS, on 2 occasions, had limited TI for differing reasons and had passed extensive TI to the crew. The LARS controller, given his workload and intensity of traffic was not unreasonable in ascertaining the BA46 crew's flight conditions and asking whether the crew would accept a RIS instead of a RAS. Prior to the handover LARS provided the BA46 crew with TI on conflicting tracks not involved in the Airprox. The handover between Brize Norton LARS and Boscombe ZONE was very protracted due to the workload of both controllers. During the handover the BA46 crew reported a change of flight conditions to IMC. LARS acknowledged this but did not offer an upgrade of service or pass the information on to Boscombe ZONE during the handover. The BA46 crew took nearly 1min to transfer frequency from Brize LARS to Boscombe ZONE and on initial contact with ZONE was provided with RIS and passed TI on the conflicting AA5B. The BA46 crew immediately informed the controller that they had received a TCAS climb. The AA5B had been transiting on a steady track and level under a RIS from ZONE. No TI was passed to the AA5B pilot regarding the BA46. Unfortunately the ZONE controller was inexperienced and did not realise the implications of a pilot reporting that he was acting in response to a TCAS alert and hence the Supervisor was not made aware of the incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Mil ATC Ops Advisor informed Members that only a partial transcript of the Boscombe Zone RT and telephone was available from the time that the radar handover was commenced by Brize Norton. This was transcribed at Boscombe Down after the event but the master tape subsequently became lost in the post when it was sent for further analysis by Mil ATC Ops for the period that the AA5B was on frequency, prior to the Airprox. Consequently, it was not possible to confirm the level of service being provided to the AA5B pilot (the ZONE controller reported providing the AA5B with a RIS) nor when and why the flight was instructed to fly at 5000ft on the RPS.

The AA5B pilot believed that he was both in receipt of a RAS and had been instructed to fly at 5000ft on QFE although the recorded radar showed the ac cruising at 5000ft altitude. During TI to the BA46 crew, ZONE had passed the AA5B's level as being 5000ft on RPS (3mb or 90ft different from QNH). Military ATC Members opined that normally the RPS was given to transit ac flying below the Transition Altitude and any change of datum to QFE occurred when ac needed to be separated when flying within or close to MATZs. Members agreed that when operating under IFR it was not best practice to fly on the RPS above the Transition Altitude - pilots must select a

FL commensurate with their magnetic track in accordance with the Quadrantal Rule (ANO Rule 30, the purpose of this Rule being to provide ac flying outside CAS with at least 500ft vertical separation against ac on crossing/ opposite direction tracks).

Members noted that both the BA46 and AA5B were not at the appropriate quadrantal levels, with both crews flying under IFR (where Rule 30 applies) and in IMC. For whatever reason the BA46 crew had selected FL50 (an odd FL+500ft or even FL should have been chosen depending whether the ac's track was <180° or 180° or more) and the AA5B was at 5000ft RPS (FL47) not FL50 which was the correct level commensurate with its track. This had led to both ac being separated by only 300ft, not 500ft or more, which Members agreed had contributed to the Airprox. Another contributory factor was the fact that both flights were in receipt of a RIS at the time of the incident. It was agreed that the Brize LARS controller could have upgraded the service to the BA46 when its crew reported going IMC during the radar handover to Boscombe ZONE. However, as an upgrade was not proffered by LARS nor passed on to ZONE, pilot Members agreed that the BA46 crew should have asked for a RAS at the time as it was the most pertinent radar service for the weather conditions.

It was unfortunate that the AA5B pilot, even under a RIS, was not given any TI on the converging BA46. It was clear that ZONE was aware of the potential confliction, after receiving the handover on the BA46, and had had ample time to pass TI to the AA5B pilot on the crossing traffic. However, in the end, Members thought that this lack of TI had not materially affected the outcome, although the AA5B pilot was undoubtedly surprised when he heard the BA46's crew announce a TCAS climb to avoid traffic, before glimpsing the airliner as it passed opposite direction above. After their initial call to ZONE, the BA46 crew had been given accurate TI on the AA5B, which was cruising 300ft below their level, at the same time as TCAS gave a TA alert on it 4nm ahead. Although visual acquisition was not possible, owing to IMC, the ensuing RA climb command was quickly followed, taking the BA46 800ft above the AA5B. Although many aspects of this incident were untidy, the Members were clear that the actions taken by the BA46 crew had resolved this conflict in Class G airspace in IMC and had ensured that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G in IMC resolved by the BA46 crew.

Degree of Risk: C.

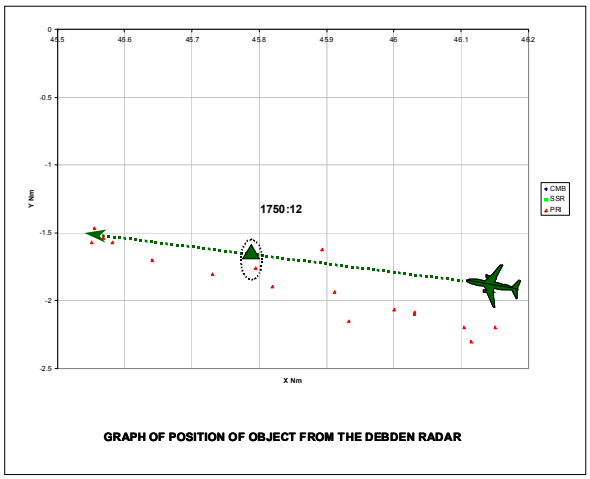
Contributory Factors:

1. Both crews were flying under IFR at inappropriate quadrantal levels for their magnetic tracks.
2. Both flights were in receipt of a RIS in IMC.

AIRPROX REPORT No 113/05

AIRPROX REPORT NO 113/05

Date/Time:	16 Jul 1750 (Saturday)	
Position:	5202N 00131E (15nm E LAPRA)	
Airspace:	P20	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737	Untraced ac
Operator:	CAT	NK
Alt/FL:	FL120	NK
Weather	VMC CAVOK	NK
Visibility:	>50km	NK
Reported Separation:		
	500ft V/Nil H	NK
Recorded Separation:		
	NR V/Nil H	



GRAPH OF POSITION OF OBJECT FROM THE DEBDEN RADAR

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying a scheduled passenger flight from Germany to Stansted under IFR. With about 45nm to run to Stansted, heading 280° at 370kt and passing FL125 in the descent to FL90, he became aware of opposite direction traffic. At first it looked like a free fall parachutist in shape. The Captain said *"What is that?"* but by the time the FO looked up it had passed underneath; this took place in the space of about 2sec. He assessed that it passed under with a relative closing speed at least 3x faster than an opposite direction ac 1000ft beneath them. It was a small, dark, delta wing craft about 500ft beneath them and about 2000ft above their cleared [descent] level and they were descending through its level. The pilot reported it to radar control but they did not see anything at the time and there was nothing shown on TCAS.

The pilot reported that he had never seen an ac like this before and thought that it looked like a kit plane or a military jet.

UKAB Note (1): Despite very extensive tracing action lasting over 3 months, nothing could be traced operating in that area. Although possible, it was thought unlikely that either a glider or light ac would be operating off the coast in the area which was Class A CAS. The MoD, DPA and USAFE confirmed that they had no ac, drones, missiles or explosive activity in the area. (Although there was activity at Shoeburyness Ranges there were no explosions until the following day). The Met Office, the DPA and USAFE confirmed that they did not launch any Met Balloons upwind in the 12-hour period before the incident. At the time the wind at 12000ft was 280/24 and at 5000ft was 300/5. The possibility of the object being balloons (possibly a cluster of coloured foil ones) from a 'village fete' or other such event could not be discounted since the wind, although light, was offshore. The possibility of the object being miss-identified as a bird or parachutist was discounted since it showed on the radar.

UKAB Note (2): RAC Mil conducted an extensive analysis of available radar data. A very slow moving primary contact is evident in the area. The speed of the object varied but was generally just under 60kt and the track was about 095° (approximately downwind). It should be noted that there was marked 'jitter' of the response and accurate measurements are not possible.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the B737 Captain, a transcript of the relevant RT frequency and radar photographs/video recordings.

Notwithstanding that it did not fit the description given by the pilot following his very brief sighting, the Board considered that the most likely object was a cluster of metallic balloons released at a Saturday afternoon event on the ground. This would explain both that they were visible on radar and were moving downwind at approximately the speed of the wind at the height of the B737. If that were the case the risk would have been negligible since,

even if the balloons were on a collision course with the airliner, they would have been deflected round and clear of it by the ac 'bow wave'. The degree of certainty in this explanation however, was not high enough to attribute a level of risk.

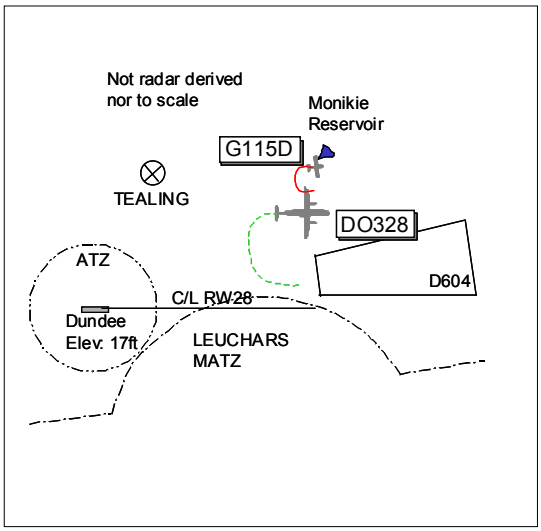
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class A CAS with an untraced object.

Degree of Risk: D.

AIRPROX REPORT NO 114/05

Date/Time:	15 Jul 1652	
Position:	5632N 00248W (9nm NE Dundee Airport - elev 17ft)	
Airspace:	FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Do328	Grob115D
Operator:	CAT	Civ Club
Alt/FL:	2200ft↓ (QNH 1013mb)	1500ft (QNH)
Weather	VMC SKC	VMC CLBC
Visibility:	40km	>10km
Reported Separation:	100ft V/1·25nm H	200-300ft V/1nm H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DO328 PILOT reports inbound to Dundee IFR and in communication with Dundee on 122·9MHz squawking with Mode C. The visibility was 40km in SKC VMC and the ac was coloured white/red with taxy, landing, navigation and strobe lights all switched on. The flight had been transferred from Leuchars Radar heading 270°, which had placed the flight N of the FAT, at 3000ft QNH 1013mb at 220kt for a visual approach to RW28. Dundee ATC gave him a RH orbit to separate his flight from a landing HS25. They entered a descending RH turn about 10nm ENE of Dundee Airport and, on passing through N, a TCAS return squawking Mode C was noted in his 12 o'clock range 2·5nm. Turning through 045° and passing 2200ft, he thought, the other ac was sighted, a white single engine ac, 1·25nm on his LHS about 100ft above commencing a L turn away to the N; by now both ac were heading approx 090°. During this encounter a TA alert was received followed by an RA 'descend' which was actioned as their R turn was continued. A GPWS terrain 'pull up' alert was also received during this manoeuvre.

THE GROB115D PILOT reports on recovery to Dundee after a local solo flight and in receipt of a FIS from Dundee on 122·9MHz squawking 7000 with Mode C. The visibility was >10km 2500ft below cloud in VMC and the ac was coloured white/blue with landing and strobe lights switched on. The RT was busy so he entered a RH orbit overhead Monikie Reservoir. Turning R through 090° at 95kt and 1500ft QNH, he thought, he saw a Dornier ac in his 5 o'clock, more than 1nm away and in a R turn. He reversed his turn into a gentle L turn keeping the other ac in sight and watched it pass about 1nm away to his R and 200-300ft below. After the other ac was clear he continued his orbit and heard another pilot call on frequency mentioning something about TCAS. ATC then asked if he was still on frequency and when he replied, the controller requested his position, height and, if he was squawking, what code was selected. He was then told to hold at his present position where he remained for about 10min after which he completed an uneventful recovery to the airfield.

AIRPROX REPORT No 114/05

THE DUNDEE ADC/APP reports that the Dornier ac was the last of 3 ac being positioned by Leuchars Radar for visual approaches to RW28 at Dundee. The airport was busy, parking space was at a premium with taxiways being used, so all commercial ac were required to backtrack the full length of the RW to vacate at the E end. The Dornier pilot reported at 8nm final, he thought, as the preceding HS25 touched down so for spacing he told the Dornier crew to orbit to the R (a L turn would have infringed the Leuchars MATZ). In reply to the crew's request about D604 status, he told them it was active up to 1500ft. Shortly afterwards the crew reported a TCAS RA which he acknowledged. The subject Grob115 was operating to the E VFR so he asked its pilot to confirm his altitude and squawk (1500ft and 7000). He told the pilot to orbit at Monikie Reservoir (9nm ENE Dundee and 5nm N of RW extended C/L) as a TDA 699P was active near Tealing disused airfield (5nm NNE Dundee Airport) up to 3000ft.

The Dundee Wx passed by the controller to the Do328 crew 15min before the Airprox was surface wind 24011KT visibility 40KM cloud FEW040 temperature 21 QNH 1013mb.

ATSI had nothing to add to the Dundee ADC/APC's report.

UKAB Note (1): The Airprox occurred outside of recorded radar coverage.

UKAB Note (2): The Dundee RT transcript reveals the Do328 crew calling on release from Leuchars shortly before 1650:30 and being instructed to orbit in their current position for delaying action. The crew reports on a 10nm final and asks if the orbit is still needed which is confirmed owing to a jet requiring to backtrack the RW. The Danger Area height upper limit is requested and is passed as 1500ft which is acknowledged at 1651:00. Approximately 1min later the Do328 crew reports *"Do328 c/s TCAS descent"*. This is acknowledged by the Dundee ADC/APP who calls the Grob115 pilot to establish if he was on the frequency and his position. The Grob pilot calls overhead Monikie Reservoir and is told to *"...remain well to the North well to the North what is your altitude one thousand five hundred"*. The Grob pilot replies *"altitude is descending through one thousand five hundred"* to which the controller asks *"are you squawking"* which is answered with *"roger seven zero zero zero"*.

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.

It was clear that this was an encounter between IFR and VFR traffic in Class G airspace where 'see and avoid' prevails. The IFR Do328 was given a RH orbit on final approach. When turning through N, TCAS showed traffic - the Grob115 - 2·5nm ahead, also orbiting. The Grob was visually acquired by the Dornier crew, as they turned through a NE'ly heading, about 1·25nm to their L and 100ft above; the turn/orbit and descent was continued. During this period a TA alert then RA 'descend' warning was received and complied with. The Grob pilot had commenced a RH orbit at Monikie Reservoir, whilst waiting to call ATC for recovery, and saw the Do328 in his 5 o'clock. Very sensibly he therefore reversed his turn to the L to avoid the Dornier, the turn being observed by the Dornier crew. Both crews agreed on the geometry and separation distances that ensued which led the Board to agree that the actions taken by both crews had effectively resolved the conflict by removing any risk of collision.

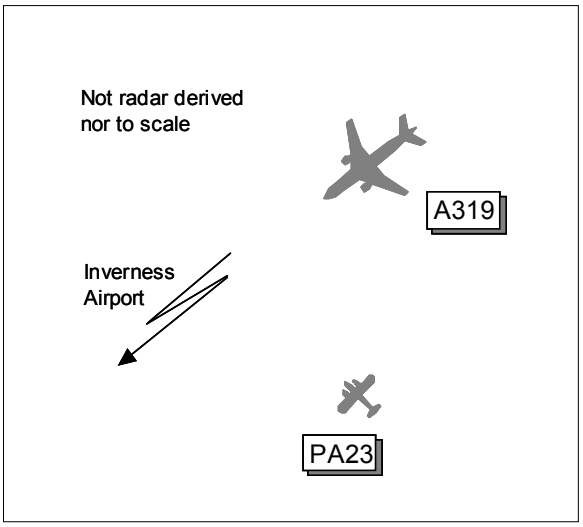
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT NO 115/05

Date/Time:	18 Jul 1021	
Position:	5739N 00351W (9nm NE Inverness Airport - elev 31ft)	
Airspace:	SFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	A319	PA23
Operator:	CAT	Civ Pte
Alt/FL:	2000ft (QNH 999mb)	2000ft (QNH 1000mb)
Weather	VMC CLBC	VMC CLOC
Visibility:	>40nm	50km
Reported Separation:	500ft V/1nm H	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports inbound to Inverness IFR and in receipt of a 'procedural' service from Inverness on 122·6MHz squawking 5153 with Mode C. The visibility was >40nm flying 1500ft below cloud in VMC. They had been cleared for a procedural VOR/DME approach to the ILS RW23 from O/H the INV VOR. When 10·5nm DME on the INV 040° RAD a R turn was commenced onto the base leg track of 160° at 180kt, level at 2000ft QNH 999mb. ATC gave TI on traffic working Lossie Radar to the NE of INV. The ac was seen on TCAS 10nm away coming from the Lossie direction indicating 2000ft altitude. They continued in accordance with the procedure and the traffic became 'proximate traffic' at about 5nm as it appeared to be travelling at high speed and catching up. A TA alert came at 3nm and visual contact was established at 2nm. As they were still turning away they continued in NAV but shortly after this an RA *'climb, climb now'* was received and followed, levelling at 2500ft. The other ac, a low wing twin-engine ac, possibly a King Air, was seen to pass 500ft below and 1nm to their L. Once clear they visually manoeuvred back to the N and repositioned onto the ILS. He assessed the risk as moderate.

THE PA23 PILOT reports flying enroute from Aberdeen to Stornaway VFR and in communication with Scottish, he thought, on 124·5MHz and 133·67MHz squawking 7000 with Mode C. About 9nm NE of Inverness heading 300° at 145kt and 2000ft QNH 1000mb, he was told by Scottish to contact Inverness at the same time that he saw a twin engined airliner in his 0230 position range 6nm on a closing heading and above him. No TI had been passed previously and, owing to the other ac's relative direction and level, he could not have seen it any earlier. No avoiding action was taken as the other ac, an A319, was seen to pass ahead (no separation distance was stated), in a climb. It would have been easy for him to descend or change course, if necessary, as he was flying over the sea at the time. He assessed there to be no risk.

THE INVERNESS ADC/APP reports that as the A319 was about to commence the RW23 VOR/DME ILS procedure Lossie Radar passed him TI on a VFR ac which was on their frequency, the subject PA23 that was crossing the RW23 FAT from the Lossie MATZ area. He passed this TI to the A319 crew, who reported a TCAS TA during their base turn, and he tried to contact Lossie to update the position of the PA23. The A319 crew then reported a TCAS RA and climbed to 2500ft before visually positioning back onto final. At the same time, Lossie advised that the PA23 was still on their frequency and its pilot was visual with the A319. The PA23 flight did not contact Inverness.

ATSI comments that the RT recording was very poor and could not be transcribed. There were a number of light ac routeing Aberdeen-Stornoway, one of which was the subject PA23. Lossie had advised of the traffic and information was passed to the crew of the A319 that the PA23 was leaving the Kinloss MATZ tracking NW, believed at 2000ft VFR. It was just after this that the A319 reported a TCAS alert with traffic 3nm away. A TCAS RA to 'climb' was subsequently received. The PA23 had not called Inverness by the time of the Airprox.

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MIL ATC OPS reports the PA23 was transiting from Aberdeen to Stornoway under a FIS from Lossiemouth Departures (DEPS) at 2000ft Orkney RPS 995mb. At 1016:50 Lossiemouth gained approval for the PA23 to cross the Kinloss MATZ at 2000ft 995mb, no closer than 4nm S of Kinloss airfield. DEPS called Inverness, at 1018:55, to advise *"…I've got another one [transit] for you, PA23 c/s, don't know his type. He's Aberdeen to Stornoway, he's flying at 2000ft and he'll be on 999, he's on a FIS VFR and he's just about to leave the Kinloss MATZ he's going to affect your A319 c/s as he turns inbound"*. Inverness replied *"OK if you can sort of give him traffic and put him across when you're ready"*. A Mode A of 3747 was assigned to the PA23 by Inverness. One minute later DEPS passed the Mode A code and instructed the PA23 crew to maintain 2000ft Inverness QNH 999mb. At 1029:33 DEPS passed TI on an A319, inbound RW23 for the ILS, to the PA23 crew *"PA23 c/s IFR traffic inbound to Inverness right one o'clock 5 miles crossing right/left shortly descending at the same height"*. The PA23 crew reported *"PA23 c/s, we have traffic in sight"*. DEPS advised the PA23 crew to continue with Inverness.

DEPS had prenoted the PA23 transit to Inverness and was asked to pass TI on the A319 inbound to RW23. DEPS passed TI and the PA23 crew reported visual and DEPS transferred the PA23 to Inverness with some 4nm separation reported between the 2 ac. There are no Mil ATC factors in this Airprox.

UKAB Note (1): 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, copies of the relevant RT frequencies, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

It was clear that both crews had been aware of each other's presence prior to the encounter. The PA23 pilot had been given TI by Lossiemouth DEPS and had seen the A319 in his 0230 position about 6nm away (the RT transcript shows the PA23 pilot reporting visual at range 5nm). The PA23 pilot had monitored the A319's crossing flight path, judging that avoiding action was not required and content that his chosen visual separation that existed at the time was adequate. Earlier, the A319 crew were told by Inverness ATC of the PA23 and had seen it on TCAS 10nm away. Having continued with the VOR/DME procedure, the PA23 had generated a TA alert at 3nm range after which the A319 crew had visually acquired the other ac with 2nm separation. As the A319 was turning away from the PA23, the crew were content to continue towards final approach but TCAS had then triggered an RA climb, which was followed, and the PA23 was seen to pass 1nm to their L and 500ft below. Until the TCAS RA occurred within the A319 cockpit, both crews were content with the relative flight paths. Clearly, even though both crews considered that adequate visual separation existed and with the PA23 pilot electing to pass safely behind the A319, the flight paths of the two ac had triggered the A319's TCAS equipment. This led the Board to agree that this had been a sighting report and that safety had been assured during the encounter.

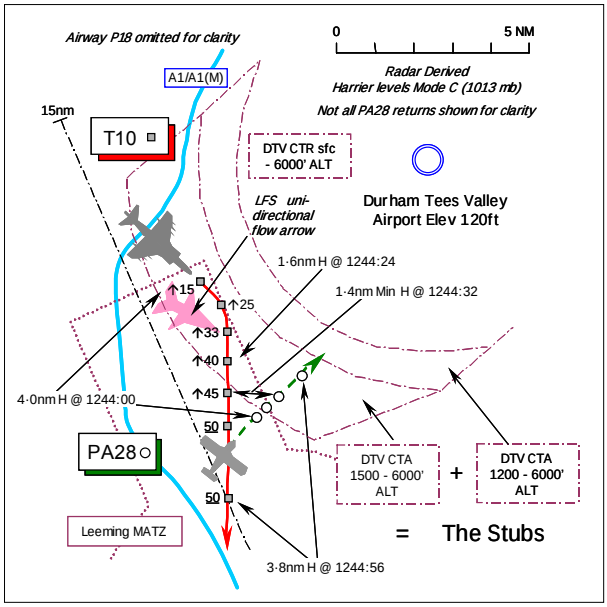
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 118/05

Date/Time:	11 Jul 1244	
Position:	5424N 00133W (8nm SW Teesside - elev 120ft)	
Airspace:	CTA/FIR	(Class: D/G)
Reporter:	Teesside APR	
	First Ac	*Second Ac*
Type:	PA28-180	Harrier T10
Operator:	Civ Pte	HQ STC
Alt/FL:	NR	1500ft (QNH)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10km	50km+
Reported Separation:		
APR:	Nil V/1½nm H	
	Not seen	Not seen
Recorded Separation:		
	1·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DURHAM TEES VALLEY APPROACH RADAR CONTROLLER (TEESSIDE APR) reports that the PA28 pilot was inbound to Durham Tees Valley Airport (DTVA), flying under VFR from Manchester/Barton with a squawk of A7052 allocated. The PA28 had previously been 'handed-over' to him from Leeming and had been cleared for a straight-in approach to RW05. A Leeming assigned squawk - A0405 - was then observed 8nm W of DTVA climbing on a SE track towards the PA28. Traffic information was passed to the PA28 pilot about the unknown traffic whereupon the contact passed down the port side of the PA28 at a range of about 1½nm, he thought climbing through the PA28's altitude, in the CTA. The PA28 pilot did not see the other ac. Leeming ATC advised that a Harrier had called them climbing out of low-level with a "problem" but by the time Leeming identified the Harrier on radar it had entered CAS and was inside the Class D DTV CTA.

THE PA28-180 PILOT provided a very brief account reporting that he was inbound to DTVA and was under a RIS, he thought, from Teesside RADAR. The allocated squawk was selected, but Mode C is not fitted.

Whilst inbound to DTVA he reported that there were no abnormal factors about the flight which was conducted under VFR in CAVOK conditions. No traffic information was given about any other ac by Teesside RADAR he thought, neither was he aware of, nor saw, any other ac.

THE HARRIER T10 PILOT, a QFI, reports that he was instructing a low-level sortie from the rear seat with an ab-initio student pilot flying the ac from the front seat. HISLs were on and a squawk of A7001 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

Flying VFR as a singleton ac at 380kt approaching the LFS 'unidirectional flow' beneath the DTV CTA stub [1500ft - 6000ft amsl] heading 140° whilst in 2-way contact with Leeming LARS who was providing he thought a RIS, at this point the student decided to pull-up on fuel minima's. Leeming cleared them into DTV's CTA stub, he thought, and he as captain of the ac, confirmed that this was OK. Leeming reported traffic on their nose at 3nm so he instructed the student to turn R 40° to avoid it so "it was not a factor". They continued their climb to FL50 and were then handed over to LATCC (Mil) for the transit back to base. He added that the airbrake was "stuck partially out" and they effected a 'minimum fuel recovery' to Wittering. The other ac was not seen at all and he assessed the risk as *"nil"*.

ATSI reports that LEEMING ZONE contacted the DTVA ATSA at approximately 1230 and passed flight details on the PA28, which was inbound to DTVA, when the ac was 10nm S of GASKO. Teesside ATC allocated a squawk of A7052.

AIRPROX REPORT No 118/05

The PA28 pilot changed the squawk at 1243:00, when it was 10nm SW of DTVA and called on the APR's frequency some 30sec later. Although no details of the flight rules had been passed by Leeming or stated by the pilot, the Teesside APR instructed the pilot to position for a straight-in approach for RW05, passed the QNH and QFE and to operate VFR. The QFE passed was 1029mb but the pilot erroneously read-back 1009mb which was not corrected by the APR [although from a later transmission it appears that the pilot had set the QFE of 1029mb]. Furthermore, no formal joining clearance was issued by the APR or requested by the pilot.

At 1244:00, just as the PA28 entered the CTA, an unknown ac - the Harrier - appeared in the PA28's 10 o'clock position at a range of 4nm tracking towards it and indicating 1500ft Mode C (1013mb). At approximately 1244:00, the APR transmitted "[PA28 C/S] *there's traffic just going through your 12 o'clock now its in your left 11 o'clock er half past 10 range of 2 miles turned towards you looks like it's climbing*". Analysis of the radar recording shows that when the transmission was ending, the Harrier was in the 10 o'clock position of the PA28 at a range of 3·2nm and indicating FL25 Mode C. The jet continued to climb and commenced a R turn from a track of approximately 135º onto 180º. The APR then asked the pilot of the PA28 his level to which he replied just before 1244:30, "*we're 2000 on 1029*". The APR advised that the unknown Harrier ac had climbed through the PA28's level. Shortly afterwards the PA28 pilot reported the 'field' in sight and was transferred to the TOWER.

When the two ac had passed, the APR contacted Leeming to establish what had happened. In the conversation Leeming explained that the Harrier had pulled up from low-level with a problem and free-called them.

The LOA between Durham Tees Valley Airport (DTVA) and Leeming states that:

"Leeming will have operational access to the [Stubs]. *Unless notified by DTVA of a conflicting public air transport movement, Leeming will assume free access to the* [Stubs]".

On this occasion, no public air transport movement had been notified and, accordingly, the Leeming controller was permitted [by the terms of the LoA] to enter specified south-westerly CTA segments ['The Stubs'] without co-ordinating with the APR. The agreement goes on to say that 'Gap Traffic' will be notified by Leeming to DTVA if it is likely to affect aircraft operations at DTVA.

If it is assumed that both the PA28 and Harrier were operating under the VFR, the requirement in Class D airspace is to pass traffic information to each crew about the other ac. Given that they were working different ATSUs and the current flight details of 'the other ac' were not known to the controllers, it is difficult to see how the airspace requirements for VFR flights in the Class D DTV CTA can be fully met.

UKAB Note (1): Analysis of the Great Dun Fell Radar shows the PA28 routeing 3nm W of Leeming tracking 020°, squawking A0402 (no Mode C fitted) and turning R onto a track of 040° inbound to DTVA at 2000ft Leeming QFE at 1242:13. The PA28's Mode A changes to 7052 when the PA28 is 5·5nm NNW of Leeming. At 1244:00, a contact squawking A0405 is first displayed in the PA28's L 10 o'clock - 4 nm, tracking 160° indicating 1500ft Mode C (1013mb) climbing – the Harrier T10 – and probably just climbing thorough the PA28's level of 2000ft Teesside QFE (1029mb), which equates to about 1520ft (1013mb). The PA28 crosses the CTA boundary at 1244:08, into Class D airspace, when the Harrier is in the PA28's L 10 o'clock 3·2nm indicating 2500ft Mode C (1013mb) some 1000ft above the PA28's height (1029mb) reported on RT. The next sweep shows the horizontal separation as 2·3nm with the Harrier initiating a R turn onto S whilst indicating FL33. At 1244:24, just as traffic information is transmitted by LARS to the Harrier crew, the latter steadies on S indicating FL40 with horizontal separation of 1·6nm evident. Minimum horizontal separation of 1·4nm is shown on the next sweep at 1244:32, as the Harrier climbs through FL45 Mode C, some 3000ft above the PA28's reported level. After this point the separation rapidly increases as the jet passes 2·8nm directly astern of the PA28 and clears to the S.

UKAB Note (2): The UK MIL AIP Vol 3 Pt 1-2-11-3 extant on the date of the Airprox (only the frequency has changed) stipulated that in order to deconflict both traffic in the LFS and airfield traffic in the Leeming/Tees-side Gap, crews flying in LFA 11 and LFA 12 within the area bounded by specified coordinates:

a. The area is to be flown in a southeasterly direction only.

b. The maximum transit height is to be 1000ft agl.

c. Crews are to call Leeming ZONE on frequency 292·7MHz at least 3mins before crossing the A1/Al(M). Formation leaders are to include in their call number of ac, formation and element spacing.

d. Crews needing to abort from low level in the Leeming/Tees-side gap and who anticipate that they will be unable to remain clear of controlled airspace are to transmit their intentions on the Leeming Zone frequency of 292·7MHz to facilitate ac identification and subsequent traffic co-ordination.

MIL ATC OPS reports that the PA28 was inbound to DTVA, northbound at 2000ft Leeming QFE (1029mb), and under a FIS from Leeming LARS that was being manned by an inexperienced trainee controller screened by a qualified Mentor. LARS was operating with SSR-only which is fed from Linton-on-Ouse some 18nm S of Leeming: therefore the base of secondary radar coverage in the Leeming/DTVA area is somewhat higher. At 1241:59, the Harrier crew attempted to make contact with LARS on 292·7MHz but good 2-way RT contact was not achieved for another 29sec when the Harrier pilot reported at 1242:28, "*unfortunately we have an aircraft problem that requires us to RTB so we will not be coming for the PD* [practice diversion]". At 1242:36, the Harrier crew transmitted "*We're looking for a VFR pick-up to climb FL280 heading direct Wittering".* Some 10sec later, the PA28 pilot was instructed to squawk a DTVA assigned code but erroneously, this SSR code setting was readback by the Harrier crew who also added at 1242:48, "*we are 2 minutes short of the Gap* [that portion of airspace located between Leeming and DTVA] *pulling up in 1 minute".* LARS requested that the Harrier crew "*recycle squawk 0405"* and advised the PA28 pilot to squawk A7052 and continue with DTVA on 118.8MHz. Some 10sec later at 1243:36, the Harrier crew reported "[Harrier C/S] *now 15 miles extended centreline looking for a right hand turn direct track Wittering".* LARS acknowledged this call and advised the Harrier crew "[Harrier C/S] *roger climb at your discretion report level FL50 initially to remain clear of CAS*" which the mentor reports was referring to airway P18. The Harrier crew acknowledged the climb but at 1243:59 they queried *"..confirm that will keep us clear of the Teesside MATZ* [sic – presumably referring to the DTVA CTA]*".* LARS advised the Harrier crew "[Harrier C/S] *we have no contact on radar, unknown, operating SSR only"*. Nonetheless, LARS identified the Harrier at 1244:26, and although no radar service was stipulated traffic information was passed about the PA28 "*traffic 12 o'clock 3 miles crossing right-left last known at 2000ft Leeming QFE 1029".* The Harrier crew acknowledged the traffic information and LARS instructed the Harrier crew to "*climb report level FL200*". At 1244:38 a landline conversation then ensued between LARS and DTVA regarding the separation that pertained between the Harrier and the PA28.

After a delay in establishing satisfactory 2-way RT communication the Harrier crew had contacted LARS prior to climbing out of the LFS, VFR, in the Leeming DTVA Gap stating, at about 1242:48, that "*we are 2 minutes short of the Gap, pulling up in one minute*". As the PA28 approached the CTA LARS instructed the PA28 pilot to change his SSR code and transferred the flight to DTVA. Some 10sec after transferring the PA28 at 1243:26, the Harrier crew reported 15nm on the extended centreline but the ac was still not displayed on radar [SSR only] so LARS initiated a climb to FL50 - at the captain's discretion – advising the crew to remain clear of CAS. The Harrier crew acknowledged the climb instruction but not that to remain clear of CAS. The Harrier crew then asked for confirmation that the climb would keep the ac clear of the Teesside MATZ [sic] – where it is assumed that the Harrier crew was referring to the DTV CTA. LARS advised the Harrier pilot that he was still below radar cover and as soon as the Harrier appeared on LARS's radar display traffic information was passed about the PA28 and a further climb given. LARS did appreciate that the Harrier would be pulling out of low level in the vicinity of Leeming/ DTV CTA: however, Leeming have full access to this airspace unless notified by DTVA of a conflicting public air transport movement [defined in the LoA as civil ac carrying fare paying passengers operating to a published programme, including charter flights].

LARS acted in a timely and effective manner upon realising that a confliction was occurring between the PA28 and the Harrier. However, a liaison call to DTVA to pass traffic information about the jet would have forewarned the DTVA APR of the Harrier's presence.

THE HARRIER T10 PILOT'S STATION had nothing further to add.

HQ STC comments that the Harrier T10 crew appears to have done all that could have been expected of them in the circumstances. They called as early as they could, explaining their circumstances. The Captain was aware of the proximity of the DTVA airspace, which he queried, and turned to avoid their perceived position of the called traffic.

AIRPROX REPORT No 118/05

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 Mil ATC Ops report had made it plain that the PA28 had been switched to DTV ATC from Leeming LARS who had earlier provided an ATS to the PA28 pilot in transit and should, therefore, have been cognisant of this pilot's intentions. It was also clear that the T10 crew had communicated fully their intentions in good time to Leeming LARS so when the T10 crew reported pulling up from low-level, pertinent traffic information was given about the PA28. Some Members thought that once the T10 pilot had communicated his own intentions to pull up in the vicinity of 'The Gap' it might have been prudent for LARS to have passed an earlier proximity warning about the PA28 inbound to DTVA under the FIS that pertained at that stage, without waiting for the T10 to paint on SSR. Nevertheless, when transmitted, this information was utilised to good effect by the T10 QFI and as a direct result he turned his ac away from the PA28's reported position and passed astern - albeit unsighted – but unbeknownst to the DTV APR at the time. However, the radar recording had shown that whilst pulling-up the T10 penetrated 'The Stubs'. The RT transcript had shown that the T10 QFI had taken care to ask if this was in order despite inexact terminology on the part of both the T10 crew and within LARS' reply. Whilst the inexperienced trainee controller's answer could not be taken as a formal clearance to enter 'The Stubs', indeed the words used were "..*to remain clear of CAS*" [referring to the airway and not the CTA the LARS Mentor's report had revealed], with no formal clearance issued by Leeming then the T10 should not have entered the Class D CTA. However, it was clear that under the provisions of the LoA Leeming have full access to 'The Stubs' unless notified by DTVA of a conflicting public air transport movement which the PA28 was not. So it could be contended that this was not an infringement of CAS.

The ATSI report had shown that the LoA also required Leeming to notify DTV of 'Gap Traffic'; this had occurred after the T10 had pulled up and the Mil ATC Ops report had shown that LARS could have passed information about the T10 to the DTV APR somewhat earlier than they did. This would have ensured that the APR was aware of the potential for the T10 to enter 'The Stubs'. So although the alert APR had spotted the T10 on radar and passed an immediate warning to the PA28 pilot, this did not enable the APR to pass complete traffic information on the T10 within the DTV CTA as he was unaware of the T10 crew's intentions and was clearly unable to fulfil completely the pilots' expectations for the provision of an ATS in the 'known' traffic environment of Class D airspace to VFR flights. Here the much slower PA28 was entering the Class D CTA as the T10 climbed up into CAS before it turned southbound and exited the CTA just at the point of minimum horizontal separation with the jet. But the DTVA APR who reported this Airprox believed that the Harrier T10 had climbed up through the PA28's level as it passed down the latter's port side at a range of about 1½nm. However, the radar recording had shown that this was not the case and at the minimum horizontal separation of 1·4nm the Harrier was some 3000ft above the PA28's reported height of 2000ft (1029mb). Consequently, the Board concluded unanimously that this Airprox was the result of a controller perceived confliction where no risk of a collision existed in the circumstances reported here.

Returning to the issue of joint access to the Class D DTV CTA, some Members were aware that a joint civil/military ATS audit had taken place regarding the provision of ATSs by both Leeming and DTVA and the Board was briefed that the results of this audit were to be issued in the near future. But it was clear to the Members from their assessment of this Airprox, together with the comments expressed in the ATSI report, that the terms of the LoA did not appear to be fully in accord with the established norm for the provision of an ATS to VFR flights in the Class D CAS. Members endorsed the ATSI view and considered that this unsatisfactory situation should be investigated further. Consequently, the Board recommended that the CAA & 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.

PART C: ASSESSMENT OF CAUSE AND RISK

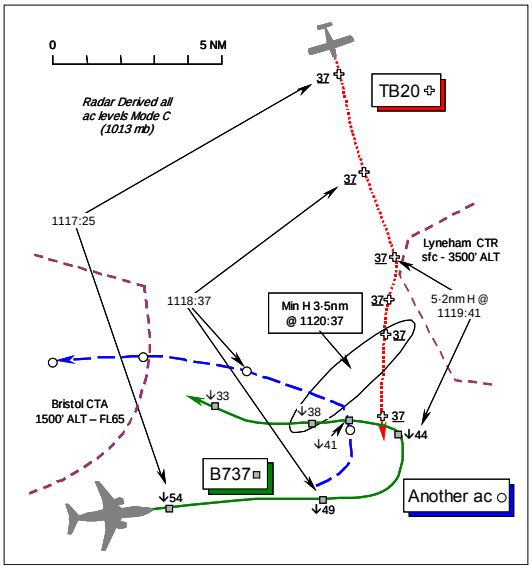
Cause: Controller perceived conflict.

Degree of 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.

AIRPROX REPORT NO 119/05

Date/Time:	18 Jul 1120	
Position:	5123N 00217W (16½nm E of Bristol - elev 622ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-700	TB20
Operator:	CAT	Civ Pte
Alt/FL:	3500ft	2000ft
	QNH (1008mb)	QNH
Weather	IMC NR	VMC NR
Visibility:	NR	>10km
Reported Separation:		
	600ft V/2·5nm H	Not seen
Recorded Separation:		
	100ft V @ 3·5nm min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-700 PILOT reports he was inbound from Valencia to Bristol flying in IMC. He was in receipt of a RCS, he thought, from Bristol APPROACH on 136·07MHz and squawking the assigned code with Mode C.

Turning L onto 300° at 180kt, he thought at 12nm finals for RW27 whilst descending through 3500ft QNH, ATC issued an avoiding action L turn. Flying in IMC the other ac – the TB20 - was not seen but he had a TCAS contact throughout and assessed the risk as *"low"*. Neither a TA nor RA was enunciated and he quantified the minimum separation as 600ft vertically and 2½nm horizontally, adding that the other ac appeared to turn towards his B737 at which point ATC, who had been keeping him well informed of the other ac's movements, issued avoiding action. He alleged the other pilot was flying at 3000ft in IMC, 12nm from the RW27 threshold at Bristol [the TB20 actually passed no closer than 17.27nm] and not talking to Bristol ATC. He opined that whilst this was "legal", it was "dreadful airmanship".

THE TB20 PILOT reports he was in transit from Shobdon to Goodwood, flying in VMC, he thought at 2000ft QNH (1008mb), [the radar recording shows it was actually at about 3500ft ALT] with an in flight visibility of >10km. He thought he was in receipt of a FIS from Filton at the time [enquiries revealed this had been terminated before the Airprox occurred] and he was squawking A7000 with Mode C. Post flight he was informed that the Airprox had occurred in the Filton/Bristol vicinity when he would have been heading 157° toward Badminton before turning onto 176° at approximately 150kt. He did not see a B737 nor hear of any proximity to one as suggested by the Radar Analysis Cell in a telephone conversation after the event. He stressed that he flew well clear of the Bristol CTR/CTA whilst routeing toward Badminton using "full colour GPS".

THE BRISTOL APPROACH RADAR CONTROLLER (APR) reports that the B737 was inbound to Bristol. The flight was noted as being under a RAS - squawking A5351 with Mode C - whilst being vectored off airways from EXMOR for a CAT 1 ILS approach to RW27 when an unknown A7000 squawk was observed some 16nm NE of the BRI tracking SE indicating FL37 Mode C. The B737 was on an extended lefthand downwind leg and was turned L onto a heading of 300° to close the LLZ and also to keep it clear of the unknown ac [the TB20] upon which traffic information was passed, this including the range and direction of the unknown ac. Whilst the B737 was on this heading it became obvious that a further turn was required to maintain separation so the pilot was instructed

to turn L onto a heading of 270° for avoiding action. Further traffic information was then passed to the B737 crew that the unknown ac was at 3o'clock - 3nm and would pass behind their airliner. Although standard separation of 5nm was not achieved, due to the relative speeds she was confident the confliction had been resolved.

UKAB Note (1): The 1120UTC Bristol Weather was: Surface Wind: 210/8kt; Visibility 2500m in mist/drizzle; Cloud: BKN @ 200ft; QNH1008mb.

ATSI reports that the B737 crew was in communication with the Bristol APR whilst the TB20 pilot, having previously worked Bristol Filton, was not in receipt of an ATS. The APR described both her workload and traffic loading as 'moderate' but no other factors which may have adversely affected the APR's performance at the time of the Airprox were identified during the course of the investigation. The B737 crew contacted the APR at 1111:05 and reported routeing direct to the BRI. The ac was 20nm SW of Bristol Airport and passing FL110 in descent to FL70. The APR instructed the crew to fly a heading of 070º and advised that they were No4 in the traffic sequence for the ILS. The B737 crew was not informed of their position nor that they were identified, as is required in MATS Part 1, Section 1, Chapter 5 page 9. Neither did the crew request a service nor did the controller ask what service they wanted. MATS Part 1, Section 1, Chapter 5 page 2, para 1.2.2 states:

'*Outside controlled airspace it is the responsibility of the pilot to request the radar service he requires. However, if the pilot fails to specify the type of service the controller must ask the pilot which radar service he requires. The controller must also obtain a readback of the service from the pilot*'.

At 1112:35, the APR instructed the crew to turn R heading 085º and descend to FL45. The subject B737 was following another company ac [shown as 'Another Ac' on the diagram] which was about 11nm ahead, also being positioned downwind left-hand for the ILS. When the B737 was 9nm SW of Bristol, the APR instructed the crew to reduce their speed to 210kt or less. Very shortly after this the APR passed a revised weather report which was a deterioration of visibility to 2500m with scattered cloud at 400ft. At this time, the TB20 was some 23nm NE of Bristol, tracking SE, and displaying a Filton squawk. Having received this latest weather report, the crew of the company aircraft ahead of the subject B737 opted to carry out a CAT III ILS approach but the crew of the subject ac stated that they would make a CAT I approach. At 1117:25, the APR instructed the B737 crew to descend to 3000ft. The B737 was now 12½nm SE of the airport, still heading 085º and passing FL54 for 3000ft whilst the TB20, now squawking A7000 and indicating FL37 unverified Mode C, was 20nm NE of Bristol tracking SSE. A short time later, at 1118:40, and following a small track adjustment turn, the APR instructed the B737 crew to turn L heading 300º which was acknowledged. The APR then added "*…this heading is to close the localiser but also to keep you clear of southbound traffic that's north of you at the moment range of 7 miles southeast bound indicating FL37 but not verified*". Analysis of the radar recording shows that the B737 was 18nm ESE of Bristol when the crew were instructed to turn from the downwind heading onto a base leg. The pilot advised that he believed he had the other ac [the TB20] on TCAS and the APR then transmitted "*Okay continue that left turn heading 270 for avoiding action*". The APR telephoned Lyneham to see if they were in contact with the pilot of the unknown ac but they were not. At 1119:40, the radar recording shows the two ac almost head on, as the B737 turns L through N, separated by a distance of 5·2nm and 700ft apart from the Mode C readouts. Further traffic information was passed as the TB20 turned slightly R onto a more southerly track. The B737 then rolled out on the heading of 270º whilst continuing its descent to 3000ft. It is clear that at this point, the TB20 would be passing behind the B737 but separation continued to reduce to a minimum, at 1120:37, [some 16·6nm E of Bristol airport] when the TB20 was in the B737's 4 o'clock - 3·5nm and 100ft below the airliner. [This relative horizontal separation of 3·5nm is maintained over the next two sweeps as the B737 descends through the level of the TB20 and the latter crosses astern, whereupon horizontal separation of 5nm was restored and the APR vectored the B737 back toward the LLZ.]

The APR advised that it was her normal practice to inform pilots of the service they were under when leaving CAS: however, on this occasion she omitted to do so. It is noted that in previous Airprox reports involving Bristol International, controllers have not always specified the ATS to crews when they leave CAS. Although a Safety Notice was issued [to Bristol ATCOs - No. 05/05 dated 18/05/2005], this, as is demonstrated by this Airprox, has not prevented a recurrence. In effect the APR provided a RAS although the pilot of the B737 stated in his written report that he believed he was under a RCS.

The APR could not accurately recall the Airprox as, in her opinion, the B737 was never in a hazardous position with respect to the TB20 and it was simply an encounter in Class G airspace. The initial plan was to vector the B737 for a left hand circuit to the ILS for RW27. Even though the flight was No4 in traffic, it was not considered

appropriate to route the B737 to the hold, located overhead the airport, and thereby ensure the flight was contained within CAS for the maximum period. The APR opined that flights departing Bristol did not want to be held at 3000ft but wanted a higher level immediately. As the top of the Bristol CTA is FL65 this only facilitates the use of one or perhaps two levels to be utilised at the 'BRI' for arrivals.

Although it is understood that an airspace change proposal is being processed at present, this will not be in place until early 2006 and accordingly, the following recommendation is made by ATSI:-

'*Bristol International ATC should review its operating practices with regard to vectoring traffic inbound to Bristol from airways with a view to establishing whether the techniques employed given the increase in traffic to the airport, are making best use of the existing airspace and provide adequate safety to the flights involved*'.

Whilst it is accepted that increased CAS will assist the controllers, the track followed by the B737 crew on this occasion would not have been encompassed within the proposed expanded airspace.

As the B737 was vectored downwind, it was some 6nm S of the Airport, outside the CTR/CTA in Class G airspace. The APR later said that she had checked her radar for any traffic operating to the S of the Bristol Class D CAS and saw none, hence the reason for vectoring the B737 so wide. The TB20's squawk was visible on the APR's radar display and she confirmed that she had seen it when it was still some distance N of Filton. Initially, the APR had thought that the unknown contact was inbound to Filton but later, at around 1117, the squawk changed to A7000 and she realised that it was heading for a different destination. Shortly before this happened, the TOWER controller advised the APR of a deterioration in the weather. This was passed to the company ac that was ahead of the subject B737 and the crew elected to carry out a CAT III ILS approach. Low Visibility Procedures (LVPs) were already in place and the unit's MATS Pt 2 requires that ac making such approaches must be vectored to intercept the LLZ at not less than 10nm from touchdown. Furthermore, the spacing between successive ac, when the following ac is carrying out a CAT II or III approach shall not be less than 12nm. The company B737 had to be vectored for at least a 10nm final and also positioned not less than 12nm behind the ac ahead, which was a Twin Otter on a 6nm final. At many units once CAT II/III operations are in place it is normal to provide the extended spacing, in this case 12nm to all traffic, but this practice is not followed at Bristol. It was explained that to minimise routeings, if it is established that the following ac is only making a CAT I approach, then the normal radar or wake vortex spacing will be applied. The B737 crew had advised that they would make a CAT I approach and so they were being positioned the standard distance behind the other company ac.

At the time that the APR instructed the B737 crew to turn L from the downwind heading onto a closing heading for the LLZ, it is clear that the TB20 would be in conflict. The APR advised that her assessment of the relative speeds of the two ac led her to believe there would not be a problem. The radar shows that the ground speeds of the TB20 and the B737 were 150kt and 240kt respectively; as the B737 started the L turn the two ac were converging at nearly 400kt – some 6½nm/min. Alternative courses of action were discussed with the APR, such as turning the B737 R the long way round, but the APR reiterated that she did not see the two ac as a serious conflict. By the time the B737 had steadied on its assigned vector of 300º, prescribed horizontal separation of 5nm had been lost. MATS Part 1, Section 1, Chapter 5, Page 3 (Radar Advisory Service) para e) states:

"*Controllers shall pass avoiding action instructions to resolve a confliction with non-participating traffic and, whenever possible, shall seek to achieve separation which is not less than 5nm or 3000feet, except when specified otherwise by the CAA. However, it is recognised that in the event of the sudden appearance of unknown traffic, and when unknown aircraft makes unpredictable changes in flight path, it is not always possible to achieve these minima*".

The situation was slightly exacerbated by the fact that the TB20 pilot made a slight R turn from a track of 155° to 200° [for a short period], but this should not have come as a surprise to the APR. It had already been established that the TB20 pilot was not in contact with Lyneham and so it would have to avoid Lyneham's CTA/CTR. The unverified Mode C readout from the TB20 pilot was FL37 - which equates to 3550ft QNH (1008mb) - so it was highly probably that the TB20 pilot would turn to avoid the southwestern end of the Lyneham CTR [sfc – 3500ft amsl] which is exactly what the TB20 pilot did. The APR explained that she did not use standard 'avoiding action' phraseology when passing the heading change onto 270° as it was clear that the TB20 would pass behind the B737 and pose no threat. Again, she reiterated that vectoring traffic inbound to Bristol outside CAS was a day-to-day occurrence given the limited dimensions of the CTR/CTA. Here, the APR misjudged the situation when turning the B737 crew from its downwind heading onto a closing heading for the ILS. Even when the conflict was

identified, the APR allowed the situation to continue before turning the B737 onto a heading parallel to the LLZ course. No level of service was specified by the APR nor requested by the pilot; the APR effectively provided a RAS but the crew of the B737 believed that they were in receipt of RCS. Whilst it is accepted that the CAS surrounding Bristol Airport is not contiguous with the nearby airways, so traffic is frequently vectored outside CAS, by adopting different techniques this time could be minimised. Whilst doing this, and providing the B737 crew with a RAS, the conditions were not satisfied as the APR did not seek to achieve the requisite 5nm horizontal separation against the 'unknown 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 controller involved and a report from the appropriate ATC authority.

It was noted that after this Airprox occurred Bristol ATC came under 'new management' and the provision of ATC is now undertaken by NATS Ltd. Whilst endorsing the ATSI recommendation, the Board was heartened to learn that as a result of this and other Airprox under the then-established Bristol ATC safety review process, Bristol ATC had already conducted a review of operating practices and the vectoring of inbound traffic off-airways. The ATSI Advisor explained that Bristol had stated within their response that the use of the correct avoiding action phraseology would be reinforced to ATCOs through routine Unit Local Competency Examiner (LCE) checks. Also to be reinforced will be the notification to pilots of the change of ATS upon exiting CAS and a small change has been made to the FPSs to facilitate this. Bristol had also responded to the ATSI recommendation as to whether the vectoring techniques employed for CAT inbound to Bristol from airways are making best use of the extant Bristol Class D CAS thereby providing adequate safety to the flights involved. The Board was advised that the incumbent management at Bristol ATC at the time of the Airprox had contended that forcing flights to enter holding at the BRI within CAS would have a negative impact on departing traffic, consequently Bristol ATC considered their vectoring practises to be adequate. However, experienced civilian controller Members who understood clearly the rationale behind the ATSI recommendation had reservations about Bristol's view on this topic. To allay their concerns the NATS Ltd Advisor added that a safety survey had subsequently been conducted on LVPs and further extensive training is taking place, which includes holding scenarios. In addition to the safety notices issued on two topics as a result of this Airprox – avoiding action phraseology and ATS outside CAS – the ATC TRUCE training regime (Training in Unusual Circumstances and Emergencies) will also reinforce these points. On the latter topic it was noted by controller Members that there is also an implicit responsibility on pilots to specify the type of radar service they require when operating outside CAS, just as there is clearly a requirement placed upon ATCOs to ensure that they ask if pilots do not specify on first contact. Moreover, there is a requirement for pilots to read-back any change of ATS stipulated. This was an important point worth repeating as several Airprox assessments of late, involving CAT exiting CAS into Class G airspace, had evinced similar irregularities. In general the establishment of the appropriate level of radar service in Class G airspace is a two-way agreement between controller and pilot such that each should be in no doubt what can be expected of the other.

Moving to a slightly different aspect the Board was briefed that it was widely known that a significant airspace change proposal has been submitted jointly by Bristol and Cardiff relating to the CAS available to the respective ATSUs [introduction of which is now postponed to 13 Apr 2006] and in one Member's view the B737 pilot might possibly have been trying to add weight to the case. The Chairman emphasised that the reporting of Airprox should not be seen as a political lever to support any airspace change proposal for the benefit of one community at the expense of other airspace users. Clearly there was a well-established process for such matters to be submitted through DAP and the Board wholeheartedly endorsed this stance.

There seemed little reason to doubt that the APR was in effect endeavouring to provide a RAS here – as noted by the APR in her report but not stated on RT - whereas the B737 crew mistakenly believed that they were in receipt of Radar Control Service, possibly in the mistaken impression that they had already achieved the sanctuary of CAS at the time of the Airprox. Consequently, the APR was seeking to achieve the prescribed separation under the RAS but apparently the somewhat unpredictable nature of the TB20's track had defeated this intent. It was perhaps unfortunate that contact had not been attempted earlier with Filton ATC in this moderate traffic scenario when the APR first spotted the ac. The intentions of the then-unknown track might then have been ascertained whilst it was under the control of Filton and a different outcome might have resulted – possibly by switching the flight to Bristol ATC themselves - but clearly this was said in hindsight. The ATSI report had made it plain that whilst the APR was aware of the presence of the TB20, it seemed that the controller had misjudged the situation when turning the B737 from so far downwind onto the ILS. Even when the conflict was identified, the APR had

merely turned the B737 onto a parallel heading to the LLZ course with no other positive action to establish the prescribed separation against the TB20. A CAT pilot Member postulated that the APR might not have been expecting the B737 to be still flying at 240kt which a very experienced B737 pilot agreed was a relatively high speed for this point on the downwind leg. This might have resulted in an unexpectedly wide turn closer to the TB20 than the APR had predicted. Controller Members opined that whilst the APR might not have achieved the requisite separation, once the B737 had been turned inbound through the 12 o'clock of the TB20, the potential threat had been 'neutralised' and the latter was always going to pass astern of the descending B737 albeit with an inevitable erosion of horizontal separation the radar recording had revealed.

Pilot Members agreed that this was not a close encounter in Airprox terms. Although the B737 pilot had reported that this Airprox had occurred at 12nm FINALS to RW27, the radar recording had shown that minimum horizontal separation of 3½nm occurred some 16½nm E of Bristol, outside the CTA in Class G airspace, where 'see and avoid' pertains. The TB20 actually passed no closer than 17·27nm from the airport and about 7nm from the CTA boundary. Although the TB20 pilot was flying legitimately in the 'Open FIR' it was suggested that it might have been preferable to communicate with Lyneham ATC whilst flying in the close vicinity of their CTR. It was not clear if Filton had suggested to the TB20 pilot when he left their frequency that he might free-call Bristol ATC: this would certainly have been preferable even this far from Bristol who it would seem are routinely vectoring large CAT ac here. But clearly the TB20 pilot was not under any compunction to do so, as the reporting pilot had stated: he had avoided all CAS and in the view of CAT pilot Members any criticism of the TB20 pilot's airmanship in this respect was misplaced.

Whereas TCAS had evidently made the presence of the TB20 known to the B737 crew as had the APR, the B737 pilot reported he was flying in IMC and had not spotted the TB20 visually. When the B737 was turning through the TB20's 12 o'clock it was more than 5nm away to the N but the latter's SSR was clearly 'broadcasting' the ac's level to the B737's TCAS, which neither enunciated a TA nor commanded an RA throughout the encounter. Given the geometry of the encounter and the separation evinced by the radar recording it was not surprising to the Members that TCAS had not predicted that an 'alert' was warranted. The Board concluded, therefore, that this was a sighting report of traffic displayed on TCAS to the B737 crew where no risk of a collision had existed in the circumstances reported here.

Whilst the Board endorsed the ATSI recommendation to the ATSU concerned about specifying the type of ATS to pilots, some Members thought it would be worthwhile to reinforce the extant MATS Pt 1 guidelines more widely to all civilian ATSUs who provide radar services in Class G airspace. Therefore, the Chairman agreed to consult with ATSI/ATSD on this topic outwith the meeting.

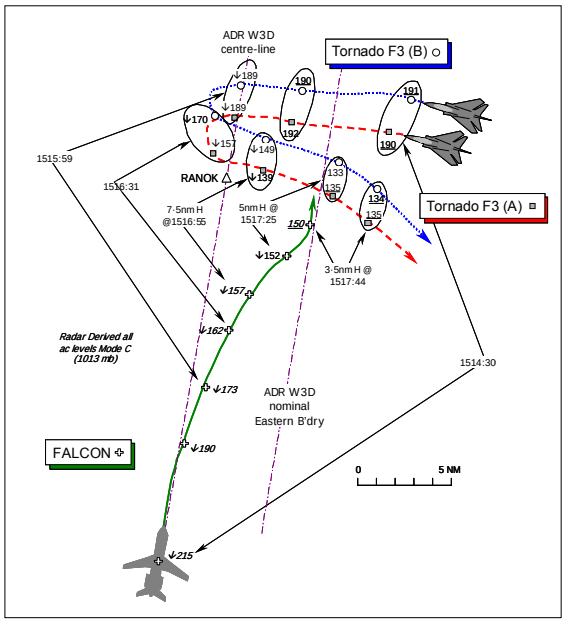
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 121/05

Date/Time:	25 Jul 1517	
Position:	5640N 00410W (vicinity of RANOK)	
Airspace:	ADR W3D/FIR	(Class: F/G)
Reporter:	ScACC W Coast Sector	
	First Ac	*Second Ac*
Type:	Falcon 2000	Tornado
Operator:	Civ Comm	HQ STC
Alt/FL:	↓FL150	13000ft (RPS 1001mb)
Weather	VMC SKC	VMC CLOC
Visibility:	>30km	>40nm
Reported Separation:		
ScACC W Coast SC:	<1000ft V/2nm H	
	1500ft V/3nm H	2000ft V/7nm H
Recorded Separation:		
	1500ft V/3·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCACC WEST COAST SECTOR CONTROLLER (W COAST) reports that he was working with Tiree (125nm range) and the Great Dun Fell (80nm range) radars selected. The Falcon 2000 was inbound to Inverness descending to FL150 under a RAS northbound on ADR W3D [FL60 – 240] flying at about 300kt groundspeed. As the Falcon approached RANOK descending through FL210, two military ac squawking A3100/3200 (subsequently identified at Tornados) were observed 20nm NE of the Falcon heading W at FL180-FL190. The Falcon crew was offered an "advisory" R turn of 10° if the Tornados were not sighted, which they took, to route the Falcon some 12nm E of the conflicting westbound traffic. As the conflicting traffic crossed the centreline of the ADR at FL190, their radar returns faded for one or two sweeps during which time they had turned hard L and reappeared in a descent heading directly toward the Falcon. He immediately issued an avoiding action R turn onto a heading of 045°. As the Falcon steadied on the heading he reassessed the tracks and advised an additional hard L turn onto 360° and it was during this turn that the Falcon crew spotted the Tornado jets. Prescribed separation was lost - he estimated to a minimum of 2nm horizontally and less than 1000ft - as the Tornados descended through the level of the Falcon. He is certain that separation would have been less if avoiding action had not been taken.

Unpredictable high-energy manoeuvres across W3D, such as those described here, gave him "extreme concern for the safety of the Falcon" and left him quite shaken after the event. The Tornado ac were squawking NATO squawks and apparently receiving some form of ADS from an AWACS controller, but this incident highlights the complete absence of "co-ordination" between airborne controllers and civil ATC. Also in his view, it shows an extreme lack of awareness of both the performance of civil ac and the kind of separation that civil controllers are seeking to achieve from unknown traffic in these situations.

THE FALCON 2000 PILOT-IN-COMMAND provided a brief account reporting that he was routeing W3D northbound under IFR to Inverness at 330kt. A RAS was provided by ScACC and a squawk of A5420 selected with Mode C. After following the ATC avoiding action vectors the other ac passed about 1500ft below his Falcon out to starboard but the safety of the ac "was never put into question" and he assessed the risk as "none". Neither a TA nor an RA was enunciated by TCAS and he added that the "cockpit never got overloaded".

THE FALCON 1ST OFFICER also helpfully provided a report substantiating fully the comments of the pilot-in-command. She added that the Tornados were displayed on TCAS from 15nm away and passed 3nm away to starboard heading away, adding they had "good visual on the traffic" and assessed the risk as "low".

THE TORNADO F3 PILOT reports that he was flying as one of a pair of camouflaged air defence grey Tornado F3 ac, conducting [practise] interceptions at 450kt against other military ac under an ADIS from an airborne

controller in an AWACS ac. A squawk of A3100 was selected with Mode C; TCAS is not fitted. They were in receipt of information on the other ac – the Falcon - by RT, AI radar and data link from 40nm range and took action to avoid the other ac vertically. The Falcon was first reported at FL210 so he descended to 17000ft RPS, but the other ac continued down to FL150 onto them thereby "negating" their own avoiding action, so he descended to 13000ft RPS (1001mb). Once clear of W3D he continued level at 13000ft RPS eastbound. Although the Falcon ac was not spotted visually minimum separation was 7nm/2000ft above their Tornado, the risk was "nil" and they had "complete awareness of the other ac".

ATSI reports that the Falcon passed abeam GOW before turning R routeing via ADR W3D, on course for Inverness. The crew established communications with the W COAST SC at 1511:50, and reported descending to FL260. The controller informed the crew that they would be in receipt of a RAS on the ADR and issued a clearance to descend to FL150. At 1514:25, the Falcon was passing FL215 tracking towards the INS when the controller passed traffic information on two military ac – the Tornado F3 pair - in the Falcon's 2o'clock – 32nm crossing from R - L, although the controller incorrectly stated that they were 20nm away. The two ac were both displaying a Mode C readout of FL190 and Mode A codes commensurate with receiving a service from a controller aboard an AWACS ac. The controller advised the Falcon crew to turn R 10° if the traffic was not sighted. The Falcon crew complied with this and reported their new heading as 020°.

The two Tornados continued on their westerly track, crossing ahead of the Falcon when at 1515:59, the two jets were at 11o'clock - 17nm indicating FL189 as the Falcon was passing FL173. Shortly afterwards the Tornado pair commenced a L turn from W onto SE and commenced a descent. W COAST SC transmitted at 1516:30 "[Falcon C/S] *avoiding action turn right heading 050° previously reported traffic has just turned onto a south-easterly heading unverified indicating 1000 feet above*".

[UKAB Note (1): At 1516:31, the Falcon was passing FL162 with the nearest of the Tornado pair turning L at 11 o'clock - 11nm, F3 (A) indicating FL157 and F3 (B) passing FL170. At 1516:55, the Tornado pair had steadied on their SE'ly track with the nearest in the 11 o'clock position of the Falcon at a range of 7·5nm passing FL139 whilst the other was passing FL149. At this time, the Falcon was passing FL157. The controller passed further traffic information at 1517:00, *"previously reported traffic has now just turned onto your 10 o'clock range of 4 miles crossing right to left* [sic] *indicating 1000 feet below and 2000 feet below maintaining"*, and advising further avoiding action of " *I suggest left turn now heading 360º to go behind"*, which the crew acknowledged at 1517:20. Moments later the Falcon crew reported visual with the traffic just as separation reduced to 5nm and 1700 feet against F3 (A) at 1517:25, as the Tornado F3 pair crossed from L - R through the Falcon's 12 o'clock as the latter's turn becomes evident. Minimum horizontal separation was about 3·5nm as the Falcon levelled at FL150 and drew astern of the Tornado pair whilst steadying on N some 1500ft above F3 (A).]

The W COAST SC correctly applied the requirements of a RAS. MATS Part 1 Section 1, Chapter 5, page 13, which states:

'*….when unknown aircraft make unpredictable changes in flight path, it is not always possible to provide standard radar separation*'.

Despite the best efforts of the W COAST SC, separation was not maintained but the crew were kept updated with traffic information enabling them to visually acquire the other traffic.

[UKAB Note (2): The UK AIP at ENR 1-1-1-1 (ATS Routes) notifies that ADRs have no declared width but for the purpose of ATS provision are deemed to be 5nm either side of the ADR Centreline.]

MIL ATC OPS reports that the Tornado F3 pair was flying an affiliation sortie up to FL240 in the FIR under the control of an E-3D AWACS crew. The pair was operating under an ADIS – equating to a RIS – which was 'limited' below FL100 with a FIS below 7000ft RPS (1004mb). At 1515:26, traffic information about the Falcon was passed to the F3 crews as "[F3 formation C/S] *link route traffic* [the Falcon] *bullseye* [5705N 00338W] *215/46 indicating FL195 heads north"* - which equates to the Falcon being in the F3 formation's L 10 o'clock at 25nm. The lead F3 crew responded "*… we are about to recommit* [from the] *west but we will remain below that advisory traffic*". The AWACS controller acknowledged the call and passed traffic information as "*Advisory traffic bullseye 217/43, now indicates FL185*" and again at 1516:18, as "*…link route* [the Falcon] *continues to descend indicates passing FL170, heads north*". Further traffic information was given at 1516:34, as the civil traffic was passing FL165 descending and the F3 formation leader reported *"F3 formation callsign, will be descending to 12000*". More traffic information was passed as the Falcon was

passing FL160 to which the F3 formation requested clarification of the level, confirmed by the AWACS controller as FL160 descending. Some 18sec later further traffic information was passed as the Falcon descended through FL155 and was reported as tracking NE. The F3 formation leader reported level at 13000ft RPS at 1517:35, whereupon the AWACS controller replied "*you're now in the traffic's 12 o'clock at 6 miles indicating FL150*".

The AWACS controller passed timely and accurate traffic information including level information and applied a RIS in accordance with JSP 552 – 235.115.1 to the F3 pair flying in the FIR. The AWACS controller passed multiple transmissions of traffic information to the F3 formation leader regarding the Falcon and although the F3 leader at no stage reported visual with the Falcon he stated that "*we will remain below that advisory traffic*".

HQ STC comments that ATC, AWACS and the crews all took action keep the two ac apart. Unfortunately, as they both kept moving, the separation was less than would have been ideal.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted from the Mil ATC Ops report that the AWACs controller had provided a steady flow of accurate traffic information to the F3 pair about the Falcon. This, coupled with the data-linked information provided from the AWACs and their own AI radar information, enabled the F3 crews to maintain good situational awareness on the approach of the Falcon from the S. Although the F3 leader had not spotted the other ac visually, this traffic information had enabled him to descend clear below the Falcon and achieve a resultant vertical separation of 1500ft - albeit slightly less than the F3 leader had estimated. Clearly this was unbeknown to the W COAST SC at the time who, under the RAS, had provided a very effective service to the Falcon crew. It was unfortunate that the F3 leader, who up to that point had maintained a level cruise westbound, had elected to turn about through the centreline of the ADR and descend. It was this turn within the ADR that was contrary to the sage advice contained on the STC Flight Safety poster issued on 10 Dec 2004 as a result of previous Airprox involving Tornado ac operating in the vicinity of ADRs. Broadly paraphrased, the STC poster entreats military crews to: get at a minimum a RIS, but if unable to obtain a radar service avoid operating (or planning to operate) in and around ADRs. Clearly the F3 crews had received a good service from the AWACs controller and had complied with this part of the advice. However, they had not crossed through at right angles to the centreline, level at a quadrantal level, which the poster also suggests in the interest of good airmanship. The initial 10° track correction offered to the Falcon crew, whilst initially taking the latter's ac clear astern of the pair, was subsequently negated by the F3s' L turn about SE bound back through the ADR centre-line. A military controller Member intimately familiar with this airspace suggested that stopping off the Falcon's descent might have proved effective here and would certainly have afforded greater vertical separation at the critical moment. Whilst this was said in the clear light of hindsight, it was evident that the W COAST SC was placed in a difficult situation by the unpredictable nature of the F3's manoeuvre. It was not until the F3s had steadied that the SC said he was aware that they had indeed turned about, back into confliction with his descending Falcon and that the pair were themselves descending above it. This necessitated the avoiding action R turn onto 045° but a civilian controller Member stressed it was very difficult to deal with encounters such as these when you do not know what the other ac are going to do. Here, the radar recording revealed that the F3 pair was originally below the Falcon as the latter descended at range but then at a similar level as the fighters turned back before the F3s then increased the vertical margin below the Falcon. Consequently, this was a very fluid and dynamic situation which, the STC Member had observed, kept moving. In the Board's view, the W COAST SC had done his best in the circumstances and had conscientiously endeavoured to provide appropriate avoiding action advice to the Falcon crew whilst seeking to achieve the requisite separation against fast moving traffic which was unknown to the controller. The W COAST SC had himself highlighted the unpredictable high-energy manoeuvres across the ADR: in addition, the entire absence of any ability to co-ordinate with the AWACS controller was clearly also of concern to him. Where such procedures had been trialled in the past at ScACC/ScATCC (Mil) they had not proved to be effective. Thus the crux of this occurrence lay squarely on the conflict between the Falcon flying under IFR and the more nimble VFR F3 ac, whose crews were receiving traffic information from a variety of sources that clearly enabled them to avoid and outrun the Falcon. All this was unknown to the W COAST SC at the time, whose conscientious attempts to resolve the situation were frustrated by the unexpected about turn by the F3 pair. Following a wide-ranging discussion a civil CAT pilot Member suggested that it was this Tornado F3's unexpected turn back across the ADR that caused the W COAST SC concern which, the Board agreed, was the cause of the Airprox.

Turning to risk, it was evident from their respective reports that none of the pilots involved was concerned over this encounter through the ADR and neither was TCAS called upon to act. Each crew was provided with copious traffic information which in the F3s case enabled them to descend in excess of 1500ft below the Falcon as they crossed 5nm ahead of it. Furthermore, the traffic information and avoiding action L turn instruction onto 360° to the Falcon crew from the W COAST SC enabled them to sight the F3 pair as they passed some 3·5nm astern to the W of the fighters. Consequently, the Board agreed unanimously that this had effectively removed any risk of a collision.

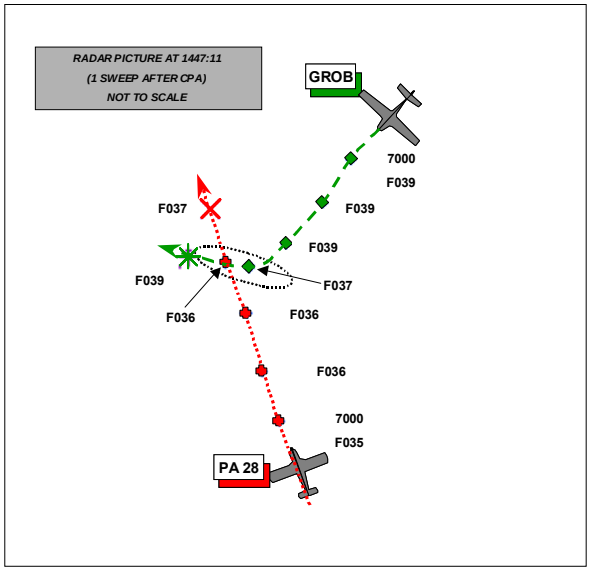
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado F3's unexpected turn back across the ADR caused the W COAST SC concern.

Degree of Risk: C.

AIRPROX REPORT NO 122/05

Date/Time:	26 Jul 1447	
Position:	5218N 00008W (S of Godmanchester)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Tutor	PA28
Operator:	HQ PTC	Civ Pte
Alt/FL:	4000ft (QNH 1007 mb)	3500ft (RPS)
Weather	VMC CAVOK	VMC CLBC
Visibility:	50km	~15km
Reported Separation:	70ft V/110ft H	Not Seen
Recorded Separation:	100ft V/0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB TUTOR PILOT reports flying a training sortie in a white ac with the HISL selected on in receipt of a FIS from Wyton APP. He was about to perform a Barrel Roll and was in a right hand turn with a slight dive, passing through a heading of 210° at 130kt and 4000ft QNH when a red and white Cherokee ac appeared from behind and below his ac. Due to the direction of approach of the Cherokee he had been totally unsighted to it and was not able to take any avoiding action. He assessed the risk of collision as being high.

THE PA28 PILOT reports that he was flying a red and white ac on a delivery flight from North Weald to Carlisle. He was in receipt of a FIS from Cottesmore LARS, was squawking as directed and at the reported time of the incident was heading 335° inbound Gamston at 100kt and 3500ft on the RPS. He did not see the other ac at any time.

THE COTTESMORE LARS CONTROLLER reports that while he was controlling several ac a PA28 called at 1447 reporting near Huntingdon at 3500ft, en route to Carlisle and requesting a FIS. He gave the PA28 a squawk and immediately passed TI on unknown traffic squawking 7000 in his left 8 o'clock at ½nm indicating 4200ft. Traffic density in the Wyton area was high with many other non-squawking tracks and the he thought that the contact mentioned might not have been the ac involved in the Airprox. He received no Airprox report.

HQ PTC comments that the radar picture tends to indicate that this was indeed Airprox material. However, the lack of the PA28 pilot's perception of the encounter and the briefness of the sighting by the Tutor makes it difficult

definitively to assess the gravity of the event. The Tutor pilot was able to see the other ac approaching from a difficult quarter and to modify his manoeuvre sufficiently to avoid it.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings, reports from the air traffic controllers involved and a report from the Grob operating authority.

The Board noted that despite the PA28 pilot wisely requesting a FIS from Cottesmore LARS, the traffic density had been such that they had not been able to provide any warning of the Grob manoeuvring in his 1-2 o'clock. A military Instructor pilot informed Members that military pilots are trained always to conduct clearing turns prior to commencing aerobatics or aggressive manoeuvring. This incident served as a reminder that notwithstanding such turns, it is commonplace to encounter 'interlopers' and it is imperative that not only the flightpath ahead must be cleared but also the greater operating 'box'. This incident was also another case where the mean tracks of the respective ac had been such that there was minimal relative motion from the respective pilots' viewpoints.

Although the Grob pilot had seen the PA28, he had only done so after the two ac had passed; the PA28 pilot did not see the Grob at any time. The radar trace had however shown that although the ac had come close to one another, their flight paths had been such that there was not an actual risk that they would have collided as the PA28 had passed ahead of and slightly below the manoeuvring Grob, albeit unsighted to its pilot probably due to the ac attitude. Although therefore there had been no actual risk that the ac would have collided, their safety had not been assured.

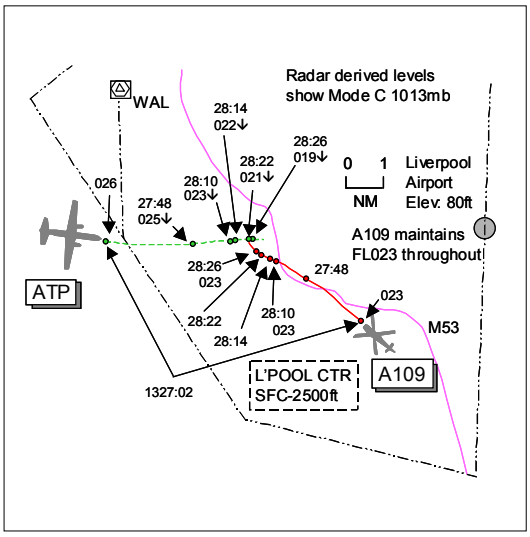
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sighting by the Grob pilot and non-sighting by the PA28 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 125/05

Date/Time:	27 Jul 1328	
Position:	5319N 00302W (6nm W of Liverpool Airport - elev 80ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	ATP	A109
Operator:	CAT	Civ Pte
Alt/FL:	1600ft↓ (QNH 1010mb)	NR (QNH)
Weather	VMC CLOC	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:	<200ft V/<2·5nm H	NR
Recorded Separation:	400ft V/0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATP PILOT reports heading 090° at 120kt established 'fully coupled' on the ILS RW09 at Liverpool and in receipt of an ATS from Liverpool Approach and Tower squawking 5471 with Mode C. At range 6nm ATC advised them of a helicopter operating S of the RW C/L at 1500ft, he thought, and its pilot was heard to report he had contact with his ATP. The helicopter traffic was identified on TCAS at the same level and, as the range decreased

to <2·5nm, a TCAS RA 'descend' was received, demanding ROD 1500fpm. The guidance was followed, descending to 1200ft whilst TCAS gave a reduce ROD then 'clear of conflict'. The black/grey helicopter was seen to cross from his one o'clock position N bound <2·5nm away <200ft above, to his R before passing behind the ATP with diverging vertical separation as they descended through 1600ft QNH 1010mb. ATC were advised of the TCAS descent both on the approach and during their taxy in at Liverpool and he assessed the risk as 'real'.

THE A109 PILOT reports enroute from a private site near Woodford to Ronaldsway at 140kt and in receipt of a FIS from Liverpool Approach on 119·85MHz squawking an assigned code with Mode C. The visibility was >10km 2000ft below cloud in VMC and the helicopter was coloured maroon with forward landing, upper and lower anti-collision lights all switched on. ATC reported an ac at or approaching Wallasey IFR for Liverpool (the subject ATP). They were routed away from Wallasey towards the SW; the ATP was not working Liverpool Approach at that time. Later they became visual with the ATP and informed ATC who instructed them to pass behind. The ATP crossed from L to R at about his height and then descended, which they assumed was with the ILS. He believed that there had be no risk during the encounter.

ATSI reports that the controller had been in position for 20min when the Airprox occurred. He described the workload as light-moderate. The Liverpool 1320 weather was reported as: surface wind 100°/7kt; visibility >10km; cloud, few at 3700ft and broken at 4800ft.

The A109 flight established communication with Liverpool Approach, at 1320 reporting flying under VFR and just approaching N of Whitegate which is situated at the SE corner of the Liverpool CTR (Class D airspace). The pilot requested to route via the O/H and then W'bound for the Isle of Man. The flight was issued with a Liverpool squawk and about 1min later the A109 pilot reported N of Whitegate requesting zone entry. At 1322:00, the A109 flight was informed *"...you can enter the er zone VFR not above fifteen hundred feet and er you can route from your present position to er track the M FiftyThree northbound"*. (The M53 runs initially in a northerly direction from the southern CTR boundary.) The radar shows the helicopter tracking W, approximately 10nm SE of Liverpool Airport at the time.

At 1323:30, when the A109 was about 8nm SSE of the airport, the pilot requested to route via Wallasey. The APR advised that a direct routeing would necessitate a climb to 2200ft to avoid the restricted area 5nm SW of the airport at Capenhurst. (A routeing via the M53 would have avoided this area.) This was agreed and the A109 was instructed to climb to 2200ft.

Following an acknowledgement of the climb instruction by the pilot of the A109, the ATP flight made its initial call on the approach frequency when it was 23nm NW of Liverpool Airport, its pilot reporting maintaining FL60 on a heading of 145°. The flight was instructed to turn L heading 130° to expect vectoring for an ILS approach to RW09. The ATP crew were cleared to descend to an altitude of 2500ft and some 90sec later was requested to report established on the LLZ. Meanwhile, the pilot of the A109 had reported levelling at 2200ft having previously been requested to advise if he was unable to maintain VMC. The controller said that his plan was to route the A109 W'bound until it sighted the ATP - then it could cross visually behind that traffic. Accordingly, at 1326:28, when the A109 was 4nm SW of the airport, the APR warned *"I may have to take you er westbound now got traffic establishing on the ILS. It's an ATP at ten miles report if you get that traffic in sight"*. The radar recording shows the A109 tracking NW with the ATP in its 11 o'clock at a range of 10·6nm. The crew of the ATP reported established, at 1327:00, and were cleared to descend on the ILS. The pilot of the A109 was then instructed to follow the motorway (M53) *"that should take you behind the ATP"*. At this point the M53 routes NW to pass through the extended C/L of the RW at about 6nm.

The minimum services which are to be provided in Class D airspace are stated in MATS Part 1, Section 1, Chapter 2, Page 1. These include: *'pass traffic information to IFR flights on VFR flights and give traffic avoidance if requested and pass traffic information to VFR flights on IFR flights and other VFR flights'*. In accordance with these procedures, the APR informed the pilot of the ATP about *"Agusta one oh nine helicopter just south of a four mile final for runway zero nine not above two thousand two hundred feet VFR"*. He then advised the pilot of the A109 *"the traffic the ATP will be descending through your level now on the localiser at eight miles, are you visual?"* The pilot reported visual and was then instructed to *"route to pass behind"*. The ATP's pilot was told that the traffic had him in sight; he was cleared for the approach and transferred to the Aerodrome Control frequency. The controller commented that he then turned his attention to other traffic on the frequency including vectoring two IFR inbounds, one of which wished to make a radar approach. The next call on the approach frequency by the A109 pilot was when the pilot reported N of the approach by which time it had passed 0·9nm behind the ATP. Meanwhile, on

contacting the ADC the pilot of the ATP reported fully established and added that he had received a TCAS alert which, he subsequently explained, was a descent RA.

The radar recording of the event shows the subject ac on conflicting tracks with the ATP descending and established on the ILS C/L as the A109 approaches it from the SE, level at an altitude of 2200ft QNH 1010mb (FL023). When the two ac are at the same altitude they are 1·4nm apart. As the horizontal distance between them decreases, the vertical separation slowly increases as the ATP descends i.e. 1·1nm/100ft (1328:14), 0·7nm/200ft (1328:22) and 0·3nm/400ft. The latter occurs at 1328:26 as the A109 passes S of the ATP. Thereafter, the ATP continues to descend as the A109 passes 0·9nm behind it.

The MATS Part 1, Section 3, Chapter 4, Page 1, provides advice and guidance to controllers on the safe integration of VFR flights with the IFR traffic flow in the vicinity of aerodromes. The following is of relevance to this incident: *'Although in Class D airspace separation standards are not applied, ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to see and avoid each other. Instructions issued to VFR flights in Class D airspace are mandatory. These may comprise routeing instructions, visual holding instructions and level restrictions in order to establish a safe, orderly and expeditious flow of traffic and to provide for the effective management of overall ATC workload. For example, routeing instructions may be issued which will reduce or eliminate points of conflict with other flights, such as final approach tracks and circuit areas, with a consequent reduction in the workload associated with passing extensive traffic information'*. Additionally, although not specifically addressed by MATS Part 1, if VFR/IFR flights are suitably deconflicted, it would reduce the possibility of undesired TCAS activation. In view of this Airprox and another similar one at Liverpool between transiting VFR traffic and an ac on the ILS, the procedures for VFR/IFR flights are being reviewed locally.

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 from the reports submitted to the Board that all parties had fulfilled their responsibilities for flights within the Class D CTR. The Liverpool APR had ensured that TI had been passed to both crews and that the (VFR) A109 pilot had visually acquired the ATP in good time before instructing its pilot to *"route to pass behind"*. The A109 pilot had complied with this instruction. However, the A109 pilot's chosen flight path towards the ATP had triggered a TCAS RA and also caused the ATP crew concern as the A109 was sighted passing close (0·3nm to the R) and slightly above (100ft increasing to 400ft at CPA). From the A109 cockpit, the pilot had chosen the separation distance and was content that this was safe and adequate. He was probably unaware that his flight path had caused a TCAS avoidance manoeuvre to be flown by the ATP crew, believing the ATP's descent was on the ILS G/P. Even though the ATP crew perceived the risk as real, the A109 pilot had seen the ATP early, monitored its progress and was always in the position to manoeuvre further if necessary. This led the Board to conclude that safety had been assured during the encounter.

TCAS can be thought of as monitoring an imaginary 'bubble' surrounding an ac. The equipment interrogates other transponders and checks a combination of slant range, relative bearing and level (if other ac have Mode C selected) and then calculates a 'time to reach the CPA' from the range and closure rate before issuing appropriate alerts and advice. In this specific Airprox, if the A109 pilot had turned earlier (even by a small amount), thereby aiming to give the ATP a wider berth, this might well have forestalled an RA command whilst also allaying the ATP crew's concern about the encounter. Members agreed that this was a good 'lesson to be learnt' which should be highlighted to pilots and air traffic controllers alike. In that process, Members were unanimous in agreeing that nothing should be communicated which would cause pilots to consider switching off their transponder's Mode C, even briefly, in such circumstances as those of the subject Airprox. An occasional 'nuisance' TCAS alert is better than no alert.

Members applauded the proposed review of local procedures for VFR/IFR traffic situations by Liverpool ATC which would have deconflicted the subject ac in this case and reduced the possibility of undesirable TCAS activation.

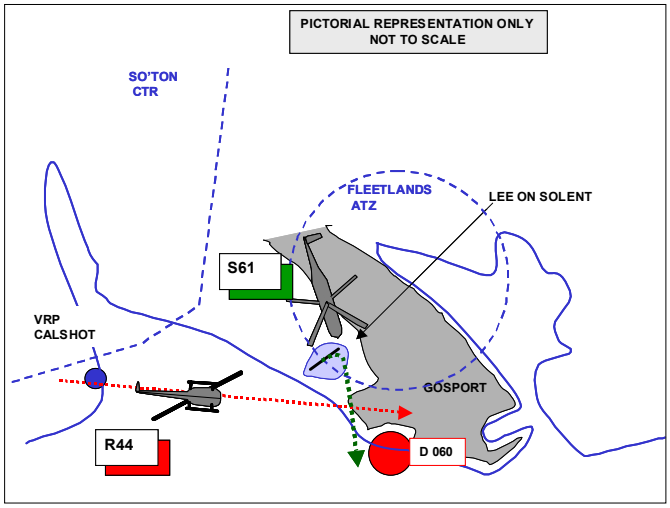
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A109 pilot's chosen flight path triggered a TCAS RA and also caused the ATP crew concern.

Degree of Risk: C.

AIRPROX REPORT NO 126/05

Date/Time:	27 Jul 0938 (Wednesday)	
Position:	5048N 00111W (Lee-on-Solent - elev 32ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Sikorsky S61N	Robinson R44
Operator:	Civ Comm	Civ Pte
Alt/FL:	300ft (QNH 1008 mb)	500ft (QNH)
Weather	VMC RAIN	VMC RAIN/MIST
Visibility:	3-4km	2km
Reported Separation:	Nil V/100ft H	Nil V/300m H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SIKORSKY S61N PILOT reports flying a SAR training flight in a red and white ac with all lights and beacons selected on squawking 7000 with Mode C and in communication with 'Lee Traffic' [a police and Coastguard ops frequency]. Having taken off in poor weather from RW 05 at Lee-On-Solent he made a blind call to Fleetlands 135·7 MHz stating that he was departing from RW 05 and was turning right to pass over the Browndown area; he then turned right onto a heading of 175° at 90kt and levelled at 300ft. While they were performing the after-take-off checks, the NHP (the Captain in the RH seat) saw a Robinson R44 (white with orange/light brown striped markings) in their 2 o'clock position at about the same height moving from R to L on a track of about 090°, at a distance of about 3–400ft and in direct conflict with their flight path. The NHP immediately called the position of the traffic to the HP in the LH seat as the latter would not be able to see the conflict. He (the Captain in the RH seat) immediately took control of the ac, initiated a very steep right turn and they passed behind the conflicting traffic at the same height. He was unable to take vertical avoidance as any climb would have put them immediately IMC. He did not see the other ac taking any avoiding action and he estimated the distance between the ac as 100ft at the same height. He assessed that had he not taken avoiding action the ac would have collided.

Once normal flight was re-established he saw the conflicting ac maintaining the same track at approximately 300ft flying over the Gosport suburban area towards Portsmouth Harbour. He then made an RT call to Police Ops at Lee-On-Solent informing them of the Airprox and asked if they had heard any calls from the reported traffic but they had not. After landing the duty SAR crew contacted Southampton ATC and established that an R44 had been in RT contact with them as it transited W to E at the time of incident.

THE ROBINSON R44 PILOT reports flying a red and white ac on a private VFR flight from a site near Bristol to Shoreham, squawking 7000 but with no mode C fitted. At the time of the incident the visibility was poor and he was in receipt of a FIS from Solent Radar [Southampton] and was heading 090° at 60kt and at 500ft QNH. He made a request to Solent to route through the Southampton overhead but this was declined due to jet traffic. He then continued to route from Stoney Cross VRP to Calshot VRP avoiding Southampton ATZ and informed Solent of his route. He then requested the status of D060 and was advised to avoid it by Solent who asked him to report 'S of Portsmouth'. The incident occurred between D060, Gosport and Lee-on-Solent [outside the Fleetlands ATZ].

In a period of high workload, he saw another helicopter at the same height, in his left 9 o'clock just behind his normal line of vision about 300m away, a few seconds before it broke to the R and passed behind him. He assessed the risk as being 'potentially disastrous'.

UKAB Note (1): The incident occurred below recorded radar cover.

ATSI reports that the S61N pilot was listening out on an operations frequency and the R44 pilot was in receipt of a FIS from Solent. Solent ATC requested that the R44 route around their CTR due to traffic and the R44 pilot acknowledged this. Although the R44 pilot's subsequent written report states that he saw the S61N, he did not report that an Airprox had taken place. Having reported at Portsmouth, the pilot changed frequency to Goodwood Information.

No ATC factors were disclosed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and a report from the appropriate ATC authority.

Board Members were unanimous in their opinion that the major contributory factor in this incident had been the very poor weather in which it took place. The only METAR available for the area was that for Southampton Airport some 30min before the Airprox: [*050/03Kts; visibility 4000m in light drizzle and mist; BKN at 400ft, overcast at 700ft; +14/+12; QNH 1008mb*]. Members suggested that the weather on the coast, some 10nm to the SE of Southampton Airport, had probably been worse and may have been close to the 2km visibility reported by the R44 pilot. Further, they noted the point in the S61N pilot's report that he was unable to climb from his altitude of 300ft due to cloud. A combination of the above suggested that the visibility had been about 2km with a cloudbase of 300ft over the immediate area near the coast where the incident took place. Although in theory the opposing ac might have been visible to the respective pilots for about 30sec, both HPs and the S61N NHP were operating under a very high workload, conducting after take-off checks, re-routeing and most importantly remaining in sight of the surface and clear of cloud.

The ANO Rules of the Air, Sect V (26 (2) (iii) stipulates the VMC minima as being:

"*in the case of a helicopter the helicopter is flying at or below 3000 feet above mean sea level flying at a speed which having regard to the visibility is reasonable and remains clear of cloud and in sight of the surface*."

[Post-Meeting Note: It was confirmed with the CAA FOI (H) that this legal limitation applied to the S61N for training flights. It is understood however, that the S61N operating company imposes more restrictive limitations for training sorties; there is no suggestion whatsoever that these limitations were not fully adhered to.]

The above being the case, the Board considered that both pilots had been operating within the weather limitations for VFR flights but Members went on to discuss whether or not this had been wise. Members considered that since SAR crews are frequently required to operate in very poor weather conditions, there is a strong justification for them to train in such weather. However, the Board unanimously questioned the R44 pilot's decision to continue his flight into such poor conditions. Members felt that he should have re-routed or even turned back before entering such marginal weather. 'Press-on-itis', the Board considered, can easily lead to an unsafe situation. While it might not have been a factor in this Airprox, a GA expert Member suggested that GA pilots who have access to simple, high accuracy, GPS-based navigation systems were sometimes tempted to press on into poor weather since the problem of navigating visually is removed; this he considered to be very bad practise. He also reminded pilots that the ANO had changed [post this incident] and requires ac (including helicopters) to fly at least 1000ft above the highest fixed obstacle when over towns or settlements.

The Board concluded that, despite that the R44 pilot may have been unwise, both ac had been operating legitimately in Class G airspace. In such poor visibility they thought that neither pilot could have reasonably been expected to see the opposing ac much earlier than they did and, that being the case, this incident had been a conflict in the FIR. Members were unanimous however in their view (confirmed by both pilots' reports) that although the S61N captain's (the NHP) action had prevented there being any risk that the ac would have collided, the situation had been far from safe.

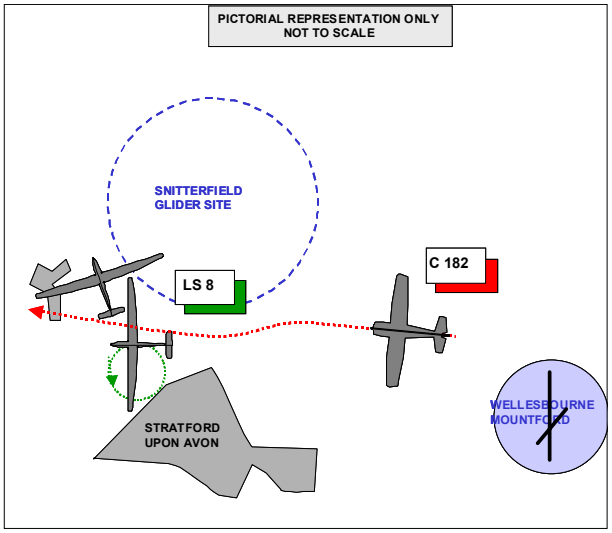
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace in marginal weather conditions resolved by the S61N captain.

Degree of Risk: B.

AIRPROX REPORT NO 127/05

Date/Time:	31 Jul 1603 (Sunday)	
Position:	5212N 00143W (Snitterfield - elev 375ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	LS8 Glider	C182
Operator:	Civ Pte	Civ Pte
Alt/FL:	1780ft	2000ft
	(QFE 1004 mb)	(QNH 1014 mb)
Weather	VMC	VMC
Visibility:	20km	>10km
Reported Separation:		
	0 V/~200ft H	500yd H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS8 GLIDER PILOT reports flying a white and dayglo glider orbiting to the left in a thermal at 50kt, 3km S of Snitterfield Gliding Site. She had been circling for about 5min. Climbing at about 200ft per minute and passing through a heading of about 340°, she heard an ac engine close by. At the time she was unable to see the other ac so she continued her turn then saw the red and white, single engined Cessna-type ac very close on her right and banking steeply to its right. It then rolled level and continued on a course of about 310°. She did not take any avoiding action as her turn was already helping to increase the separation and by the time she could see the other ac it had already taken adequate avoiding action. The ac was close enough to read the registration letters easily so she noted them down. However she was not completely confident that she had noted them correctly as she saw the other ac only briefly and was rather shaken by the incident. She also noted the time. The other details, such as exact location and climb rate, were verified from the flight recorder trace which she inspected after the flight. Although she assessed the risk as being high, since the other ac had already passed and she was turning away, avoiding action was not appropriate.

THE C182 PILOT reports flying a private flight in a red, white and blue ac under VFR from Wellesbourne to Droitwich at 2000ft on the QNH [1625ft agl] and at 120kt. At the time he was still in communication with Wellesbourne. [UKAB Note (1): The pilot advised that he had elected to leave the ac's transponder switched off since this was a short flight]. He had turned to the left onto W (into sun) to avoid a village, some cloud and the Snitterfield gliding site when he saw a white glider about ¾nm away and about 200ft above his alt. He then commenced a gentle turn to the right to avoid both it and another glider which was on his right, missing both by about 500yd.

UKAB Note (2): None of the ac are seen on the radar recording.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted solely of reports from the pilots of the LS8 glider and the C182.

AIRPROX REPORT No 128/05

The Board determined that both pilots had been operating legitimately in Class G airspace; both therefore had an equal responsibility to see and avoid each other, with powered ac giving way to sailplanes. The C182 pilot had seen the glider at a distance of ¾ nm and had avoided it iaw the Rules of the Air, by as large a margin as possible laterally bearing in mind the local constraints and the position of the other glider. However, the glider pilot did not see the C182 until after it had passed, probably due to her position in the orbit and/or the bank angle of her ac. The Board suggested that the glider pilot might have been startled by the incident. If that were the case, she may have underestimated the miss-distance between the ac which may have been closer to the 500yd that the C182 pilot, who had seen the glider throughout the incident, reported. Further, noting the height that the pilots reported flying, it was likely that there was also a little, perhaps up to 200ft, vertical separation. The Board determined therefore, that the incident had been a conflict in the FIR and, since the C182 pilot had successfully manoeuvred to avoid the glider, there had been no compromise of safety.

Although in this case it had not been a factor in the incident, the Board noted that the C182 pilot had been operating with Mode C fitted but switched off. Mode C is an important safety tool as it can provide controllers with data to provide others with information and instructions that enables them to avoid the subject ac. One Member suggested that its use should me mandatory as it is with military ac.

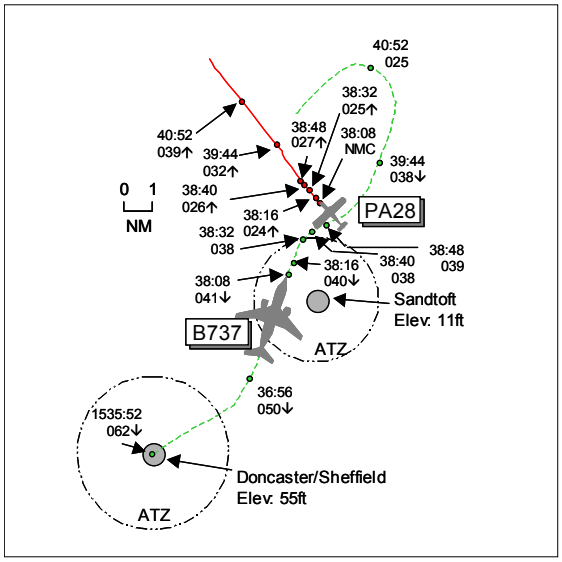
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the C182 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 128/05

Date/Time:	30 Jul 1539 (Saturday)	
Position:	5336N 00052W (9nm NNE Doncaster/Sheffield - elev 55ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-300	PA28
Operator:	CAT	Civ Pte
Alt/FL:	↓2500ft	↑
	(QNH)	NK
Weather	IMC KLWD	NK
Visibility:		NK
Reported Separation:		
	1000ft V/2nm H	NK
Recorded Separation:		
	1200ft/1·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Doncaster/Sheffield (DSA) IFR and in receipt of an ATS from Doncaster/ Sheffield Approach. They were cleared for the alternate procedure for RW20 after overflying the FNY NDB. They passed over the FNY at about 5000ft descending to 2500ft heading 020° at 170kt with flaps at 5°. On joining the D/W position at 3d, they noticed a TCAS return from another ac in their 1 o'clock range 6nm on a crossing track showing 3000ft below but climbing; he surmised the ac had just got airborne from Sandtoft. They monitored the ac's flight path as it continued to climb on a converging track of approximately 290°. At the time they were in 'full' IMC and undoubtedly the other ac was also. When separation reduced to about 3nm and 1000ft, he thought, they engaged ALT HOLD and turned 40° R to pass behind the other ac and told ATC what they were doing; without this manoeuvre they were convinced they would have collided. As they passed behind it, the TCAS diamond went

solid white but they did not receive a yellow TA. Once clear of the traffic they continued their descent to 2500ft and turned inbound at 14d. The other ac was seen on TCAS still to be climbing, passing through 3500ft. They kept ATC informed of their and the other ac's progress and eventually completed the ILS procedure, the cloud base was 1000ft on the approach. Later he was informed by ATC that Sandtoft had been told of the B737's arrival and intentions, which had been broadcast on the Sandtoft frequency, but the pilot of departing PA28 had not responded to the transmission. He assessed the risk as high, opining that the lack of CAS and effective radar coverage (DSA radar was u/s) had contributed to the incident.

THE PA28 PILOT was traced and contacted post incident. After several requests to complete a CA1094 Airprox Report Form, with promises to return said form duly completed, no return was received.

THE DONCASTER/SHEFFIELD APP reports he was mentor to a trainee carrying out the combined ADC/APP function. The B737 was handed over from MACC E at 1533 and 7d from FNY. He cleared the flight descending to FL50 and for the ILS approach RW20 and asked the crew to report beacon outbound. He immediately telephoned Sandtoft A/G operator to advise them of the B737. At 1536 the B737 crew reported beacon outbound and were informed that Sandtoft was active on RW05 and to report LLZ established on RW20. Almost immediately the B737 crew reported traffic on TCAS to the R and below followed by them taking avoiding action by turning R out of the procedure. He acknowledged the call and asked the crew to report established. The B737 crew then said that the other ac was on the RW20 extended C/L at 3500ft and climbing. When asked of their intentions, the crew reported turning onto finals 700ft below the traffic. He telephoned Sandtoft again to establish whether they were handling any traffic in the area and was told that the only traffic they had was a PA28 which had departed them at 1538 N'bound to Cumbernauld. The A/G operator had broadcast a traffic message concerning the B737 as per normal but the PA28 pilot was the only ac not to respond.

The Doncaster/Sheffield special METAR shows 1534 EGCN 33012KT 9999 –RA FEW009 BKN050 16/14 Q1012=

ATSI reports that no apparent ATC causal factors were disclosed. At the time of the Airprox radar was not available at DSA, consequently the B737 was carrying out a procedural ILS to RW20. There is a proposed LOA between DSA and Sandtoft which, although not yet signed formally, states that: *'When operating a procedural approach service Doncaster Approach will endeavour to inform Sandtoft via the direct line whenever an aircraft is beacon outbound for a procedure to runway 20. This telephone call is strictly subject to controller workload and cannot be guaranteed.'* On this occasion Doncaster Approach did telephone Sandtoft to inform them about the B737 going beacon outbound.

UKAB Note (1): Analysis of the Great Dun Fell radar recording at 1535:52 shows the B737 squawking 6160 O/H DSA tracking 050° descending through FL062 before, just over 1min later, it has steadied on the D/W leg of 020° 4nm NE of DSA indicating FL050 descending. As the B737 passes 1·3nm NW of Sandtoft descending through FL041 a 7000 squawk with NMC appears, believed to be the subject PA28, in its 12 o'clock range 2·5nm tracking 320°. The next radar sweep 8 sec later shows the B737 indicating FL040 as the PA28 shows FL024 unverified and climbing 2·2nm ahead. At 1538:32 the B737 is seen to commence a R turn and level at FL038, 2nm N of Sandtoft, with the PA28 1·6nm to the N showing FL025 climbing. The CPA occurs on the next sweep at 1538:40 with the PA28 showing FL026 as the B737 steadies onto a 060° track showing FL038 as it passes 1·5nm behind and 1200ft above the PA28. The next sweep 8 sec later the PA28 continues climbing on a steady 320° track showing FL027 as the B737 diverges slowly 1·6nm SE of it indicating FL039 before the B737 turns L to track 020° and commences descent at 1539:44 3·4nm to the E of the PA28. The B737 levels at FL025 at 1540:52 whilst turning L through 290° towards the RW20 FAT as the PA28 passes 4·2nm W of it climbing through FL039.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the B737 pilots, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities. There was no report from the PA28 pilot.

The ATSI Advisor informed Members that the Approach Radar function for DSA was provided from Liverpool ATSU using remote radar feeds from Waddington and Scampton. At the time of the Airprox, radar services had only been available for a short time and there was a shortage of validated controllers to provide the service. A NOTAM had been issued promulgating that radar services were not available and the B737 crew elected to carry out the procedural letdown in IMC. The DSA ADC/APP had fulfilled the requirements of the proposed LoA

between themselves and Sandtoft but, for whatever reason, the PA28 had not received the TI about the inbound B737.

Pilot Members were unclear which IAP the B737 crew were flying as the ac's recorded radar track did not seem to follow the alternate procedure promulgated in the UK AIP. The alternate procedure requires a CAT C or D ac to proceed from the IAF, the FNY NDB(L), on NDB(L) QDR 043° to I-FNL D10.6 before turning left onto the localiser. This would have taken the B737 towards the Sandtoft O/H and behind the departing PA28's NW'ly route. The radar recording corroborates the B737 pilot's report showing the turn onto a downwind track of 020° after approximately 3nm on FNL QDR 043°, placing the ac further to the W of Sandtoft and towards the PA28.

Members wondered what the PA28 pilot might have done even if he had noted the B737's presence. A call to DSA would have elicited updated TI from the controller but this would have been based solely on pilot reports - non-radar derived data. Putting this conjecture to one side, of more pertinence was the fact that other ac could have been flying quite legitimately through the area VFR, not talking to DSA. Ultimately, the B737 crew were responsible for their own separation from other traffic in the Class G airspace through 'see and avoid', the DSA ADC/APP would have provided separation from other participating IFR traffic under the Approach Control Service. Fortunately, the B737 crew had 'seen' the PA28 on TCAS and adjusted their flight path, thereby negating the generation of any alerts/warnings and ensuring that any potential for conflict was removed. Use of TCAS for separation in the horizontal plane is unwise, owing to its known system deficiencies, but the crew had proactively levelled their ac at a level well above the climbing PA28. The B737 crew had then monitored the PA28's flight path and had recommenced their descent to a level below the PA28 before turning back inbound when it was diverging clear of the DSA FAT and well above. Members agreed that resolution of the situation had been well handled by the B737 crew and that the actions taken had effectively removed any risk of collision. At the end of the day, this had amounted to no more than a sighting report on TCAS where safety had been assured throughout the encounter.

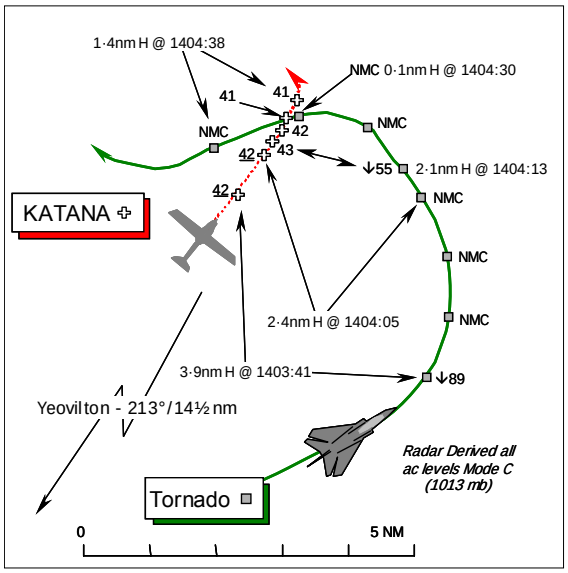
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 129/05

Date/Time:	2 Aug 1404	
Position:	5113N 00225W (14½nm NE of Yeovilton)	
Airspace:	Yeovilton AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR1	Katana DA20
Operator:	MOD DPA	Civ Club
Alt/FL:	4500ft↓ (RPS 1018mb)	FL42
Weather	VMC NR	VMC NR
Visibility:	>25km	>10km
Reported Separation:	50ft V/Nil H	Nil V/½nm H
Recorded Separation:	<0·1nmH	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR1 PILOT reports that he was occupying the rear seat whilst instructing a student test-pilot in the front seat on an instructional sortie in his red/white and blue ac. The HISLs were on, neither TCAS nor any other form of CWS is fitted.

Operating as a singleton descending from about 10000ft to low level whilst under a RIS from Boscombe RADAR squawking A2604 with Mode C, they called their intention of "ready to descend low level going en route" and were immediately told to "squawk as required". They did not request to cancel the RIS nor was it formally cancelled by Boscombe RADAR before they changed squawk to A7001 and switched to a Yeovil RADAR frequency for a "listening watch". During a descending L turn at about 45° AoB from a northerly to westerly heading, they executed the pre low-level and pre terrain-following checks as a 'challenge and response', the front seat student pilot interrupting the checks between each item to perform a visual look out for other traffic. Passing through a heading of about 300° in the L turn at 450kt between an altitude of some 4-5000ft, on one such visual check the front seat pilot detected a single engine monoplane similar to a Grob 115 "low and straight ahead" about 1/3nm away. The front seat PF pulled up hard at 4G to avoid the other ac – the Katana DA20 – which passed about 50ft directly below their Tornado with a "high" risk of a collision. He, as the rear seat ac captain, never actually saw the other aeroplane due to the lack of forward field of view.

Boscombe RADAR was then called to inform them of the Airprox with a "Grob". Weather conditions were excellent but neither he nor his student recall any traffic information calls being given on this traffic by Boscombe RADAR prior to changing frequency some 1min before the Airprox. He stressed that a collision was avoided only because the front seat PF maintained a frequent visual lookout between each item of the checklist that was being performed. In hindsight, incidents such as this could be better avoided by maintaining a RIS positively for as long as possible during a descent to low level rather than cancelling a RIS as soon as the descent to low level is commenced. However, although they had not specifically called that they wished to cancel the RIS and go VFR, the implied response from Boscombe RADAR was that the RIS had been cancelled by changing squawk to A7001 once they had declared their intention of descending to low level.

THE KATANA DA20 PILOT reports his monoplane has a white colour-scheme and the HISLs were on whilst conducting a training flight in VMC. Flying level at FL42 heading about 020° whilst approaching a position about 2nm E of Radstock, he thought, [the Airprox actually occurred about 5nm S of the Radstock VRP] at 100kt, he sighted a military jet ac during his lookout scan at about 3 o'clock at the same level but did not specify the range. The jet pilot took avoiding action in what appeared to be a climbing turn to port before it flew into his blind spot and he lost sight of the military ac. He estimated that the jet – the Tornado - passed ½nm away but he took no avoiding

action. He was receiving a FIS from Bristol at the time of the Airprox but added that he was not given any traffic information on that particular ac. He did not assess the risk.

MIL ATC OPS reports that the timings on the Boscombe Down RT recording were found to be 15sec fast; the timings within this report have been corrected to UTC.

The Tornado GR1 was operating under a RIS from Boscombe Down RADAR whilst conducting general handling up to FL240 in the airspace between Boscombe Down and Yeovilton. Multiple transmissions of traffic information were passed to the Tornado crew on various conflicting ac whilst they were operating in this very busy portion of Class G airspace. At 1404:01, the Tornado crew reported "[Tornado C/S] *is now complete manoeuvring ready to descend to low level going en-route*". RADAR asked the crew to confirm if they were flying VMC and the crew responded "*Tornado C/S, affirm in sight of the ground*", whereupon RADAR passed the crew the Portland RPS (1018mb) and instructed them to "*squawk as required*". The crew readback the RPS and stated they would be squawking A7001. RADAR said "*good day*" at 1404:17 and this was acknowledged by the crew. One minute after this transmission, the Tornado crew checked back in on RADAR's frequency and then reported an Airprox "*with a Grob, we are happy to continue it was about 3 or 4 miles east of our current position*". RADAR then passed the crew some traffic information before applying a FIS.

The Airprox was reported by the Tornado crew just over 1min after they left RADAR's frequency. The Tornado crew were descending into the low level system in the vicinity of the Wells TV Mast. RADAR had passed the Tornado crew multiple transmissions of traffic information on tracks not associated with the Airprox but did not pass traffic information on the Katana before they changed to an en-route frequency at which point the Katana was 2nm laterally separated from the Tornado. The base of the Boscombe SRE cover in the vicinity of the Airprox is approximately 3000ft aal which renders it highly likely that the Katana, generally maintaining FL42, was painting on the controller's display. The passing of traffic information by RADAR regarding the position of the Katana to the Tornado crew would have undoubtedly given them a more accurate air picture before they switched to their en-route frequency.

[UKAB Note: Analysis of both the Burrington and Clee Hill Radar recordings was necessary but the sparsity of Mode C data from the descending Tornado jet did not allow a complete picture of this Airprox to be developed. The Katana is shown steadying on a track of about 030° at 1403:12, squawking a Bristol Approach assigned squawk of A4622 that generally maintains FL42 Mode C (+/-100ft) throughout the encounter. Meanwhile, the Tornado squawking A2604, which has been flying level at FL91, is shown tracking 070° some 5000ft and 4nm S of the Katana. The L turn reported by the Tornado pilot is then shown as the jet descends through FL89 Mode C with the Katana indicating FL42 at 1403:41, some 3·9nm distant. No further Tornado Mode C indications are shown on the Burrington recording until after the Airprox has occurred but at 1404:13, as the jet is turning L through NW it is shown on the Clee Hill recording passing FL55 with the Katana on the inside of the Tornado's turn some 2·1nm away and 1200ft below the jet at FL43. The Tornado continues to turn L and converge on the Katana as the former changes squawk to A7001 with NMC shown. The Tornado is shown indicating NMC on the Clee Hill recording at 1404:30 with the Katana at 12 o'clock at 0·1nm indicating FL41 just moments before the jet passes the Katana in-between sweeps. Mode C is not evident from the Tornado again until it has cleared to the W of the Katana whereupon after one return displaying FL55 but with A0000 – data unreliable - the next sweep shows the jet at FL49 as the ac diverge but possibly indicative of the Tornado crew's avoiding action "4G pull". The lack of Mode C data prevents determination of the vertical separation from the recording, but by interpolation the available data suggests that the horizontal separation was less than 0·1nm - 200yd.]

THE TORNADO GR1 PILOT'S STATION comments that it is clearly prudent to retain a radar service for as long as possible when operating VFR in busy Class G airspace. In this case, although not positively cancelled by either the crew or the controller it is entirely reasonable that ATC understood that the Tornado pilot had cancelled his service - the phrase *"..ready to descend low level going en route"* makes this intention clear. Indeed, the Tornado crew had actually changed frequency by the time the Airprox occurred. It is fortunate that the front seat pilot had been briefed to carry out the TF checks in slow time and to visually scan ahead of the aircraft between them. A number of points arise:

The need for constant, thorough visual lookout when VFR, even in high workload situations;

The benefit of retaining a radar service for as long as possible;

The need for both aircrew and controllers to be clear in their requests and responses;

Consideration should be given to re-introducing the phrase 'radar service terminated, squawk 7001, continue en-route' which would remove any doubt over the contract in place.

In this case, the brief to conduct a positive lookout between each line of the TF checks saved the day: ultimately, when operating VFR, lookout must be the top priority.

MOD DPA DIRECTORATE of FLYING had nothing further to add**.**

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident that here the pilots' of both ac were legitimately proceeding about their respective sorties and wholly responsible for effecting there own separation against other observed traffic in the 'see and avoid' environment of Class G airspace. But to assist them with that responsibility, particularly as they were operating in the vicinity of the Yeovilton AIAA, the Tornado crew had wisely obtained radar assistance from Boscombe Down ATC. It was evident from the Mil ATC Ops report that up until the point that the Tornado crew had commenced their descent to enter low-level the controller had conscientiously provided a good flow of traffic information under the RIS that pertained. Whilst recognising that the Tornado Station's suggestion for a small amend to the RT phraseology was well founded, the Board nonetheless believed that it should have been self-evident to the Tornado crew that the RIS would have been terminated when they reported *"…going en-route*".. Nevertheless, when RADAR acknowledged the Tornado crew's intentions in the series of transmissions just before they switched at 1404:17, it seems that the Katana should have been within the coverage of the Boscombe Down SRE and displayed to RADAR beforehand. Therefore, it should have been apparent that the DA20 was a potential confliction to the Tornado in the L turn and descending towards it before the crew switched from RADAR's frequency. Thus it would have been prudent to have given a warning to the Tornado crew about its presence. Controller Members agreed with the Mil ATC Ops view that the absence of traffic information about the DA20 was a crucial omission and a significant contributory factor to this close encounter in Class G airspace.

From the Katana's cockpit, the pilot operating only under a FIS did not have the benefit of a radar service and so traffic information was unlikely to have been forthcoming. But the DA20 pilot had spotted the Tornado at the earliest opportunity on the starboard beam – which was when it was just under 4nm away, the radar recording revealed - as the jet turned towards his ac. Nevertheless, pilot Members were somewhat surprised that the DA20 pilot had not attempted to keep the jet in sight, as it clearly overflew his ac a lot closer than the DA20 pilot had estimated at ½nm. On the other hand the Tornado student test pilot with the additional task of completing the TF checks did not see the DA20 until just about 1/3nm away. Some Members contended that this was a late sighting as the Katana was there to be seen on the inside of the Tornado's turn. But recognising that the small DA20 was a difficult ac to detect visually, it was indeed fortunate that the student test pilot had spotted it when he did and was able to alter the jet's flight path by aggressively pulling up above the light ac. Without further discussion, the Board agreed unanimously that this Airprox had resulted from a conflict in the Class G Yeovilton AIAA that had been resolved by the Tornado student test pilot. The radar recording had shown that the Tornado passed less than 200yd away when it overflew the DA20, by that stage into the latter pilot's blind spot. At these distances, whilst the student test pilot's robust 4G pull had prevented a collision, the Board agreed unanimously that the safety of these two ac had not been assured by any means.

PART C: ASSESSMENT OF CAUSE AND RISK

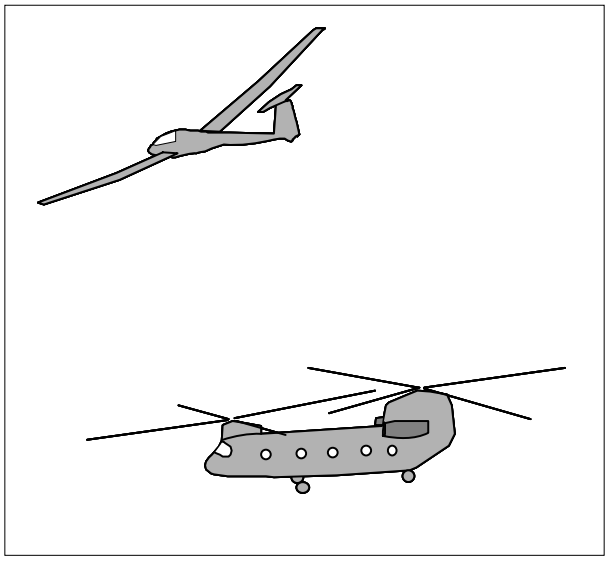
Cause: Conflict in the Yeovilton AIAA resolved by the Tornado student test pilot.

Degree of Risk: B.

Contributory Factors: Lack of traffic information from RADAR about the DA20 before allowing theTornado crew to switch en-route.

AIRPROX REPORT NO 130/05

Date/Time:	3 Aug 1400	
Position:	5114 N 00102W(4nm W Odiham - elev 405ft)	
Airspace:	London FIR	(Class: Class G)
	Reporting Ac	*Reported Ac*
Type:	ASW 19B	Chinook
Operator:	Civ Pte	JHC
Alt/FL:	3600ft (QFE 1000 mb)	4200ft (1013mb)
Weather	VMC CLBC	VMC
Visibility:	>30km	>10km
Reported Separation:	200ftV/0ft H	200ft V/500m H
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASW 19B PILOT reports flying a white glider on a GH flight from Lasham. He was heading 180° at about 55kt and having completed a short cross country flight he was soaring locally before landing. About 1min after turning towards Lasham he noticed to his L and slightly below a Chinook heading towards him; the ac passed directly below him without changing course. He did not have time to take avoiding action, assessing the risk of collision as high.

UKAB Note (1): The glider pilot forwarded data from his flight log that shows his return from the cross-country flight. After some local flying the trace then heads N towards the E side of Basingstoke before turning S towards the position of the incident. The barograph trace shows the ac's altitude throughout the flight, at 1400hrs indicating about 3600ft above Lasham Airfield. An expanded view of the time of the incident shows that the ac was descending immediately before and immediately after the incident but at the time was in approximately level flight.

THE CHINOOK PILOT reports flying a dark green ac with 2 pilots under the instruction of a QHI and 2 crewmen in the rear, squawking as directed and in receipt of a RIS on climb out from Odiham. He was heading 270° at 100kt and at 4200ft when he was given TI on a contact at 2nm in his 12 o'clock with no height information. He was not able to acquire the other ac visually until it was spotted by the crewman passing about 200ft above and to their right. The glider was white in colour and was not visible to either pilot against the white cloud background. He did not take any avoiding action because it was too late, assessing the risk as being moderate.

THE CHINOOK STATION comments that this is not the first Airprox between helicopters out of Odiham and gliders from Lasham. During mass competition launches in the summer months the airspace to the SW, W and NW of Odiham is very congested with up to 80 gliders operating at varying heights. Odiham traffic, whilst aware of any accompanying NOTAMs, still has to operate to the W and has to access Odiham airfield.

UKAB Note (2): The RT transcript shows that shortly before the incident Odiham APR, having twice passed TI to the Chinook pilot on the subject glider, limited the RIS as the Chinook was entering an area of high traffic density. After the second TI the pilot called that they had just seen the glider go over the top of them.

HQ JHC comments that the airspace around Odiham is very busy and extensively utilised by light ac, helicopters and gliders. Avoidance is generally on the 'see and avoid' principle that has proved on a number of occasions to be inadequate in locating gliders. In this occurrence where the Chinook crew, receiving a RIS, were given good TI about the conflicting traffic at 2nm, they were unable to spot the glider. This incident again highlights the importance of maintaining a meticulous lookout as a top priority when operating in Class G airspace.

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.

Despite apparently accurate TI being passed by Odiham APR on 2 occasions regarding the subject glider, none of the 3 pilots on the Chinook flight deck were able to acquire it visually (albeit the view from the 'jump seat' is restricted). The glider was significantly above the Chinook and would have not initially have had much relative motion. Also, it was white against presumably a white cloudy background making it very difficult to acquire visually. One Member expressed surprise that having failed to acquire the glider the Chinook crew did not opt to turn away from it; he accepted however that the airspace was very busy indeed and that such action may well have precipitated further conflicts.

Since in this incident the glider pilot had not had time to initiate any avoiding action and the Chinook crew did not see the glider until they had effectively passed it and that there was no confirmed information regarding the lateral miss-distance, the Board was of the view that the safety of the respective ac had not been assured.

A gliding expert informed the Board that on such fine days in mid-Summer it was not uncommon to find over 50 gliders in that area, whether or not competitions are in progress, since Lasham is a well used turning point; although not specifically reported, he opined that the glider in question had not been flying in a competition. He suggested that the best means to avoid gliders is by flying above or below their commonly-used altitude band on days when good gliding conditions prevail. The meeting was also informed that no cost and weight-effective solution had yet been found in the quest for a lightweight transponder with a reasonably long operating time on its batteries.

PART C: ASSESSMENT OF CAUSE AND RISK

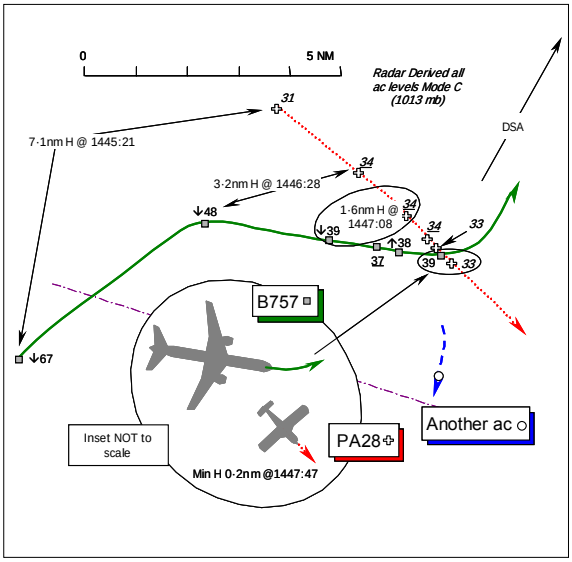
Cause: Effective non-sighting by both crews.

Degree of Risk: B.

AIRPROX REPORT No 131/05

AIRPROX REPORT NO 131/05

Date/Time:	7 Aug 1447 (Sunday)	
Position:	5321N 00107W (8·3nm SSW Doncaster Sheffield Airport - elev 55ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B757	PA28
Operator:	CAT	Civ Pte
Alt/FL:	4000ft↓ (QNH 1020mb)	3500ft (QNH 1020mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	10nm+	70km
Reported Separation:	500ft V/1nm H	300m H
Recorded Separation:	300ft V/0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports that he was on an IFR flight inbound to Doncaster Sheffield Airport (DSA) for a visual approach to RW02, flying in VMC some 1500ft clear below cloud [with none at his altitude] and a flight visibility in excess of 10nm. The HISLs were on and he was in communication with Doncaster ATC on 126·22MHz and, he reports, "nil" ATS. The assigned squawk was selected with Mode C and TCAS is fitted.

Turning onto 110° at 210kt, positioning for a 7nm FINAL for RW02 he was advised by TOWER of a light ac at Worksop at 3000ft [which was not the reported ac]. Descending from 4000ft Doncaster QNH (1020mb), a TCAS TA was enunciated on traffic 10nm away some 900ft below his B757. The traffic – a low-wing light ac, probably a Warrior - was visually acquired at a range of 7nm – 500ft below crossing from L - R. An RA [unspecified] was enunciated and avoiding action was also taken visually to avoid the light ac which passed 1nm away down the starboard side and 500ft below his B757 at the closest point, he thought. He opined that without the TCAS warning the other ac would have been "very adjacent".

Whilst in his view this was not an Airprox as he had manoeuvred his ac before such a situation occurred, without TCAS the visual sighting would have been a lot later. He also mentioned that the reference by ATC to local place names is not helpful as the whereabouts of such locations are often unknown to visiting pilots.

THE PA28 PILOT reports his ac had a white/red/silver colour scheme and the wingtip HISLs were on whilst flying a local sortie from and back to Leeds Bradford Airport. He was flying in VMC some 2000ft clear below cloud with an in-flight visibility of 70km whilst in receipt of a FIS from Doncaster on 126·22MHz. The assigned squawk of A6160 was selected with Mode C: TCAS is not fitted.

Heading 140°, approaching a position some 9nm NW of GAMSTON VOR/DME at 100kt, cruising level at 3500ft Doncaster QNH (1020mb), the B757 was not seen until after it had passed above his ac and was in his 8 o'clock some 1½nm away. Consequently, no avoiding action was taken before the B757 passed about 300m astern (according to the diagram in his report) obliquely from R – L some 500ft above his ac with no risk.

UKAB Note (1): No report was provided by the DSA ATCO who was unaware of the Airprox report until contacted by ATSI.

ATSI reports that the Doncaster Controller was performing the joint tasks of AERODROME/APPROACH CONTROL - radar was not available. He was operating with a trainee who was not far off from obtaining a Certificate of Competence for both positions at the time of the Airprox. The controller described his workload as moderate.

The PA28 pilot established communication with Doncaster APPROACH at 1437, reporting over Barnsley at 2500ft BARNSLEY RPS (1015mb), routeing to Gamston, before returning to Leeds. The pilot was informed that a FIS would be provided and instructed to squawk the Doncaster conspicuity SSR code of A6160 [unvalidated and unverified]. At 1444:30, the pilot of the PA28 reported 13nm NW of GAMSTON and was requested to report turning at Gamston.

The B757 crew contacted Doncaster at 1445, reporting their position as 12nm, 240° Radial, descending to FL50. The pilot confirmed he would accept a visual approach for RW02 and was "cleared" No 2 to a TB20 on a 6nm FINAL. The B757 crew was informed of glider activity that had been reported 25min earlier in the vicinity of L BASE for RW02. Later, after 1447, the B757 crew was also advised of an unrelated Rallye ac - also squawking A6160 - at Worksop, southbound, at 3000ft, whereupon the pilot reported at 1447:30, *"we've got traffic that's 500 feet below us"* [the subject PA28 - about which no traffic information was provided to the B757 crew by ATC]. No further comments about the encounter are believed to have been made on the frequency.

ATSI Note: The CAA/SRG Transcription Unit commented that all the RTF transmissions were subject to audio level fluctuations and severe clipping, resulting in some words missing from the original recording. This issue has been addressed locally at DSA.

The radar recording shows the B757 at FL37 [the equivalent of 3500ft Doncaster QNH (1020mb)] with traffic, squawking A6160, 12 o'clock 1nm, 300ft below - this is the subject PA28, which is routeing towards Gamston, rather than the Rallye ac reported at Worksop. The radar recording shows 'another ac' squawking A6160 but with no Mode C, heading S, about 4nm S of the subject PA28 that is believed to be the Rallye.

The MATS Part 1, Section 1, Chapter 1, Page 2, describes a FIS. It states that although controllers are not responsible for separating aircraft they:-

"…will, subject to workload, provide pilots with information concerning collision hazards to aircraft operating in Class C, D, E, F or G airspace when self evident information from any source indicates that a risk of collision may exist. It is accepted that this information may be incomplete and the controller cannot assume responsibility for its issuance at all times or for its accuracy".

The controller involved could not explain why he had not ensured that his trainee passed traffic information to the subject ac as it was evident on the information provided by the PA28 pilot that it would route through the approach to RW02. Workload, although moderate, was not sufficiently high to preclude this information being issued (reference the traffic information that was passed concerning the Rallye). He did comment that if D/F was provided at Doncaster, it would assist controllers in recognising potential conflictions. However, despite any criticism of the controller's actions, it is still the pilots' responsibility to 'see and avoid' outside CAS.

[UKAB Note (2): The Clee Hill Radar recording shows the B757 NE bound at 1445:21, just after the crew established communication with Doncaster ATC, with the subject PA28 at 12 o'clock - 7·1nm and the range that the B757 crew reported acquiring the latter visually. The PA28 maintains FL34 as the B757 turns R onto a track of about 110° descending through FL48. The B757 was 500ft above the PA28 as it descended through FL39 at a range of 1·6nm, before bottoming out at FL37 at 1447:24, some 300ft above the PA28 and the point of minimum vertical separation. A short climb is then evident - probably in response to the reported RA as the B757 climbs to a maximum of FL39 – some 600ft above the PA28's observed unverified Mode C indication of FL33 - as the airliner closes to the minimum horizontal separation of 0·2nm and passes astern of the PA28. By then the airliner is in the L turn onto the FAT for RW02, some 8·3nm SSW of Doncaster (2nm NW of Worksop disused aerodrome) before descending once more as the PA28 maintains its course.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Although it was reported that good VMC prevailed it was clear to the Board that the B757 crew, though flying by visual reference and executing a visual approach to RW02 at DSA, was still technically operating under the IFR in ATS terms. As such, although the B757 pilot had reported that they were not in receipt of an ATS they were in fact actually receiving a 'Procedural' Approach Control service in Class G airspace (as no radar was available).

Consequently, the combined AERODROME/APPROACH control team (mentor/trainee) was responsible for separating and sequencing the inbound B757 only against other inbound IFR flights to DSA. Whilst the ATSI report had made it plain that traffic information should have been passed about the subject ac to each pilot, here 'see and avoid' prevailed against any other VFR traffic in the 'Open' FIR. However, it was not clear whether the passing of traffic information by ATC would have had any more significant impact on the outcome of this encounter as the B757 pilot reports he was already aware of the presence of traffic - the PA28 - from his TCAS display from a range of 10nm. From the PA28 pilot's perspective, in receipt of a FIS from the same controllers, the Board agreed it would have been very difficult for him to have detected the B757 much earlier than he did without a prompt from ATC: the airliner was approaching from abaft his starboard beam and was throughout the encounter above the PA28 and therefore virtually impossible to see from the LHS of the PA28's cockpit. Some Members questioned if the PA28 pilot was wise to fly where he did - crossing through the approach to DSA's RW02 at around 8½nm FINALS - but this was clearly perfectly legitimate and although he had wisely sought a FIS from DSA ATC he had achieved little benefit from it. Whilst a GA Member suggested that the PA28 pilot might well have been able to glean sufficient warning about the B757 from merely listening to the RT, others thought that DSA AERODROME/APPROACH should have passed traffic information under the FIS which might have helped the PA28 pilot be more aware of the potential for a close encounter as he crossed through the FAT to RW02. The Board concluded, however, that the PA28 pilot could not have been expected to avoid the B757 approaching unseen and that he had virtually no impact on the outcome of this Airprox.

The B757 pilot reports that the PA28 was acquired visually from 7nm - 500ft: this was somewhat at odds with the radar recording which clearly showed that at 1445:21, as the B757 was heading NE towards DSA (with whom the crew had just established communication), the PA28 was at 12 o'clock at a range of 7·1nm - the reported sighting range - but still some 3600ft below the B757 as the latter descended towards it. This suggested to some Members that the subject PA28 was not seen until later - perhaps just before 1447:08 - when the B757 was heading 110° and 500ft above the light ac that was in the B757 crew's 11 o'clock at a range of 1·6nm. This would be in accord with both the B757 pilot's account and the later RT report to ATC of sighting the "…*traffic* [the PA28] *that's 500 feet below us"* some 22sec later at 1447:30. Whilst noting that the B757 crew had been cleared No2 to the TB20 at 6nm FINALS, if the PA28 had been sighted at a range of 7nm from the light ac then at that point perhaps it might have been wiser to have flown closer toward DSA on the visual approach to pass astern of the PA28 before turning onto a Base leg. As it was the B757 crew turned onto a heading that would evidently take their ac very close to the PA28 and descended toward that ac knowing it was below them. In the Board's view this was the crux of this Airprox and it was clear that at these distances having set up the geometry of the encounter a TCAS RA was the inevitable outcome. Pilot Members stressed that the B757 crew could have chosen to give the PA28 a wider berth but did not do so: therefore, the Board agreed unanimously that this Airprox had resulted because, despite being aware of the presence of the PA28, the B757 crew continued to descend into conflict with it.

Turning to assessment of the inherent risk, if the B757 crew had not pressed on toward the PA28 as they closed the FAT for their visual approach, TCAS might not have been required to act. As it was they descended to some 300ft above the PA28 as they started to draw abeam (according to the recorded radar data). It appeared that it was at this point that TCAS generated the RA resulting in the 200ft climb to 3900ft (1013mb). This, combined with the pilot's reported visual manoeuvre to pass astern of the PA28, placed the B757 some 600ft above the PA28 at the closest point of 0.2nm – somewhat closer than the B757 pilot's estimate of 1nm. Despite the close proximity of these two ac, in the Board's view, the B757s pilot's visual sighting and manoeuvre to pass clear astern of the PA28, coupled with the TCAS-induced climb ensured that there was no risk of a collision in the circumstances reported here.

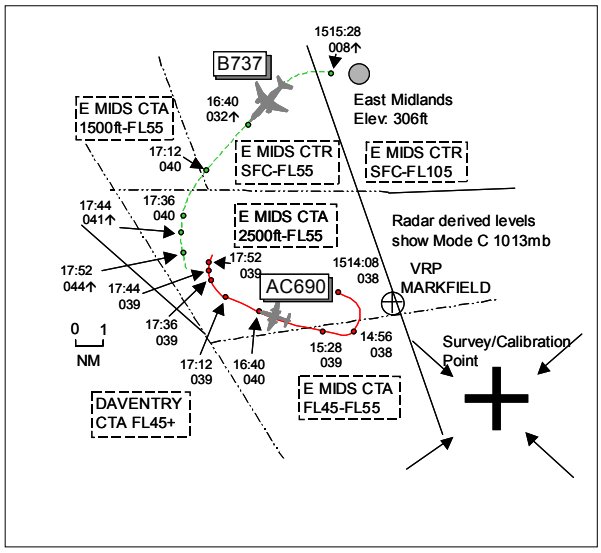
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Despite being aware of the presence of the PA28, the B757 crew continued to descend into conflict with it.

Degree of Risk: C.

AIRPROX REPORT NO 132/05

Date/Time:	9 Aug 1518	
Position:	5243N 00129W (9nm SW East Midlands - elev 306ft)	
Airspace:	E MID CTA	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-300	AC690
Operator:	CAT	Civ Pte
Alt/FL:	↑5000ft (QNH 1015mb)	4000ft (QNH)
Weather	VMC CAVK	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:	600ft V/800m H	300ft V/1nm H
Recorded Separation:	500ft V/1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 225° at 250kt outbound from East Midlands and in receipt of ATS from East Midlands Radar on 134·17MHz squawking 7256 with Mode C. Flying a DTY 2N SID (which terminates at FL70) and when climbing through 3800ft, they were instructed, he thought, to maintain 4000ft. The PNF reset 4000ft 'level change' on the MCP and as he was hand flying the ac, a quick pitch change was possible which prevented an altitude bust. About 5sec after levelling at 4000ft, a TCAS TA was received which coincided with them passing the 6·5 D fix where a L turn is required. However, since the conflicting traffic was on their L side and indicating at the same level, no turn was initiated. Five seconds later ATC told them to climb to 5000ft, with a good ROC. Simultaneously they received an RA 'climb' command, demanding a minimum ROC of 1500fpm. He pitched the ac up to achieve about 2000fpm ROC whilst PNF set 5000ft and 'level change' on the MCP. After about a further 5sec, *'adjust v/s'* was received followed quickly by ''clear of conflict' when 600ft above the traffic. The other ac was sighted by the FO, about 800m to their L, and ATC were informed of their TCAS manoeuvre. The controller told them that he was aware of the other ac but that it had extended its orbit without telling them. He assessed the risk as medium.

THE AC690 PILOT reports flying VFR on a survey/calibration flight from Retford/Gamston level at 4000ft around the Markfield VRP at 120kt and in receipt of a RIS, he thought, from East Midlands Radar on 134·17MHz squawking an assigned code with Mode C. The visibility was >10km 1000ft below cloud in VMC and the ac was coloured blue/white with anti-collision beacon and strobe lights switched on. About 10nm SW of East Midlands airport whilst turning R onto heading of 110°, ATC told him to turn L. Immediately on levelling the ac's wings prior to commencing the L turn he saw a B737, wings level or possibly climbing. Whilst replying to the ATC request to turn L, he told the controller that he was already in a R turn. ATC then told him to continue the R turn, which he did, and the B737 was seen to pass about 1nm to his L and 300ft above; he did not assess the risk.

UKAB Note (1): The AC690 operator was contacted, as Special Flight paperwork was not available from ATC post incident. The company stated that Non Standard Flight (NSF) paperwork was not issued for the flight which was carried out 2-3 times a month and which entails the ac running in to a point on the W side of Leicester on survey lines from the NW, NE, SE and SW. A photocopied map was provided to the UKAB.

THE EAST MIDLANDS APR reports the AC690 was operating on a survey flight approximately 10nm SW of East Midlands airport at 4000ft and its pilot reported he was turning R onto track 110° after completing a RH orbit. The ADC requested departure release for the subject B737, which was approved on a DTY 2N SID. The B737 crew called on frequency 3nm SW of the airport and were instructed to *"expedite climb through 4000ft"* but the ac appeared to level-off at 4000ft. Previously, he had assessed that a good ROC would allow departing ac to climb above the AC690. The AC690 had extended its orbit slightly to the NW – its pilot later stated that he could only

carry out turns with max AOB of 20° - and was slow to commence its turn. TI was passed to the B737 crew and with separation estimated to be 1·75-2nm he told the flight to continue climbing initially to FL50 then FL70. The B737 crew reported having a TCAS RA and was then transferred to LTCC on 130·92MHz.

ATSI reports that the controller described his workload as moderate at the time of the incident. He had been in position for about 15min.

The AC690 had been carrying out a survey task to the S of the airport at 4000ft for some time prior to the controller taking over the APR position. He said that he had observed it performing its task previously, whilst he had been operating in the Radar 2 position. He recollected it had been operating from about 10nm SW of the airport to a position approximately 10nm SE. The APR commented that he assumed that the flight was operating under a VFR clearance. However, neither the fps nor the handover he received from the off-going controller indicated its flight rules. It is understood that the pilot later reported that he was operating VFR at the time.

At 1511:10, when the radar shows the AC690 8nm SSW of East Midlands Airport, the pilot reported taking up a track of 270° which would be followed by a R turn heading 120°. At the time the APR was engaged in a telephone call and did not register this transmission. He had initiated a telephone call to the ADC requesting a check on any S'bound departures because of the presence of the AC690. The ADC advised that the B737 would be airborne from RW27 in about 4min. This flight was routeing S'bound on a Daventry (DTY) 2N SID i.e. *'climb straight ahead to I-EME d1, then left onto track 225°M. At I-EME d6.5 turn left onto DTY VOR R341 to DTY VOR. Cross I-EME d7 3000' or above, DTY d31 FL55 or above, DTY d23 at FL70'*. It was agreed that the ADC would check for a release when the B737 was lined up on the RW.

At 1511:50, the APR telephoned the ADC to inform her that the next inbound was making a visual approach. During this exchange the ADC said that the B737 would depart ahead of the inbound and added that she could see the AC690 turning (on the ATM). The APR explained that he could see that the AC690 was in a R turn but having missed this flight's previous call he asked the pilot his intended track. The pilot responded *"er we're just turning right now passing zero two zero er we're just going to be tracking one one zero"*. As a result of this information, with the AC690 routeing away to the E, clear of the DTY SID track, the B737 was released for departure. The radar recording shows the AC690, as described, in a R turn 8·3nm SW of the airport.

At 1514:10, when 8nm S of the airport, the AC690 pilot reported *"AC690 c/s just making one right-hand turn to come back onto track one one zero"*, to which the controller responded *"roger"*. The APR commented that he believed that the ac would make a fairly tight orbit and, consequently, not affect the B737's departure. On receiving a call from the Tower that the B737 was airborne at 1515, the APR informed the ADC that the B737 could *"go all the way up and straight to* (London)*"*. He then informed her that the AC690 was carrying out *'a quick orbit'* back to the SE. At the time, the AC690 was 9·5nm S of the airport, in a R turn passing through a heading of approximately SSW. Again, the APR said that he did not consider that the two flights would conflict because the AC690 would complete the turn and be routeing away to the E, clear of the B737's departure track.

Approximately 1min later, the APR telephoned the ADC commenting *"I don't know what that (AC690 c/s prefix) is supposed to be turning southeast"*. The ADC asked, as she was still in contact with the B737, whether she should transfer it to the APR. This was agreed and, at 1516:40, the B737 established communication with the APR, reporting passing 3500ft climbing to FL70. The radar recording shows that, at the time (1516:40), the B737 is tracking SW, passing 3200ft Mode C. It is 6·7nm N of the AC690, which is still on a W'ly track at 4000ft. The APR replied *"B737 c/s good afternoon and if a good rate of climb through four thousand feet please there's traffic south of you at four thousand who is on a survey"*. The pilot, presumably misunderstanding the transmission, responded *"four thousand levelling off B737 c/s"*. The APR confirmed that he had not registered the pilot reporting levelling off. He had heard the pilot say 4000ft and believed that he was reporting passing that altitude. Shortly afterwards, he was surprised to see that the B737 had appeared to level at 4000ft. His initial reaction was that the ac might have a problem. However, as the subject ac were on conflicting tracks at the same altitude, he instructed the B737 to continue its climb to FL50. The radar recording reveals that the two ac were still on the same tracks, now 4nm apart. The APR explained that he cleared the B737 to FL50, rather than FL70, for two reasons. One would be to keep it within CAS if he issued it with an avoiding action R turn (the base of CAS to the W was FL45). Secondly, it was the upper level which would ensure separation from Birmingham's traffic in that area. In the event he did not issue an avoiding action turn, preferring to rely on the B737's climb rate and the AC690 turning out of the way. This, he reasoned had the added advantage of ensuring that the B737 would not be routed outside CAS, if it had not climbed above FL45, or taken off the SID. The East Midlands MATS Part 2, Section 4-2-11, states that ac

above 3000ft may be vectored off the SID for separation purposes but *'this should only be used when absolutely necessary and consideration must be given to the possible environmental effect of such action'*. Accordingly, he reiterated a good ROC to the B737 crew and instructed the AC690 pilot to turn L onto S. At the time he believed from observation of the primary radar that the latter was still tracking W and had not commenced its R turn. However, as it happened, the ac was already in the R turn. On receiving this information from the pilot, the controller instructed the flight to continue the R turn heading 110°. By this time (1517:36), the radar recording shows the B737, at 4000ft, in a L turn onto a S'ly heading, with the AC690 in a R turn 2·5nm SSE of it. The B737 pilot was instructed to *"continue that rate of climb please there's traffic left ten o'clock at two miles, just going down your left-hand side"*, whereupon the pilot responded he had the traffic in sight. He was, subsequently, cleared to climb to FL70. The radar recordings of the event show that the subject ac passed 1nm apart horizontally and 500ft vertically (1517:52). The pilot of the B737 reported, subsequently, that he had delayed his turn at d6·5nm because of a TCAS TA on traffic at the same altitude on his L and he had then received a TCAS RA to climb, which was complied with, at the same time as ATC were instructing him to climb to 5000ft.

The MATS Part 1, Section 1, Chapter 2, Page 1, states the minimum services to be provided by ATC Units in Class D airspace. Of relevance to this Airprox is: *'(b) pass traffic information to IFR flights on VFR flights and give traffic avoidance if requested';* and *'(c) pass traffic information to VFR flights on IFR flights and other VFR flights*'. On this occasion, although TI was passed to the B737, it was not reciprocated to the pilot of the AC690. The APR explained that his intention was to separate the 2 flights. He assessed that the B737 would quickly climb above the AC690, providing at least 1000ft vertical separation. It was only because the former levelled at the same altitude as the latter that the Airprox occurred. An additional factor, which he did not realise at the time, was that, because of the nature of the equipment carried on the AC690, it restricted any turns made by the ac to only 20° AOB. He added that, had he been aware of this information, he would have taken early effective action to control the situation. He did admit that it would have been appropriate to have used the term 'avoiding action' when attempting to resolve the confliction.

As a result of this Airprox, a Unit Safety Notice (01/2005) was issued to alert controllers to the circumstances of the event so that lessons could be learnt. It stressed the importance of using the term 'avoiding action' whenever an urgent response is required.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Discussion initially focussed on the ATC elements, particularly regarding the lack of paperwork associated with AC690's non-standard flight profile. ATCO Members could understand the APR's thought process with respect to these types of flight, being mindful of the importance of allowing the flight to complete each survey run without interruption. However, without a thorough brief of the AC690's sortie details, the APR was unaware of the intended flight profile and the ac's flight (AOB) limitation. The APR had gleaned some information by observing the AC690's track on radar prior to the incident and had based his plan from this acquired knowledge. Unfortunately, the APR had thought that the AC690 was entering an orbit when its pilot had called *"...making one right-hand turn to come back onto track one one zero"*. With regard to the B737, this ac had been released for departure and although the passing of TI to both crews would have fulfilled his responsibilities in Class D airspace, the APR intended to separate the two ac, based on the B737's climb performance. Members were clear that when the APR had noticed that the AC690 was tracking NW and not entering the orbit as he anticipated, more positive control on the AC690 should have been exercised to resolve the confliction. That this did not happen had contributed to the Airprox.

Turning to the piloting aspects, it was clear from the RT transcript that the B737 crew had misunderstood the ATC climb instruction and had reported 'levelling-off'. This incorrect read back had then gone undetected by the APR. These 2 factors when combined had led to the B737 flying into conflict with the AC690 which had caused the Airprox. Pilot Members noted that although the APR did not use the approved phraseology 'expedite climb', the phrase used '..a good rate through..' should have elicited the required response. Also, although it was understandable that the B737 crew were reluctant to turn at d6·5 owing to the AC690's presence, they should have informed ATC of their concerns and of their non-compliance with the SID.

Risk-wise, the APR had climbed the B737 to a level above the AC690 to resolve the situation and passed TI to its crew, although it was disappointing that the phrase 'avoiding action' was not used to emphasise the importance of

the instruction. The B737 crew had received a TA alert immediately after levelling-off at 4000ft and had delayed the L turn on the SID when TCAS indicated that the other ac was to their L at the same level. Shortly after being told to climb to 5000ft, a TCAS RA 'climb' command was received which was quickly followed with the AC690 being seen to pass about 800m clear to their L and 600ft below. The AC690 pilot first became aware of the deteriorating situation when he was told to turn L but when he queried this, as he was already turning R, the APR changed the turn direction and told him to turn R. He followed this instruction and saw the B737 to his L as it passed 1nm clear and about 300ft above. The radar recording had shown that the AC690's R turn had already started to take the sting out of the incident by removing the crossing element of the subject ac's tracks. This element, when combined with the APR's climb instruction and the robust TCAS action taken by the B737 crew, was enough to persuade the Board that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

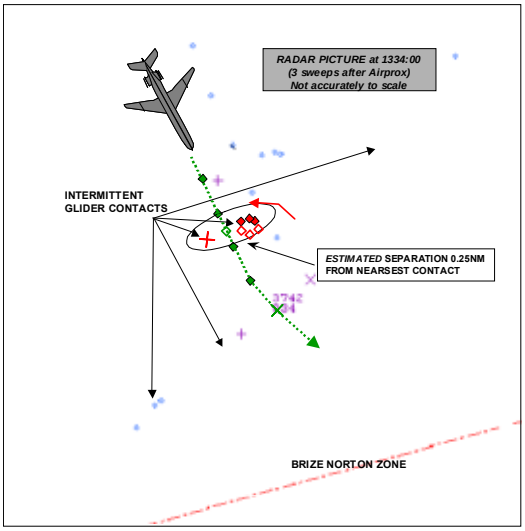
Cause: Having misunderstood an ATC climb instruction which went undetected by the East Midlands APR on read back, the B737 crew levelled their ac at 4000ft and flew into conflict with the AC690.

Degree of Risk: C.

Contributory Factors: Lack of positive control of the AC690.

AIRPROX REPORT NO 133/05

Date/Time:	8 Aug 1534	
Position:	5151N 00148W (5nm WSW of Little Rissington)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	VC10	Untraced Gliders x2
Operator:	HQ STC	N/K
Alt/FL:	2500ft	NR
	(QFE 1010 mb)	NR
Weather	VMC CLBC	NR
Visibility:	>10km	NR
Reported Separation:		
	200ft V/200ft H	NR
Recorded Separation:		
	NR V/Estimated at .25nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VC10 PILOT reports on an IFR recovery from Shawbury to Brize Norton at 250kt, descending and squawking 3742 with Mode C. Nav lights and HISLs were on. After clearing the Birmingham Zone he was routed direct to Brize Norton while receiving a RIS from them. About 10nm NW of Little Rissington they turned onto 180° to avoid the NOTAM'ed area around the airfield and about 5nm later Brize Norton alerted them to 2 primary radar contacts with no height information. Crew lookout identified 2 gliders, one 400ft away to the R and 400ft above and the other passed astern 200ft away to the left and 200ft above. The gliders were white, unpowered with T tails and were tracking to the W. Due to the relative positions of the gliders and the late sightings he did not take any avoiding action but assessed the risk as being low.

UKAB Note (1): Despite extensive tracing action throughout Southern UK none of the gliders in the area could be identified.

UKAB Note (2): No NOTAM could be traced for any activity at Little Rissington on the day of the incident. There was however a NOTAM for a major gliding competition originating at Lasham.

THE VC10 STATION comments that throughout August there are many National Gliding competitions taking place in the South of England. Although details of the events are notified using the NOTAM system, the routes are not decided until the day of the competition and are therefore not included in the NOTAM information. A telephone number on which to find further details is published in the NOTAM. To reduce the potential of collisions during this period of increased activity, a local order has been produced where, during August, ac on recovery to RAF Brize Norton are held high by ATC.

UKAB Note (3): The transcript of the RT shows that the VC10 was identified and placed on a limited RIS due to poor radar performance and high traffic density at 1530:26. TI was passed at 1530:54 and, in a series of transmissions ending at 1531:38, the pilot was advised that Little Rissington was active and of its position. The VC10 pilot then reported he was turning right 15 degrees to avoid the airfield. The TI was updated at 1531.43 and again at 1533:04 and 1533:23. The VC10 crew called visual with the traffic at 1533:28.

UKAB Note (4): Analysis of the Clee Hill radar shows the VC10 throughout the incident and two primary contacts believed to be the gliders. The CPA occurs between 2 sweeps and at that time only one of the glider contacts is showing.

HQ STC comments that it is difficult to manoeuvre a large ac quickly enough to avoid late spots. On this occasion the crew were content that the gliders were far enough away. The procedures in place to mitigate the risk, in future, are sound.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the VC10 pilot, a transcript 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.

There was some confusion as to whether or not the activity at Little Rissington had actually been NOTAM'd or merely notified to Brize Norton. Members thought however that since it had been determined that the gliders had not been operating from there this was not pertinent to their discussions.

The Board noted that this was another in the series of incidents involving gliders in good weather in mid-summer. Despite seemingly good TI from Brize Norton APR, the VC10 crew were unable to see the gliders in very busy airspace until they were too close to take any avoiding action. Although Members were surprised that the VC10 pilot considered the risk to have been low when he had been unable to turn his ac to provide more than the 400ft separation that he reported they accepted his assessment and therefore considered this incident had been a conflict in the FIR.

There was some discussion on the utility of NOTAMs for gliding competitions. In general, Members thought that although the fact that a competition was taking place from a specified location is useful, the route and timings could be very broad brush and may lull some pilots into expecting to encounter gliders only on a straight line route between the specified turning points; that could be very unreliable. The Board was informed that Military Low-Level NOTAMs do contain the route where it is known. A gliding expert suggested that, as Brize Norton have already instigated, holding recovering ac high for as long as possible on good gliding days was one way of reducing the risk of such Airprox. Members were also interested to hear that the BGA is conducting some work in trying to computer model the predicted glider traffic flow and density for the weather and wind conditions that prevail on any given day. This, Members thought, could be most useful to a wide variety of 'customers'.

PART C: ASSESSMENT OF CAUSE AND RISK

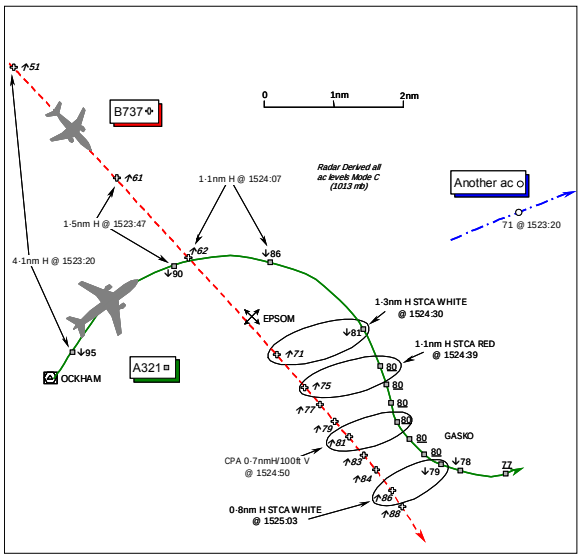
Cause: Conflict in Class G airspace with unidentified gliders.

Degree of Risk: C.

AIRPROX REPORT No 138/05

AIRPROX REPORT NO 138/05

Date/Time:	15 Aug 1524	
Position:	5118N 00020W (4nm E of Ockham VOR)	
Airspace:	London TMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A321	B737-400
Operator:	CAT	CAT
Alt/FL:	FL80	↑FL120
Weather	VMC CLAC	VMC NR
Visibility:	Unrestricted	40km
Reported Separation:	300ft V/1nm H	nil V @ <1nm H
Recorded Separation:	Nil V/0·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports [translated from the original] that he was inbound IFR to London Heathrow from Malaga flying in VMC above cloud. The landing lights and HISLs were on.

They were instructed by London Control to make a complete turn over "OCK" and to depart on a heading of 075°. Flying at 220kt in a R turn passing through a heading of 150° level at FL80, they received a TCAS "warning" of conflicting traffic. The controller instructed them to make a rapid alteration of course onto a heading of 070° and also alerted them to the closeness of the traffic. A TCAS RA was enunciated and they descended from FL80 to FL77, keeping visual contact with the other ac, which passed 1nm away to starboard and within 300ft vertically. The risk was not assessed.

When he commented to ATC about the manoeuvre carried out, London Control reported that the other traffic was on a different frequency.

THE B737-400 PILOT reports that after take-off from RW27L he was departing on a DVR4G SID from London Heathrow bound for Prague and had been cleared by London CONTROL to climb to FL120. Heading 141° at 250kt, S of the EPM NDB and passing about FL80, a TA was enunciated before an RA, he thought it was *"ADJUST VERTICAL SPEED",* [but more probably a MONITOR VERTICAL SPEED] was demanded for less than 10 sec. The other ac – an A321 - was spotted about 1nm away to port, his B737 having passed less than 1nm away, slightly behind and at the same level. The other ac was initiating a turn to the R then reversing into a L turn and, he thought, "climbing faster" before levelling off. After he advised ATC of this, they were given vectoring instructions R then to the L toward DVR. He assessed the risk as *"medium".* The A321 callsign was not heard on their frequency.

THE LTCC HEATHROW INTERMEDIATE DIRECTOR SOUTH (LL INT S) reports that he was providing a Radar Control/Approach Service to the A321 crew whom he instructed to orbit overhead OCK at FL80 and then depart on a heading of 070°. When the A321 was half way round his orbit, STCA alerted him to a conflict with an outbound ac adjacent to the A321 climbing through FL70. He immediately issued avoiding action and traffic information to the A321 crew and the outbound ac passed 1nm to the W of the A321 whilst continuing to climb above it. He then gave the A321 instructions to continue with his approach.

THE LTCC SE DEPARTURES CONTROLLER (SE SC) was mentor to a pre-Terminal Validity Course (TVC) trainee controller when the traffic started to "increase" so she took over the RT and told the trainee to continue marking the FPSs. The SE SC checked the CCTV and did not "register" any inbound traffic in the OCK Hold: therefore she "locked" the outbound B737 on its heading and instructed the crew to climb to FL120. Unaware of

the conflict until she saw the STCA flash white, it then immediately changed [within 10 sec] to a high-severity red alert against the A321. The B737 was climbing through FL78 so she issued an avoiding action R turn onto 195° and, because of the B737's high RoC, instructed the crew to expedite their climb to FL120.

ATSI reports that at the time of the Airprox, the B737 crew was in communication with the LTCC SE SC whilst the A321 crew was under the control of the LL INT S. The SE SC described both the workload and traffic loading as "*high*". The SE SC was operating with a pre-TVC trainee who was being permitted to operate the RT, which is discussed later in this report. This trainee was waiting to commence a TVC Course that had been cancelled. The Sector frequency was, initially, not very busy and so the SE SC was content to let the trainee have some time using the RT. The workload then started to increase and the trainee began to fall behind with the running of the Sector. The B737 crew established contact with the SE Sector at 1521:20 and reported passing 2400ft. The trainee instructed the crew to squawk 'ident' and to confirm their cleared level. The ac was following a DVR SID and so was routeing on a SE'ly track towards EPSOM before turning onto E to route via DETLING. As the B737 crew was commencing their L turn towards EPSOM, the A321 was 8nm SW of OCKHAM passing FL110. The LL INT S instructed the crew of the A321 to make a RH orbit at OCKHAM and roll out on a heading of 070º maintaining a speed of 220kt. This was acknowledged by the A321 crew and, shortly afterwards, descent clearance to FL80 was issued. At that time, the B737 crew was climbing through 4300ft for 6000ft, in the A321's 11o'clock - 8nm. At 1523:20, the SE SC took over the frequency from her trainee and almost immediately transmitted "[B737 C/S] *continue present heading climb flight level 120*". The B737 crew read this instruction back and the SE SC continued dealing with other traffic on the frequency. When the clearance had been issued, the A321 crew was just commencing its RH orbit over OCKHAM, descending through FL94 for FL80 with the B737 3½nm N of the A321 heading SE towards EPSOM. STCA activated white with a low severity alert at 1524:30, as the B737 was passing FL71 and the A321 was at FL81. Very shortly afterwards the LL INT S transmitted "[A321 C/S] *avoiding action turn left heading 060° traffic right-hand side gone through his level he's just passing FL75 in the climb left turn heading 060°*". [To which the A321 crew replied *"copy heading we have the traffic in sight heading 060°…".*] At 1524:47, the A321 crew was in the process of reversing their turn onto 060º whilst the B737 was in its 2 o'clock at a range of 0.8nm and 100ft below the A321. Meanwhile, moments after 1524:40, the B737 pilot transmitted "*RADAR* [B737 C/S] *we have TCAS resolution*". The SE SC responded by transmitting "*sorry avoiding action* [B737 C/S] *turn right immediately heading 195 degrees*". Minimum separation occurred during this transmission, at 1524:50, when the B737 was passing FL81 in the 3 o'clock position of the A321 at a range of 0·7nm. The SE SC passed traffic information to the B737 crew and instructed them to expedite their climb to FL120. The effect of the turn instructions, together with the B737 crew expediting the climb resulted in standard separation being restored by 1525:12.

The SE SC advised that she had taken over the position some 10-20min before the Airprox and said that there are no formal guidelines as to what a pre-TVC student can be permitted to do at an operational position. Accordingly, it is left to the discretion of the OJTI Mentor. On this occasion she was content to let the trainee control and they were discussing what was happening and likely to happen in the short and long term. After a short time the traffic level increased and the trainee was falling behind. She realised that he was losing the picture, as he was simply replying "*Roger*" to pilots' transmissions. A few minutes before the Airprox the SE SC was intending to take over the position: however, the trainee seemed to be getting back on top of the traffic situation, but this was short lived. When she took control of the RT again there were a number of outstanding items to attend to, including a separation problem at DETLING. The trainee was then tasked with keeping the FPSs correctly marked: however, the SC found that she had to point out where the relevant strips were located. The SC remembered checking the CCTV stack display and saw one strip under the OCK designator and two under the BIG one. At the time, there were two company ac [with similar CCDS numerics] including the subject A321 [ABC4126] in the vicinity of OCKHAM and the SC postulated that it was possible she saw the leading ac in the recovery sequence [ABC4236 shown on the diagram as *Another ac*] and then mis-identified it as the second subject A321. However, she could not be certain of this. Having issued the instruction for the B737 crew to climb to FL120, the SE SC concentrated on traffic at DETLING and whilst she was dealing with this a colleague shouted a warning about the subject A321.

Traffic had departed from Gatwick to route to the E and the SC remembered checking what level the B737 had passed in order to clear the Gatwick traffic to climb to a safe level. It was therefore likely that a check of the radar was made between instructing the B737 crew to climb to FL120 and the Airprox occurring. MATS Part 1 Supplementary Instruction No.3 of 2005 (Airborne Collision Avoidance System – Traffic Alert and Collision Avoidance System – TCAS II) para 5 states:

'*On being informed that an aircraft is manoeuvring in accordance with a TCAS Resolution Advisory (RA), a controller must not issue control instructions to that aircraft. Once an aircraft departs from an ATC clearance, in response to an RA, the controller ceases to be responsible for providing standard separation between that aircraft and other aircraft affected as a direct consequence of that RA manoeuvre. However, controllers should continue to provide traffic information to aircraft affected by the manoeuvre*'.

The SE SC advised that she did not hear the pilot of the B737 reporting a TCAS alert so, when STCA changed to a red high severity alert, avoiding action was passed. At that time, the leading company ac [ABC4236] was 9nm NE of the B737 and so if the SC had, indeed, confused the 2 ac the 'Another' company ac was not a confliction to the climbing B737.

The SE SC stated that she had been qualified as an OJTI for some 3 years, although it was not a role that she really enjoyed. She estimated that her operational time was split approximately 60% controlling on her own whilst on 40% of occasions a trainee was present. She added that if a controller did not want to have a trainee for a particular shift that wish was recognised. However, on this occasion no objection was raised to the trainee's presence. This is the second occurrence to occur at LTCC during August whereby an inexperienced trainee was present at the operating position [UKAB Note: The other although filed as an Airprox was subsequently withdrawn by the reporting pilot]. On both occasions the trainee was tasked with annotating the FPSs.

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 clear that the reporting A321 pilot had for his part been following the instructions of the LL INT S when he detected the B737 climbing up toward the A321's level and issued the avoiding action L turn to the latter's crew. The A321 pilot's report also showed that he had seen the B737 and received a TCAS RA to descend, which he had not reported on RT. In his account, the B737 pilot had reported that the TCAS RA enunciated had been *"ADJUST VERTICAL SPEED",* but CAT pilot Members said that the norm would be a *"MONITOR VERTICAL SPEED"*. The comprehensive ATSI report had shown that the B737 pilot had also transmitted to the SE SC whilst climbing just after 1524:40, "*RADAR* [B737 C/S] *we have TCAS resolution*". Pilot Members added that whereas this was not the stipulated phraseology that might normally be encountered of *"TCAS CLIMB"* or *"TCAS DESCENT*", the RA *"MONITOR VERTICAL SPEED"* was a passive or 'preventive' RA, which did not require the pilot to make any specific change at that stage to his established ROC. So as long as the B737 pilot continued climbing at the rate TCAS specified it was 'content'; in effect TCAS required him to do nothing more than he was already doing but clearly he wanted to communicate this to the controller albeit that no deviation from his extant ATC clearance was necessary. It was this unusual terminology which might be why the SE SC had not recalled hearing the B737 pilot report the intervention of TCAS, which evidently he had done.

The ATSI report had shown that the SE SC who was providing a RCS to the departing B737 crew had been instructing a very inexperienced pre-Terminal Validity Course (TVC) trainee controller who, the Board was informed, had not completed simulator training prior to being allowed by the SE SC OJTI to operate the Sector and the RT under her supervision. A controller Member familiar with the training system at LACC explained that it was entirely up to OJTIs whether such direct involvement by students was allowed at this stage of training. It was clear that the inexperienced trainee became unable to keep up resulting in the SE SC taking the RT back and although tasked with keeping the FPSs correctly marked, it was evident that this had also, perhaps understandably, been beyond the competence of the trainee. So it was in this 'catch–up phase' at 1523:20, after taking back the RT from her trainee, that the SE SC instructed the B737 crew to climb to FL120 through the level of the A321. It was evident from the radar recording that 'another' company ac was ahead of the subject A321 and controller Members understood why, when she checked the CCTV 'Stack' display and saw one strip under the OCK designator, that the SE SC might have mistaken the 'Another ac' - that was not a potential conflict to the B737 - for the A321 in the 'Stack' display. Nevertheless, the subject A321 should have also been clearly displayed to her on the radar at the time and the ATSI report had suggested that a more rigorous checking process should have occurred before the climb instruction was issued. Following this wide-ranging debate, the Members agreed unanimously that this Airprox had resulted because the SE SC cleared the B737 to climb through the level already occupied by the A321 without ensuring that adequate horizontal separation would exist.

Once the SE SC had realised that the climbing B737 was in confliction with the A321 when the STCA was triggered, appropriate avoiding action and traffic information was issued. The avoiding action transmission was issued just at the point of minimum horizontal separation and the R turn instruction to the B737 crew had little effect on the overall outcome as by that stage TCAS had also recognised the situation. The LL INT S's avoiding action turn ensured that the ac got no closer than 0·7nm as the B737 climbed up through the A321's level as the latter turned away. Moreover both pilots had each other's ac in sight so despite the relative closeness of the encounter, the Board concluded that these combined actions had effectively removed any risk of a collision in these circumstances.

The SE SC had for entirely understandable reasons allowed the inexperienced trainee to control traffic on the Sector. The investigation of this Airprox had revealed that there were, at the time, no formal guidelines as to what an LTCC pre-TVC student can be permitted to do at an operational position. The Board was briefed that following this Airprox and other related occurrences the ATS provider had taken decisive action on this topic. Members were reassured to learn that this action included an OJTI and mentoring 'Best Practise' guide that has now been developed for LTCC which includes the impact of trainee FPS marking - this is now at the implementation stage and will be delivered in early March 06. Also, a presentation pack of the recent OJTI/Trainee incidents has been produced and delivered to LTCC Watch Training Managers for discussion with all current OJTIs on their watch, who should all be briefed by early March 06. Watch Safety Representatives have been advised of the subject Airprox incident and instructed to make their controllers aware of issues relating to trainees continuing to mark FPSs, after the OJTI had taken control of the frequency. Moreover, a review is being conducted of the experience levels required to be an OJTI at LTCC - currently 2 years radar experience - and what supplementary support should be provided to new OJTIs. Additionally, the need for OJTIs to attend an OJTI Refresher Course is being reviewed and an OJTI Competency Scheme is also being developed for LTCC, but no date has been decided for implementation at this stage.

PART C: ASSESSMENT OF CAUSE AND RISK

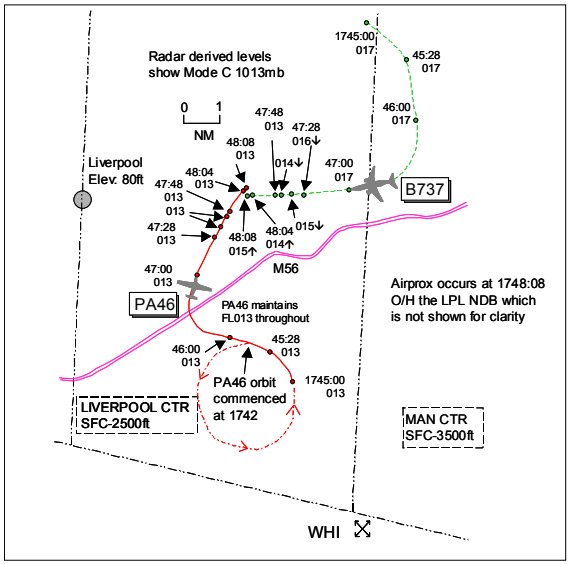
Cause: The SE SC cleared the B737 to climb through the level already occupied by the A321 without ensuring that adequate horizontal separation would exist.

Degree of Risk: C.

AIRPROX REPORT No 139/05

AIRPROX REPORT NO 139/05

Date/Time:	15 Aug 1748	
Position:	5320N 00243W (5nm E Liverpool - elev 80ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-300	PA46
Operator:	CAT	Civ Pte
Alt/FL:	2000ft↓ (QNH)	1500ft (QNH 1024mb)
Weather	IMC KLWD	VMC CLBC
Visibility:		7km
Reported Separation:	Nil V/<1nm H	Not seen
Recorded Separation:	200ft V/0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Liverpool being radar vectored on a R base leg to a 7nm final to RW27 at 150kt. He was aware of VFR traffic routing WHI-LPL- Kirkby which was under ATC instruction to hold S of the M56 motorway. They were cleared for the ILS and they intercepted the GP at 2000ft at approximately 6·5nm final. Although he, the Captain PF, was busy with gear/flap selections and the ensuing landing checklist actions, he noticed traffic on his TCAS display on a relative bearing of approximately 310° range 4nm indicating 500ft below. Expecting this ac to turn away, he allowed the approach to continue. His next recollection was that this ac was still at 310° relative bearing at range 2·5nm indicating 300ft below. He called 'go-around' and immediately after go-around actions were initiated there was a TCAS 'traffic' alert followed a few seconds later by an RA 'descend descend' which was then followed by another RA command 'climb climb'. The FO recalled seeing zero feet vertical separation and <1nm horizontal on his nav display but as all of this was whilst in IMC the other ac was not seen visually. At 2000ft 'clear of conflict' was received, the ac status was ascertained/verified and ATC were informed. After the go-around, the After T/O checklist was actioned and the flight was radar vectored LH downwind for another ILS. The Captain was concerned over the sequence of TCAS interventions which followed his decision to execute a non-TCAS directed 'go-around' which made him query the validity of his decision to continue the approach to the extent he did.

THE PA46 PILOT reports flying solo en route from Oxford to Blackpool heading 340° at 160kt and 1500ft QNH 1024mb and in receipt of a FIS from Liverpool ATC on 119·85MHz squawking 0263 with Mode C. A Ryan 7000 TCAD ACAS device was fitted to the ac which give audible warnings of proximate traffic and shows relative altitude difference but no relative bearing. The visibility was 7km 500ft below cloud in VMC and the ac was coloured white/ blue with strobe lights switched on. About 20nm from WHI NDB heading 310° he requested to transit the Liverpool zone from WHI via LPL NDB. He received clearance to transit WHI-LPL-KIRKBY at 1500ft QNH 1024mb VFR and to report passing WHI. After passing WHI he was told to orbit S of the M56 motorway due to traffic on approach to Liverpool. After 1 orbit he was cleared to the LPL at 1500ft and on approaching the LPL, ATC told him of traffic on the approach and asked if he had the traffic visible. He did not see the traffic and heard the other ac's pilot inform ATC that he was climbing following TCAS – by now he was passing the LPL. He routed to KIRKBY to Blackpool and he was asked to contact ATC after landing.

THE LIVERPOOL APR reports that his trainee had cleared the PA46 to transit the zone via WHI-LPL-KIRKBY VFR not above altitude 1500ft with a subsequent instruction to remain S of the M56 motorway due to inbound IFR traffic. The PA46 pilot correctly acknowledged this and acted upon the instruction. TI was passed to the PA46 pilot on the subject B737 establishing at 6nm on the ILS for RW27 and he was asked to report the traffic in sight, which was acknowledged. Shortly thereafter the PA46 was observed tracking N'bound. TI was passed to the B737 crew on the PA46 and the previous TI given to the PA46 pilot was reiterated. The PA46 pilot said that he

still did not have the B737 in sight but he was seen to continue N'bound. TI was again reiterated to the B737 crew by which time the radar returns had merged and the B737 crew reported 'going-around' before advising that this was due to a TCAS RA. The PA46 continued on to leave the zone to the N and apologised for the incident.

ATSI reports that the Liverpool APP/APR position was being operated by a mentor and trainee. In the period leading up to the Airprox, 3 ac were being vectored to the ILS RW27 and several others were receiving a service including another inbound, an outbound and a number of overflying ac. The subject B737 was being positioned number 3 in the sequence.

The PA46 flight established communication with Liverpool Approach at 1730 requesting to route via Whitegate and the LPL to Blackpool at 1500ft. The flight was allocated a squawk of 0263 and was cleared to *"join and report at Whitegate not above altitude one thousand five hundred feet VFR routeing Whitegate Lima Papa Lima Kirkby"*. The pilot acknowledged the message correctly.

The B737 flight made its initial call on the frequency at 1736 whilst descending to FL70 on course BAROS. The pilot was instructed to continue on the heading and descend to 5000ft. Shortly afterwards, the PA46 pilot reported at Whitegate and was instructed to *"...continue towards the LPL but remain south of the M Fifty-six on reaching. There's er quite a stream of inbound IFR traffic at this moment"*. The pilot replied *"er that's copied that's to remain south of the M Fifty-six and to the Lima Papa Lima"*. The pilot was requested to report taking up the orbits S of the M56. When he was approximately 6nm SE of the airport, the PA46 pilot reported, shortly before 1742, *"...south of the river and we're starting our orbit"*, the controller responding *"...I'll get you across very shortly"*. Meanwhile the B737 was being vectored downwind RH for RW27, descending in stages to 2000ft. At 1745 it was given a R turn onto base leg, 11nm from touchdown.

TI was then issued to the PA46 flight when it was about 7nm SE of the airport. The pilot was informed that he would be passing behind a B737 currently on R base which was positioning for a 7 mile final and he was asked to report it in sight.

[UKAB Note (1): The RT transcript shows the APR's transmission just before 1745:30 as *"...traffic information that you'll be passing behind is an (company prefix) seven three seven currently on right base will be er positioning for a seven final on the ILS pr (part word) er ILS approach for runway two seven report when you get him in sight"* to which the PA46 pilot replies *"that's copied..."*.]

Shortly afterwards at 1746, the B737, at 8·5nm, was given a closing heading for the LLZ. By 1747, the B737 pilot had reported established and had been cleared for the ILS approach. At this time the PA46 was tracking NNE, 3·8nm SE of the airport. The B737, 400ft above, is in its 2 o'clock at a range of 4nm. The pilot of the PA46 was asked if he was visual with the B737 on final at 6 miles. When he replied negative, TI was passed *"roger he's in your right two o'clock range of about three miles"*. No instructions were issued to deconflict the two ac. The B737 pilot was then informed (1747:30) that *"...traffic you may see on TCAS just south of Runcorn Bridge is er believed to be a Tomahawk (sic) at fifteen hundred feet VFR he will orbiting for spacing behind you"*. Clearly the PA46 was not orbiting, nor was it subsequently instructed to take up an orbit. The B737 pilot acknowledged the call and 10sec later reported going around due to the traffic. At 1748:04, as the radar shows the PA46 crossing the final approach path 0·3nm ahead of the B737 and separated vertically by 100ft, the trainee asked again if the PA46 pilot was visual with the traffic. The pilot responded negative but *"...we have him on TCAS though"*. The PA46 continued tracking to Kirkby and the B737 was re-positioned to the ILS.

[UKAB Note (2): The CPA occurs on the next radar sweep as the B737 is seen climbing through FL015 (1860ft QNH 1025mb) as the PA46 diverges 0·2nm N of it 200ft below.]

The plan to deconflict the subject ac by holding the PA46 S of the M56 was sound. However, after issuing TI to the pilot about the B737 that he would be passing behind, the PA46, having completed 1 orbit, appeared to track N towards the LPL. Neither the mentor nor trainee made any further comments to the pilot of the PA46, other than passing further TI. The plan relied on the PA46 pilot sighting the B737, which he never managed to do. If ATC expected the PA46 to continue holding, which would have resolved the situation, it would have been prudent to remind the pilot of that fact when initially passing the TI about the B737.

The 1750 Liverpool weather report: 320/11kt; visibility more than 10km; broken cloud at 1500ft. (The previous weather gave the cloud as scattered at 2200ft.)

AIRPROX REPORT No 139/05

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed with ATSI's report that the Liverpool APR's initial plan to orbit the PA46 had been sound but, somewhere along the way, it had become diluted. From the PA46 pilot's perspective, he believed that one orbit was required S of the M56 and then to route onward to the LPL. The RT transcript had revealed that no clearance was given to leave the orbit but he had been given TI on the traffic he would be passing behind, the B737 being vectored onto the ILS, and to report visual with it. The PA46 pilot acknowledged this with *"..that's copied"* but had apparently misunderstood this TI as clearance to leave the orbit and proceed towards the LPL. In doing so, the PA46 pilot did not comply with the Liverpool APR's instructions and flew into conflict with the B737 on final approach which he did not see. This was a part cause of the Airprox.

ATCO Members discussed the controller's minimum requirements for Class D which were fulfilled as he had passed TI to both flights. However, as the APR's plan had been to deconflict the subject ac, Members thought that when the APR noticed the PA46 had left the orbit and when its pilot reported that he was not visual with the B737, the APR should have taken immediate steps to resolve the deteriorating situation. It was unclear whether the Trainee/Mentor team thought that a visual sighting by the PA46 pilot would sort out the problem for at that time the PA46 was on a converging track. Even if the PA46 pilot had seen the B737 at that stage, his proximity to the B737's projected flight path would almost certainly have generated a TCAS RA within the B737 cockpit. It was agreed that a lack of positive control by the Liverpool APR after the PA46 had left its orbit had been the second part cause.

Turning to risk, from the both pilots' reports and the METARs available, the PA46 pilot was flying just below the cloudbase whilst the B737 was in the cloud layer above and descending so that visual acquisition by the PA46 pilot would not have been possible until very late in the proceedings. The B737 crew exhibited good situational awareness and had monitored the PA46's flight path, the Capt electing to execute a 'go-around' when he saw the separation continuing to reduce. Undoubtedly, the B737 crew were concerned that TCAS generated an RA 'descend' as they commenced the 'go-around' but, as soon as the equipment had sensed the B737's upward flight path change, it reversed its command into a 'climb'. From the radar recording, it appears the B737 levelled at FL013 (1660ft QNH 1025mb) for about 12sec before a climb is shown, by which time the PA46 had crossed 0·3nm ahead and 100ft below. Although this had the potential for a serious encounter, the action taken by the B737 crew had been sufficient to remove the actual collision risk. The Board was clear that the subject ac had passed in close proximity, unsighted by both crews, to such an extent that safety had been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

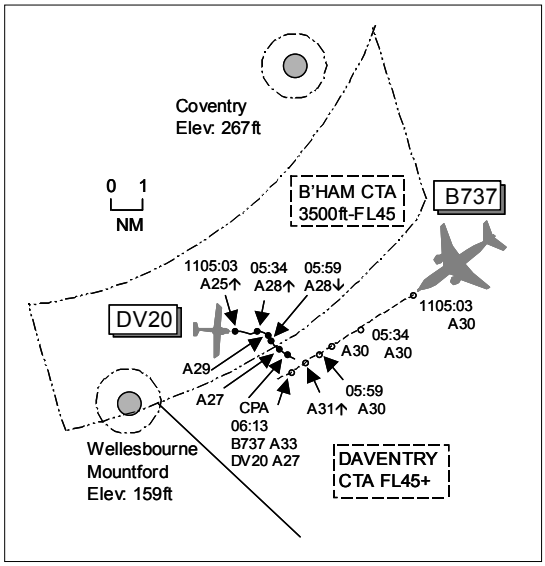
a. The PA46 pilot did not comply with the Liverpool APR's instructions and flew into conflict with the B737 on its final approach which he did not see.

b. Lack of positive control by the Liverpool APR.

Degree of Risk: B.

AIRPROX REPORT NO 140/05

Date/Time:	14 Aug 1106 (Sunday)	
Position:	5212N 00129W (10nm S Coventry Airport - elev 267ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-500	DV20 Katana
Operator:	CAT	Civ Trg
Alt/FL:	3000ft	↑3000ft
	(QNH 1017mb)	(QNH)
Weather	VMC	VMC
Visibility:	>10km	20km
Reported Separation:		
	300m H	300ft V/800m H
Recorded Separation:		
	600ft V/0·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 240° at 210kt inbound to Coventry and in receipt of a Limited RAS on 122·0MHz squawking 5544 with Mode C. The visibility was >10km 500ft below cloud in VMC. Having initially planned for arrival RW23 at Coventry and after being given a downwind vector for this RW, ATC advised that previous company ac reported a 5-10kt tailwind and asked if they would prefer RW05. They elected to use RW05 and were given a R turn onto a heading of 230°. Soon after, this was adjusted to a heading of 240° and they were then also advised that there were numerous ac just to the S of the C/L, many of which they could see on TCAS, but ATC did not know of all traffic and so had downgraded the service to a "Limited Advisory". One ac was seen on the TCAS display about 3nm away closing and soon after they were given a heading of approximately 340° for base, but owing to the proximity of a TCAS contact closing in on them showing -01, they declined. A TCAS 'climb' RA was received before they could finish telling ATC that this heading was not acceptable. The other ac was then seen visually, a white coloured low wing twin engined light ac, he thought, passing 300m to their R whilst the PF disconnected the A/P and followed the TCAS guidance; ATC was then advised of TCAS climb. The approach continued after regaining original altitude, having climbed 300ft, without further incident.

THE DV20 PILOT reports flying a dual training sortie, departing the upwind leg of RW36L at 75kt at Wellesbourne Mountford and in receipt of a FIS from Wellesbourne Information on 124·02MHz squawking 7000 with Mode C. The student began his climbing exercise on an E'ly heading to climb to 3000ft QNH. In good VMC - the visibility was >20km - they saw a B737 in their 12-1 o'clock position on a crossing/converging track in a descent. He took control and stopped the climb with a slight L turn keeping the traffic in sight at all times as the B737 passed a minimum of 300ft vertically before climbing higher and within 800m horizontally to their R. Once clear they resumed the exercise tracking SE. He assessed the risk as low.

THE COVENTRY APR reports vectoring the B737 for RW23 and it was positioned downwind LH at 3000ft approximately 15nm from touchdown. The ADC called to say that the previous landing ac had reported a 5-10kt tailwind on the RW23 approach. He informed the subject B737 crew of this and they elected to make an approach to RW05. He was unable to coordinate climb into CAS or a routeing via HON for the flight (the accepted inbound routeing for RW05 arrivals) owing to Birmingham inbound traffic. He downgraded the service to a Limited RAS which the pilot acknowledged, also being informed that there were multiple unknown contacts to the SW of Coventry. The B737 was now late downwind RH for RW05 and about to turn onto R base-leg when the pilot reported a TCAS RA which he acknowledged. The ac climbed for several seconds before the crew reported *"RA complete, descending to 3000ft"*. He turned the ac onto base leg and the ac landed safely without further incident.

ATSI reports that the B737 was being vectored inbound to Coventry by the APR. Initially it was being positioned for RW23 descending to 3000ft but, at 1101, having been advised of a possible tailwind, the pilot opted to land on

RW05. At the time the flight was SE of the airport, LH downwind for RW23. In view of the change of RW, the B737 was instructed to turn R heading 230°, positioning RH for RW05.

At 1103:00, the pilot of the B737 reported a TCAS contact on traffic 2·5nm in his 2 o'clock. This was traffic working Coventry at 1500ft and the pilot of the B737 was informed accordingly. Shortly afterwards the flight was given a tactical R turn heading 250°. At 1104:35, the pilot was advised that due to *"multiple unknown contacts to the south west of the field all manoeuvring believed to be beneath controlled airspace it's a limited radar advisory service at the moment"*. The pilot read back the service adding *"we have quite a number of aircraft on TCAS as well"*. This was the first time that the radar service being provided was mentioned. The radar recording shows 4 ac in that general area. The controller commented that he would try to *"feed you through those unknown contacts"* and would attempt to obtain a clearance from Birmingham into CAS via Honiley. The pilot asked if he could go another 5nm before turning in. The radar recording at 1105:03 shows the B737 at 3000ft, 8nm SSE of Coventry Airport, outside CAS where the base is FL45. The closest unknown ac, subsequently established to be the DV20, was in its 1 o'clock at 5·6nm, at 2500ft unverified. About 20sec later the pilot was informed *"I'm going to feed you in behind Birmingham inbound traffic to keep you inside controlled airspace turn right heading er three two zero"*. As the pilot did not respond straightaway the heading change was reissued. This time the pilot responded *"negative we've got a contact same level..."*. The radar at 1105:59 shows the subject ac 1·5nm apart, with the DV20, just within the lateral confines of the Birmingham CTA where the base is 3500ft, in a R turn, 1·5nm NW of the B737 and 200ft below. The R turn issued to the B737 would have routed it directly at the DV20. The controller said that he must not have seen the radar return from the DV20 at the time. Even under a Limited RAS, he would not have knowingly turned the B737 towards unknown traffic or not passed TI if he had observed it. The B737 crew reacted to a TCAS RA and climbed. It passed within 0·6nm of the DV20, but by this time (1106:15) the vertical separation had increased to 600ft.

Under a RAS, as stated in MATS Part 1, Section 5, Paragraph 1.4, the controller must seek to achieve separation which is not less than 5nm or 3000ft from unknown traffic. Coventry is not equipped with SSR so the APR was reliant on providing 5nm horizontal separation. Even taking into account he had limited the radar service (MATS Part 1, Chapter 5, Page 4 refers) due to the number of unknown ac, it should have been apparent on the radar display that the subject ac were on potentially conflicting tracks for some miles.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear that this was an encounter in Class G airspace where 'see and avoid' prevailed. Pilot Members opined that it might have been better if the DV20 pilot had been speaking to Coventry where information on the approaching B737 could have been obtained from the controller or from the exchange of RT between the APR and the B737 crew. The B737 crew were under a limited RAS and were given a R turn onto base leg by the Coventry APR as he endeavoured to vector the ac through some unknown radar contacts. However, this turn, if followed, would have placed the B737 into direct conflict with the DV20 which was seen on the B737's TCAS display but apparently was not showing on the APR's primary radar display. The B737 crew declined the turn but in the meantime had received an RA 'climb' warning. The guidance was followed, as the other ac was visually acquired to their R, and ATC were informed of their manoeuvre. The DV20 instructor had seen the B737 as it was crossing ahead and had stopped his ac's climb and turned slightly L to maintain separation. The Board agreed that the combined actions of both crews had been timely and effective in resolving this conflict in Class G airspace thereby ensuring that safety was assured during the encounter.

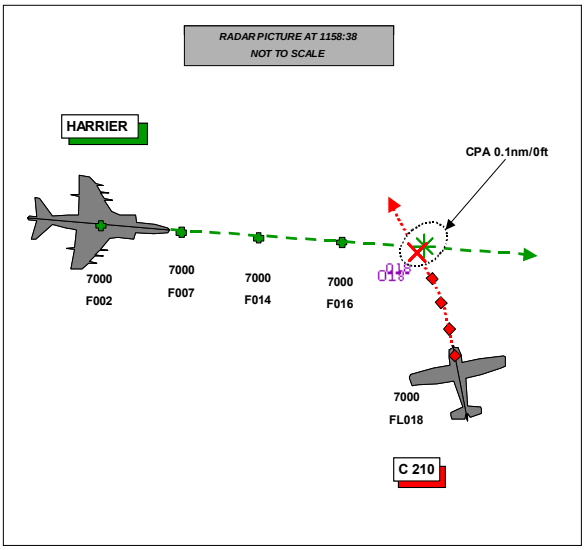
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT NO 141/05

Date/Time:	16 Aug 1159	
Position:	5238N 00001E (15nm E Wittering - elev 273ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Harrier T10	C210
Operator:	HQ STC	Civ Pte
Alt/FL:	2120ft	2000ft
	(Rad Alt)	(QNH)
Weather	VMC CLBC	VMC CLOC
Visibility:	20km	>10km
Reported Separation:		
	Nil V/50m H	100-200ft V/400ft H
Recorded Separation:		
	0ft V/0.1nm (200) yd H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HARRIER PILOT reports flying a singleton grey ac with HISLs selected on squawking 7000. After clearing the Wittering MATZ and being informed of no conflicting traffic, he switched to Holbeach frequency and descended. He was flying a SOP transit to Holbeach AWR initially at 425kt and at 500ft (Rad Alt) but once it was evident that the weather was suitable he climbed to 2000ft and attempted to contact Holbeach. While flying at about 2100ft he glanced to his right and saw a white light ac at very close range. It was immediately obvious that they would not collide and that the light ac would pass about 50m behind at the same height. There was not enough time to take any avoiding action and he assessed the risk as being high and thought that at the time he may have been preoccupied by his range joining call. He reported the incident to Cottesmore APR and they rapidly identified the conflicting ac.

THE CESSNA 210 PILOT reports flying a white, yellow and blue ac solo with all external lights and strobes selected on from Top Farm to Fenland at about 2000ft and 140kt. He was squawking 7000 with Mode C although not in communication with any unit. He saw a military high wing ac emerging from behind his port wing about ¼ nm away in his 10 o'clock on a converging track. He made a hard left turn and passed 400ft behind the ac and about 1-200ft below. He assessed the risk as being low/medium.

UKAB Note (1): The recording of the Debden radar shows both ac clearly, including the C210's left turn commencing 2 sweeps (16sec) before the CPA. Both the ac indicate FL018; the C210 passes about 200yd behind the Harrier as a result of the turn.

THE HARRIER STATION comments that it is surprising that the light ac was not detected and TI passed, given its distance from Cottesmore radar; local procedures will be reviewed to see if anything can be improved.

UKAB Note (2): The radar recording shows that the incident occurred at 1158:38. The RT transcript shows that the Harrier pilot requested at 1157:11 "*Departures [C/S] do you have any recovering traffic"* to which they replied *"negative"* and the Harrier went "*en route"* at 1157:16. As the ac departed the MATZ it descended briefly to FL002 (~500agl) before climbing and passing through FL018 (2100ft agl/amsl) at the time of the incident.

HQ STC comments that it would seem that the Harrier changed frequency before Cottesmore ATC could reasonably have provided information on the C210. Subsequently, and perhaps concentrating on joining the range, the Harrier pilot spotted the other ac late and with insufficient time to carry out any avoiding action. Military pilots should be aware that 2000ft is a commonly used alt by GA ac, ironically in this issuance, in an attempt to avoid the height band normally used by fast jets.

AIRPROX REPORT No 143/05

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 Harrier operating authorities.

The Board noted that both ac had been operating legitimately in Class G airspace: therefore collision avoidance was based on the see and avoid principle. In this case the Harrier had the other ac on its right and should have given way to it (Rule 17 2 b of the Rules of the Air). However, this principle only works if the pilot sees the other ac which although in this case he did, his sighting was so late that he was unable to initiate any effective avoiding action. This may have been because he was engaged on range-joining procedures and RT calls: nonetheless, particularly in single pilot ac, it is most important not to allow other seemingly more important tasks to degrade lookout. Although the C210 pilot had seen the Harrier before its pilot saw the C210 and he had initiated an apparently effective hard left avoiding turn, Members considered that this action had been later than desirable and, bearing in mind the rate of closure between the ac of about 1nm every 8sec, the miss distance (recorded at 0.1nm) had not been sufficient to ensure positively the safety of the ac.

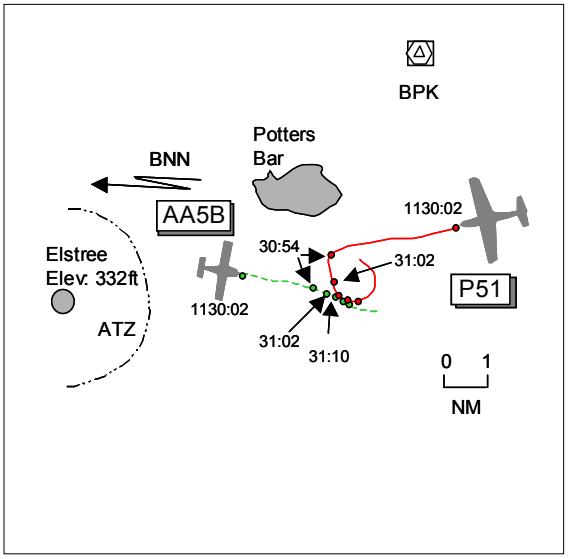
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sightings by both pilots.

Degree of Risk: B.

AIRPROX REPORT NO 143/05

Date/Time:	6 Aug 1131 (Saturday)	
Position:	5140N 00009W (6nm E Elstree - elev 332ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	AA5B	P51 Mustang
Operator:	Civ Club	Civ Pte
Alt/FL:	2300ft (QNH)	2300ft (QNH)
Weather	VMC CLBC	VMC CLOC
Visibility:	>10km	>10km
Reported Separation:	10ft V/70m H	not seen
Recorded Separation:	<0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AA5B PILOT reports heading 090° at 103kt and 2300ft QNH after departing from Elstree to Southend VFR and in communication with Elstree RADIO on 122·4MHz squawking, he thought, 7000 with Mode C. The visibility was >10km 400ft below cloud in VMC and the ac was coloured white/blue with strobe lights switched on. Tracking towards Stapleford about 7nm E of Elstree a passenger seated behind him alerted him to an ac to port banking L towards them moving unusually fast. He tried to visually acquire the other ac, told his passenger that he could not see it at which point she said, in a far more anxious tone *"it's heading straight towards us"*. He was reluctant to take avoiding action as he still couldn't see it so he asked her to point at the ac so that he could get a 'clock code' indication as to its position. As her L hand came over his shoulder she shouted *"go down, go down or something"* at which point he felt compelled to take action whether or not he could see it owing to her distressed voice. He

immediately dived his ac steeply with a slight R 10-15° bank at which time he saw the other ac, a P51 Mustang, which looked diabolically close, about 150m away heading towards him and then in a steep climbing L turn, as if it was avoiding his ac, although this may have been an optical illusion owing to his adopted attitude. He estimated it passed about 70m to his L and 10ft above, seeming to be where his ac had been 1-2sec earlier. The whole incident from the first sighting by his passenger to him initiating a steep dive was about 10sec. He assessed the risk of collision as imminent.

THE P51 MUSTANG PILOT reports he sighted several ac during his sortie, none of which he considered constituted a risk of collision. He did provide details of his flight which was a local sortie from North Weald VFR routeing W'bound to BNN at 2300ft QNH and 200kt then NW bound to the Westcott area before returning. He was squawking, he thought, 7000 with NMC. The purpose of the flight was for general handling and display practice in preparation for a display the next day. He was very familiar with the area as he has operated from Elstree for 25 years and was aware of how busy/congested the airspace can be on a fine Saturday afternoon and of the need to maintain a good lookout at all times. Once airborne from North Weald he established contact with Elstree Information to establish if there was any known traffic as his intention was to pass N of the ATZ whilst maintaining a 'listening watch'. No mention was made by the Elstree AFISO of the subject AA5B whose pilot had subsequently filed an Airprox against his ac 7nm E of Elstree.

UKAB Note (1): Analysis of the Heathrow 23 and 10cm radars shows the Airprox occurring at 1131:10 6nm E of Elstree. Although both pilots report squawking, neither ac show squawks at the time of the incident but the tracks followed by both radar returns match those reported by both pilots and correlate to known departure times from their respective airfields. At 1130:02 a primary only return is seen, believed to be the AA5B, 4nm E of Elstree tracking 095° with another primary only return, the P51 Mustang, in its 11 o'clock range 5nm tracking 265°. Both ac continue on steady tracks until 1130:54 when the P51 is seen to enter a L turn towards the AA5B from its 9 o'clock position range 0·9nm. The P51 tracks SSE for 8sec before entering a LH orbit 2·5nm SE of Potters Bar, both ac separated by 0·25nm. The CPA occurs 4sec later at 1131:10 as the P51 passes <0·1nm NE abeam the AA5B which is seen to turn slightly R, as described by its pilot. Thereafter the P51 rapidly draws away from the AA5B laterally to the N, eventually rolling out towards Elstree as the AA5B resumes its E'ly track towards Southend.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members were clear that the crux of this Airprox was a sighting issue, with both pilots flying VFR in good VMC in Class G. Each had the opportunity to see one another as they converged from each other's forward L quarters, initially flying on tracks to pass port to port without incident. However, the P51 is then seen on radar to turn L towards the AA5B, into the area that the P51 pilot would be expected to clear visually prior to executing the turn. This turn is continued and seen to describe an orbit on radar during which the AA5B would have been unsighted to the P51 pilot as he flew 'belly-up' to it. From the AA5B pilot's viewpoint, the P51 had approached from about his 9 o'clock position unsighted but visible to a passenger seated in the L rear of the ac. Members commended the CRM exhibited when the AA5B pilot heeded the passenger's advice by executing a steep dive and a R turn, this action taken before he saw the P51 some 150m away to his L and heading towards him. The AA5B pilot commented that the Mustang pilot may have been taking avoiding action: this had not been the case and Members agreed that there had been a great deal of luck during this encounter. It was purely fortuitous that the P51 had turned away and the manoeuvre executed by the AA5B pilot, which turned out to be avoiding action, had been taken prior to the pilot seeing the conflicting ac without reference at all to their relative flight paths. This left the Board in no doubt that the outcome had been mainly down to luck and that an actual risk of collision had existed during the encounter.

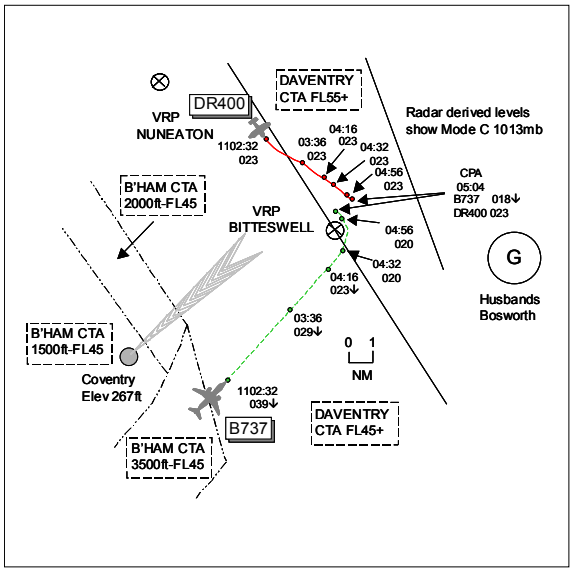
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the P51 pilot and an effective non-sighting by the AA5B pilot.

Degree of Risk: A.

AIRPROX REPORT NO 145/05

Date/Time:	18 Aug 1105	
Position:	5228N 00114W (10nm NE Coventry - elev 267ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737	Robin DR400
Operator:	CAT	Civ Pte
Alt/FL:	2000ft (QNH 1014mb)	2400ft (QNH 1014mb)
Weather	VMC HAZE	VMC CLBC
Visibility:	3500m	>8km
Reported Separation:	300ft V/<1nm H	c0·8-1.5nm H
Recorded Separation:	500ft V/0·9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying inbound to Coventry at 180kt after handover from Birmingham Approach to Coventry Approach. They were receiving radar vectors under a RAS to the ILS RW23 at Coventry squawking an assigned code with Mode C. The Captain was undergoing line training under the supervision of a Training Captain. On downwind heading of 055° descending to 2000ft QNH under radar control, he could see a single TCAS 'other traffic' symbol showing the same relative altitude. The other ac appeared to be positioned 10nm on the extended C/L for RW23 about 12nm ahead. The controller advised that he had this traffic on radar and that it was not under his control. He, the Captain, initially requested that they maintain their downwind heading as this appeared to provide the best separation looking at the TCAS presentation but was advised by the controller that, according to their respective radar tracks, this would place them in direct conflict with this traffic. They were offered a 'hard' (the phrase used) L turn onto base leg, which was commenced immediately in HDG SEL with the A/P in CMD as they were in fairly poor VMC – the inflight visibility was about 3500m. Level at 2000ft QNH on the base leg heading of 320° they received a brief TCAS *'Traffic'* immediately followed by an RA *'Descend, Descend, Descend*'. The PF disengaged the A/P and followed the TCAS command. '*Clear of conflict'* was received at 1600ft QNH: fortunately they had ground contact. Coventry Approach were advised of their TCAS descent. Visual contact was not made with the intruder at anytime; the TCAS RA symbol indicated close proximity (less than a mile) in their 2 o'clock +300ft. He assessed the risk as high.

THE ROBIN DR400 PILOT reports flying en route VFR from Hawarden to Belgium heading 128° at 104kt. After leaving Hawarden Approach Control he immediately contacted London Information, he thought, on 124·75MHz to whom an initial position report was given as well as informing them of his flight intentions. He confirmed a FIS was being provided and that his next reporting point would be Sywell with an estimate of 1116UTC. An intermediate position report was given N of Stafford, with a cruising altitude of 2400ft on the QNH 1014mb. After passing N of Nuneaton VRP, and moments before the notified Airprox, he was looking to his LHS to identify Husbands Bosworth airfield where an international glider competition was taking place. The gliders were still on the ground and the towing had not yet started. Looking forward again approaching Bitteswell he saw the B737 in his 2 o'clock position in a LH turn towards Coventry with a medium bank and slightly above his position and descending. His estimation of the minimum separation was approximately 0·8-1·5nm. Avoiding action was not necessary because the B737 was already clear of his flight path. The B737 must have approached from the direction of the sun; visibility in that direction was limited. He did not contact London to notify them of a possible Airprox as he regarded the risk of actual collision as being low. For primary navigation, he was using a commercially available VFR/GPS 1/500000 Chart and a GPS with moving map as backup. He had remained clear of Coventry by 10nm and complied with all information/instructions given to him by London Information but no advice was given to him regarding any traffic conflicts at any time.

THE COVENTRY APR reports that the B737 was being vectored for an ILS to RW23. When downwind he passed TI on unknown conflicting traffic 6nm to its N and asked the crew if they could accept an early turn to intercept the LLZ. This was declined and the crew asked to continue downwind. He believed that the B737 would have continued to converge with the conflicting traffic so he instructed the flight to make a hard L turn onto 320°. The crew took the turn and subsequently received a TCAS RA as the ac passed 1nm apart.

The Coventry METAR at 1050Z shows EGBE CALM 5000 NIL FEW050 24/13 Q1014=

ATSI reports that the B737 was being vectored downwind LH for RW23 by the Coventry APR. At 1102:30, as it was descending to 2000ft SE of Coventry. The controller informed the pilot that as he was leaving CAS, the service was now a RAS. Subsequently, at 1103:38, the flight was given information about *"traffic left eleven o'clock range of four miles crossing left right no height information. If you're happy I'll turn you in early against that traffic"*. (Coventry ATC is not equipped with SSR.) The pilot replied *"yeah he's showing on TCAS er it's at three hundred below I think er I think we better maintain our heading for the time being"*. The radar recording shows the B737 passing 2900ft, on a conflicting track with a 7000 squawk, showing a Mode C of 2300ft, which is 6nm N of it. (The 7000 was, subsequently, established as the DR400.) The RT exchanges then continued*: "Okay I can er give you a left turn to go behind that if you wish"; "Yeah er is he under your control?"; "Negative he's unknown to me but his track is er crossing you left to right if you continue you'll er. you'll converge with that traffic"; "Okay we'll take a left turn now then"; "roger then make it a hard left turn onto er three two zero"; "Okay turning left heading er three two zero that's copied...".* By the time the "hard left turn" was issued (1104:16) the two flights were at the same altitude, now 3·8nm apart. The radar recordings reveal that as the B737 commenced the L turn (1104:32), the DR400 had turned slightly R towards it, 2·7nm away. As the B737 continued its L turn, it closed to 1nm and 300ft from the DR400 (1104:56) by which time the pilot reported *"I've just had an RA off that traffic"*.

[UKAB Note (1): The CPA occurs on the next radar sweep at 1105:04 as the B737 and DR400 pass starboard to starboard separated by 0·9nm, the DR400 steady at 2300ft Mode C whilst the B737 has commenced a descent indicating 1800ft Mode C, 500ft lower.]

The MATS Part 1, Section 1, Chapter 5, Paragraph 1.4, describes RAS as *'an air traffic radar service in which the controller shall provide advice necessary to maintain prescribed separation between aircraft participating in the advisory service, and in which he shall pass to the pilot the bearing, distance, and if known, level of conflicting non-participating traffic, together with advice on action necessary to resolve the confliction'*. Additionally, *'There is no legal requirement for a pilot flying outside controlled airspace to comply with instructions because of the advisory nature of the service. However, should a pilot choose not to comply with advisory avoiding action then he will become responsible for his own separation and any avoiding action that may subsequently prove necessary. Controllers shall pass avoiding action instructions to resolve a confliction with non-participating traffic and, wherever possible, shall seek to achieve separation which is not less than 5nm or 3000 feet, except when specified otherwise by the CAA. However, it is recognised that in the event of the sudden appearance of unknown traffic, and when unknown aircraft make unpredictable changes in flight path, it is not always possible to achieve these minima'.* On this occasion, the controller was not able to achieve the 5nm/3000ft criteria. The pilot initially decided not to take the advisory turn, thereby delaying the action necessary to resolve the confliction. By the time he agreed to take the turn, it was not possible to achieve the requisite 5nm horizontal separation. The controller said that he was limited in the action he could take as a R turn was not practicable because of a gliding competition taking place at Husbands Bosworth, with many radar returns showing in the area. Additionally, the radar recording shows 2 ac manoeuvring approximately 6nm to the R of the B737 as the L turn was offered. It was later discovered that the DR400 contacted London Information at 1110, i.e. after the Airprox had occurred, but made no mention of 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 authorities.

The Coventry APR had noticed the DR400 on radar and, with the separation at 6nm, he had passed TI to the B737 crew and offered an early turn in (towards the LLZ) against the traffic. This was declined by the B737 crew who had seen the DR400 on their TCAS display and had thought that they would be better placed remaining on their present heading whilst continuing their descent to 2000ft. Pilot Members opined that making a decision in the horizontal plane based on TCAS display information was inappropriate owing to its known inaccuracies: the

equipment is designed for conflict resolution only in the vertical plane. This azimuth information had led the B737 crew astray and after a further prompt from the APR on the converging DR400, they elected to take the 'hard L turn'. It was noted that this was executed with the A/P engaged which would have increased the turn radius owing to the ac's flight performance with A/P engaged. However, ATCO Members thought the APR should have been trying to achieve 5nm separation from the outset when providing a RAS, so that the first transmission to the B737 flight when TI was actually given, should have been 'avoiding action', as opposed to 'an early turn in' and when this was declined the service should have been downgraded to RIS with further TI. The APR would have been used to these traffic scenarios, operating in the FIR without the benefit of CAS, but he did not turn the B737 early to avoid the DR400 nor did he stop its descent after the B737 crew reported the other traffic about 300ft below (recorded radar showed 600ft difference). One reason mooted was that the APR was looking at the situation in plan view with primary-only returns whereas the B737 crew had the benefit of vertical information from the DR400's Mode C. One Member thought that the offer of an early turn in by the APR may have been the controller's idea of avoiding action but this was apparently not clear from his report. Although the APR's options were limited, owing to other ac in the area, the L turn instruction issued towards final approach given to the B737 flight had brought it into conflict with the DR400 and this had caused the Airprox.

The L turn followed by the B737 crew had commenced as the ac levelled at 2000ft when it was already 300ft below the DR400. Undoubtedly the B737 crew were concerned when TCAS triggered first a brief TA alert then an RA 'descend' with the other ac only being 'seen' on the TCAS display passing down their RHS 300ft above within 1nm as they manoeuvred in accordance with the RA command. However, although the reported reduced visibility could have prevented earlier visual acquisition of the B737 by the DR400 pilot, it was seen in his 2 o'clock position slightly above in a descending turn and he watched it pass about 0·8-1·5nm clear to his R. The recorded radar had shown the TCAS descent having commenced just before the CPA when the B737 passed 500ft below and 0·9nm clear of the DR400. Taking all of these elements into account, the Board were persuaded that safety had not been compromised during this encounter.

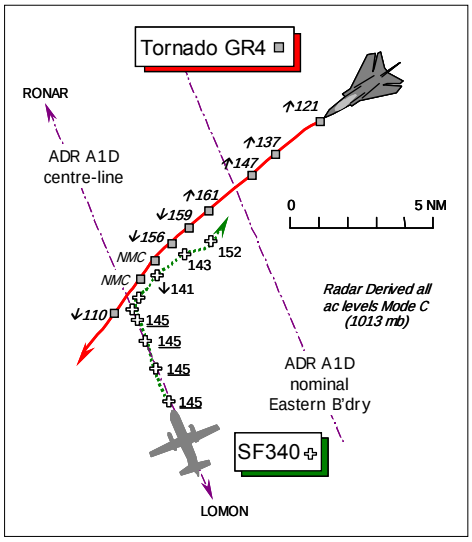
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Coventry APR vectored the B737 into conflict with the DR400.

Degree of Risk: C.

AIRPROX REPORT NO 146/05

Date/Time:	19 Aug 1335	
Position:	5623N 00448W (21nm NNW LOMON)	
Airspace:	ADR A1D	(Class: F)
	Reporting Ac	*Reported Ac*
Type:	Saab 340	Tornado
Operator:	CAT	HQ STC
Alt/FL:	FL145	NR
	(SAS)	NR
Weather	VMC CLBL	VMC CLOC
Visibility:	>75km	30nm
Reported Separation:		
	50ft V/20m H	100ft V/¼nm H
Recorded Separation:		
	½nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340 PILOT provided a very comprehensive account reporting that his ac has a white livery and the HISLs were on whilst routeing A1D from Glasgow to Stornoway under IFR at 275kt, in receipt of a RAS from ScACC on 127·27MHz and squawking the assigned code of A5471 with Mode C: TCAS is fitted. Flying in a level cruise at FL145 some 35nm from Glasgow in VMC some 7000ft above and 3-4nm clear of cloud with an in flight visibility >75km, Scottish informed them of unidentified traffic at 2 o'clock - 20nm. Shortly after that Scottish advised that the traffic was still at 2 o'clock but the range had decreased to 10nm. They tried to acquire the reported traffic visually but believed it was behind a large cumulus cloud build up. Less than 20sec later there was another call telling them that the traffic was at 2 o'clock the range now 6nm and the controller advised that if they were not visual with the traffic to turn immediately onto a radar heading of 090°. Neither crewMember could see the other ac so the turn was executed in HDG mode using autopilot with 25° AoB. During the turn TCAS enunciated 'TRAFFIC, TRAFFIC' and the traffic symbol on TCAS turned yellow indicating that it was 1600ft above them [+16] but descending, after this warning the symbol returned to a blue diamond but still indicating +16 'TRAFFIC, TRAFFIC' was sounded again this time showing the traffic symbol in yellow at 1300ft above them [+13]. The pilot-in-command visually acquired the traffic - a Tornado with swept wings - above a CB in a descending L turn towards their Saab 340 some 3-4nm away. The 1st Officer became visual shortly afterwards whereupon an RA was enunciated immediately commanding 'DESCEND DESCEND'. The 1st Officer PF disengaged the autopilot and initiated a descent in accordance with SOPs, maintaining the turn onto 090°, whilst the PNF maintained visual contact with the other ac, which maintained constant relative bearing. Using visual information only the pilot-in-command increased the angle of bank and rate of descent as in the pilot-in-command's opinion the TCAS RoD was insufficient to avoid an impact/collision. TCAS then enunciated 'MONITOR VERTICAL SPEED' which seemed strange as the threat was approaching its most severe stage, just before TCAS then commanded 'CLIMB, CLIMB' which the 1st Officer PF followed as the Tornado ac passed under their Saab's port wing – "within or just outside the dimensions of the wing" - some 50ft below them in a descending turn/roll – the exact attitude was not clear as the jet was very fast and his Saab 340 was in an unusual attitude itself, but he stressed that only the port side and top of the Tornado jet was seen. The 1st Officer re-established straight and level flight at FL154 and then initiated a descent to their assigned level of FL145 as cleared. SCOTTISH asked for the Tornado's level before clearing them direct to the STN. When questioned if the Saab 340 crew would be reporting an Airprox he affirmed that he would be filing.

THE TORNADO GR4 PILOT reports his ac has a grey camouflage scheme but the HISLs were on whilst flying independently and not in receipt of an ATS. A squawk of A7001 with Mode C was selected but neither TCAS nor any other form of CWS is fitted. Approaching a position 20nm NE of Oban heading 250° at 400kt they were crossing advisory route (ADR) A1D level at FL160 he thought, in VMC some 5000ft clear of cloud with an in flight visibility of 30nm. As they crossed through the ADR "centreline", he set the RPS and initiated a shallow descent to LL. The small twinjet was first seen directly ahead in the HUD at a range of 4nm so to avoid it he turned R and

descended. The minimum horizontal separation was ¼nm with 100ft vertical separation and a *"moderate/low"* risk of collision. He attributed his late sighting to concentrating on looking L and R for ADR traffic because the Saab was stationery in his HUD on a 180° reciprocal heading. He stressed that he had time to turn to the R and increase his RoD to pass port - port about ¼nm away.

THE ScACC WEST COAST COMBINED TACTICAL & PLANNER CONTROLLER reports that the Saab 340 was en route from Glasgow to Stornoway on ADR A1D level at FL145 in receipt of a RAS. About 25nm NW of GOW traffic information was passed on a fast moving contact displaying an A7001 squawk at 2 o'clock - 17nm crossing from R to L descending through FL120 which looked to be passing in front of the Saab 340. The controller advised the Saab crew that he would pass further information if the conflicting ac climbed. When the conflicting ac reached about 8nm from the Saab 340 a climb was noted and further information was passed. The conflicting ac continued to climb through FL140 and was now pointing directly at the Saab 340 so the controller called further traffic and advised the crew that if the other traffic was not sighted to turn immediately onto a heading of 090°. The Saab 340 crew complied with this instruction and further traffic information was passed at about 3nm range by which time the conflicting ac had climbed up to FL160. However, the Controller lost the Mode C readout on the conflicting ac as the radar blips merged, but reappeared when the jet was to the W of the Saab 340 displaying FL120. The pilot reported that had seen a Tornado pass 50ft under his wing, approximately ¼nm away. When the conflicting ac was clear he instructed the Saab crew to resume their own navigation to STN/Stornoway.

THE TORNADO GR4 PILOT'S STATION comments that this once again highlights the issues with respect to Advisory Routes. Flying across an ADR at the correct quadrantal does not ensure deconfliction, neither does the sharpest set of eyes – although both may help. There are 2 aspects to this issue; the simplest solution on the military side remains a call to an ATC unit to ensure that the area is traffic-free, a fact that is well known to all FJ crews. This crew was busy, both radios were in use for task-related matters and they did their best to mitigate the risk but the risk was still present. It would be unwise to mandate a radio call for military ac prior to crossing an ADR, current traffic densities do not appear to warrant this, but this occurrence will serve to remind FJ crews of the increased risk that is attached to the decision not to make that call. Both parties (military and civilian) have an equal part to play in ensuring safe separation in this area.

ATSI reports that the SF34 was enroute from Glasgow to Stornoway on ADR A1D in Class F airspace, level at FL145, the correct quadrantal and in receipt of a RAS from the ScACC WEST COAST Sector. Traffic levels were described as light. At 1334 the flight was passed traffic information about fast moving traffic at 2 o'clock - 17nm, passing R to L at FL120 descending. Later the traffic information was updated, 2 o'clock - 8nm, now climbing and passing through FL137. This time the controller added *"if not sighted turn right immediately…on to heading of 090 degrees"*. The term 'avoiding action' was not used. STCA activated seconds later. In less than 30sec, further traffic information was issued, 3nm NE - FL156, whereupon the SF34 pilot reported visual with a Tornado passing down his left-hand side. The radar recording of the event suggests that, after the avoidance turn was issued to the SF34, the Tornado made about a 15° turn to the L, thereby reducing the horizontal distance between the two flights.

MATS Part 1, Section 1,Chapter 5, Page 3, states under the heading 'Radar Advisory Service' that:

"Controllers shall pass avoiding action instructions to resolve a confliction with non-participating traffic and, wherever possible, shall seek to achieve separation which is not less than 5nm or 3000 feet, except when specified otherwise by the CAA. However, it is recognised that in the event of the sudden appearance of unknown traffic, and when unknown aircraft make unpredictable changes in flight path, it is not always possible to achieve these minima. Controllers shall continue to provide information on conflicting traffic until the confliction is resolved".

UKAB Note (1): The poor quality of the ScATCC (Mil) radar recording did not allow the geometry of this encounter to be analysed with confidence. Moreover, no time is visible on the recording provided. The SF340 is shown northbound on course along A1D level at FL145. The Tornado GR4 is shown climbing through FL121 some 11½nm away before 'topping out at about FL161 and reversing into a descent as the jet approaches the ADR centreline in Class F airspace. Meanwhile, the SF340 executes a R turn as reported, but broadly NE it would appear, whereupon a descent through FL141 is apparent as the jet also descends below FL156 and passes about ½ nm port-port abeam the airliner. NMC is shown at this point but in all probability it is as the Tornado descends through the level of the SF340, whose descent is then reversed and is shown passing FL143 and then, it seems, to FL152 as the jet clears to the SW.

HQ STC comments that whilst agreeing with the sentiments expressed by the Stn, the Tornado was, again, close enough to the other ac to cause concern to the crew and to TCAS. Although not that early a spot by the GR4 crew, we believe they had time to avoid the Saab by a greater margin than they did.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A longstanding civilian controller Member cited an Airprox previously assessed by the Board which involved a Tornado ac in the vicinity of Scottish ADRs and also another Airprox (121/05), filed under similar circumstances. The Member reminded the Board of Airprox 235/2002, which involved a formation of 3 Tornado F3s. Following its assessment and as recorded in the Post meeting Note to Airprox 235/2002, the UKAB was advised that 1 Gp staff will ask the squadrons to be '…*more respectful of the ADR structure'.* In the civilian controller Member's view the GR4 crew involved in this latest incident had shown little respect for the widely promulgated ADR, the track of which had been assiduously followed by the SF340 crew. Moreover, whilst noting the Station's comments about a radio call to ATC prior to crossing an ADR, the Member opined that if such a call had been made it might potentially have alerted the SC to the GR4 crew's intentions.

The GR4 pilot reported that just before the Airprox occurred he was heading 250° at 400kt crossing the advisory route level at FL160. However, this was not quite accurate and his recollection of the event was slightly at variance with the recorded data. Despite the poor quality of the radar recording, it was evident that the GR4 was not in level cruise at a quadrantal level when it crossed through the ADR and the Station's view was incorrect in this aspect as the jet had climbed above the SF340 to FL161 and then descended once again. The civilian controller Member stressed that when confronted with unpredictable manoeuvres such as occurred here it was very difficult to offer sound avoiding action advice to crews in receipt of a RAS. The STC fast-jet Member contended that the GR4 crew could well have climbed back up to FL161 to maintain VMC above cloud. However, robust manoeuvres through, or in the vicinity of ADRs was not wise where there was clearly increased potential for encounters with commercial ac as illustrated by this Airprox.

The ATSI Advisor pointed out that the GR4 crew had done little to comply with the sage advice promulgated by the Command about Scottish advisory routes. Broadly paraphrased, the STC Flight Safety poster issued to flying units on 10 Dec 2004 entreats military crews in the interest of good airmanship to get at a minimum a RIS but if unable to obtain a radar service; to avoid operating (or planning to operate) in and around ADRs; to cross ADRs at a quadrantal flight level at right angles and not to conduct TOO (targets of opportunity) training against ac routeing on the ADRs. Clearly there was no suggestion whatsoever that the GR4 crew was conducting TOO training as they were merely proceeding about their sortie SW'bound through Class F airspace which they are legitimately entitled to do. Nevertheless, the advice from the poster, if heeded, could lead to a safer environment for all concerned, the Command suggested. This was not meant to inhibit the freedom of aircrews to conduct their sorties. In a further attempt to improve awareness, the Board was briefed by the NATS Advisor that a video was in preparation, jointly with ScATCC (Mil), in an effort to explain the difficulties that controllers are confronted with when trying to provide a radar service to IFR traffic. The STC Member hoped that this would engender wider understanding and the Board was encouraged by this development.

Here the W COAST SC had identified the confliction and passed traffic information initially at a range of 17nm when he saw the unknown GR4 jet was descending through FL120 and below the level of the SF340 which was maintaining a level cruise at the correct quadrantal of FL145. However, as the range decreased the unknown jet's Mode C was indicating a climb so when the GR4 had closed to 8nm the controller issued traffic information advice to the SF340 crew to turn R onto E to avoid it before either STCA or TCAS was triggered. Members noted that the subsequent climb up to FL161 by the GR4 and then the immediate descent through the SF340's level of FL145 and through the ADR centreline to below FL110 was entirely unpredictable and placed the controller in somewhat of a dilemma. A military controller Member thought that the avoiding action turn was issued too late to be effective, whilst seeking to achieve the requisite 5nm horizontal separation. However, it was pointed out by another controller Member that the W COAST SC could have been endeavouring to establish vertical separation on the GR4's observed Mode C level, as it was first seen descending below the SF340, but was subsequently caught out when it reversed into a climb. Whilst the Board understood entirely that the GR4 crew was reasonably entitled to transit Class F airspace VFR, maintaining appropriate safe separation from other observed traffic, the

unpredictable nature of the flight had undoubtedly caused the SF340 crew and the W COAST SC some difficulties. Although the SF340 crew had complied promptly with the avoiding action R turn it was not clear from the scale of the radar recording if they ever steadied on the advised heading of 090° as the pilot had reported they were maintaining the turn. It appeared not, but this might have been as a result of the SF340 crew's compliance with the TCAS RA just after the PNF spotted the GR4 and a desire to maintain visual contact with the jet, but it was clear that the SF340 crew was being kept very busy during this short period. Within the SF340 crew's cockpit, in addition to the traffic information and avoiding action advice proffered by the W COAST SC, TCAS was dependably keeping watch over the airspace, had detected the presence of the GR4 and had also alerted the crew with a TA. It was apparent that the SF340 would not be able to out-manoeuvre the nimble Tornado when TCAS commanded a DESCEND RA, which was just after the SF340 PNF spotted the GR4 3-4nm away above a CB in a descending L turn and assessed himself that the demanded RoD was insufficient to resolve the conflict. The radar recording had shown that by the time the SF340 had turned NE'ly the airliner was descending through FL141 with the Tornado descending less than 1500ft above them on a broadly reciprocal track displacement. Whilst some Members thought that the SF340 pilot's estimate of the visual acquisition range might have been over optimistic if the GR4 was seen above a CB, it lent credence to the STC Members assertion that the crew were avoiding cloud. The GR4 pilot said the SF340 was first seen directly ahead in the HUD at a range of 4nm so to avoid it he turned R and descended. It was observed that the TCAS RA would have been completely ineffective against the jet's descent profile and some Members suggested that the GR4 pilot might have actually spotted the SF340 a little closer than he originally estimated as the radar recording did not replicate any R turn by the jet and indeed Members noted that a L turn toward was more discernable just as they passed abeam each other port - port. Furthermore, the GR4 pilot had frankly reported that despite his cautionary scan L and R prior to crossing the ADR, he had spotted the SF340 somewhat late. Weighing up all these factors, in the opinion of the pilot Members whilst the GR4 crew was rightfully entitled to operate through this ADR, if they had not climbed and then descended through it inappropriately and instead maintained level flight at an appropriate quadrantal level then at least quadrantal separation would have resulted and this Airprox might have been avoided. This, coupled with the reported late sighting by the GR4 crew was fundamental to the cause of this Airprox. Consequently the Board agreed, unanimously, that this Airprox had resulted because the Tornado GR4 crew had crossed the ADR inappropriately and following a late sighting, flew into conflict with the SAAB.

Turning to the risk inherent within this encounter, a very experienced CAT pilot suggested that as the Tornado was not equipped with TCAS, any RA generated by its presence as a 'threat' to the TCAS equipped SF340 might potentially be less effective as TCAS was unable to 'co-ordinate' its actions. Whilst TCAS was still entirely capable of resolving such 'un co-ordinated' conflictions within its designed parameters there was probably more potential for RA 'reversals' such as the SF340 pilot describes here. The reported sequence involved a TA followed by a 'DESCEND' RA, which was modified, to 'MONITOR VERTICAL SPEED', and then a reversal into a 'CLIMB' RA. Here it seemed that the GR4 manoeuvred vertically in such a manner that it thwarted the effectiveness of the issued RA causing TCAS to then modify the RA and then reverse the sense of the initial advisory and enunciate a CLIMB RA. CAT pilot Members thought this a good example of the TCAS RA being negated by the performance of the jet. The lack of displayed Mode C on the radar recording from the GR4 did not allow the minimum vertical separation at the point of minimum horizontal separation to be determined with any accuracy, but it was clear that the GR4 had descended through the SF340's level as it passed. Even the robust avoiding action manoeuvres demanded by TCAS were, in the reporting pilot's view, insufficient causing him to increase the angle of bank and rate of descent Members noted. The SF340 pilot's estimate of 20m was significantly closer than that replicated by the radar recording, which suggested that the horizontal separation was actually more than the GR4 pilot's estimate of ¼nm as the radar showed they passed about ½nm apart. In the Board's view both crew's had spotted each other's ac at less than ideal ranges but from the SF340 pilot's perspective he had the benefit of a radar service, displayed data from TCAS as the jet closed on a constant relative bearing and therefore greater warning of the nimble jets approach. Perhaps the reciprocal tracks and relatively small cross-sectional area of the SF340 approaching at a constant relative bearing at a head-on aspect with no crossing motion to draw attention to it in the HUD also hindered the GR4 pilot's visual acquisition, relying entirely as he was on 'see and avoid'. Whilst the eventual sighting and combined evasive manoeuvres at close quarters had removed the actual risk of a collision, taking all these factors into account, the Board agreed that the safety of the ac involved here had indeed been compromised.

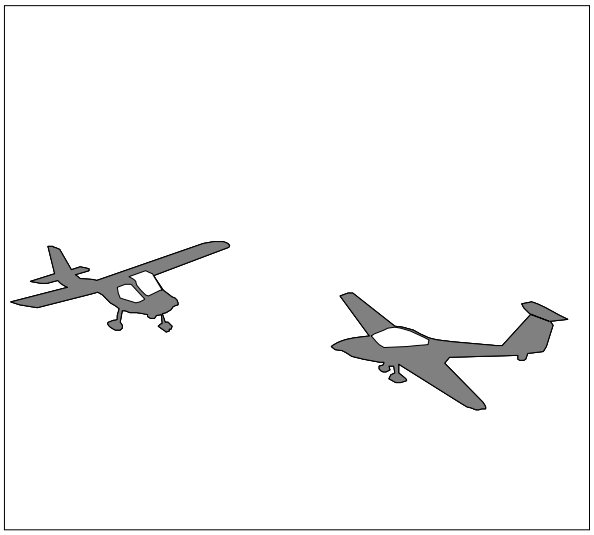
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado GR4 crew crossed the ADR inappropriately and following a late sighting flew into conflict with the SAAB.

Degree of Risk: B.

AIRPROX REPORT NO 147/05

Date/Time:	21 Aug 1506 (Sunday)	
Position:	5152N 00145W (2.5nm W Little Rissington - elev 730ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Vigilant Motor Glider	CT2K
Operator:	HQ PTC	Civ Club
Alt/FL:	2000ft (QFE)	2650ft (RPS)
Weather	VMC CLOC	VMC
Visibility:	>40km	10km
Reported Separation:	70-100ft V/0ft H	Not seen
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT PILOT reports flying a white ac with dayglo stripes on the wings with landing light, HISLs and nav lights selected 'on' on a local training sortie from Little Rissington. He was squawking 7000 but no Mode C was fitted and he was listening out on the local ops frequency. He was heading 150° at 60kt just to the W of the airfield in an area where he had experienced extensive conventional glider and light ac activity throughout the sortie. He had just seen a conventional glider descending and passing behind their ac towards the airfield and he executed a LH turn through 90° to keep it in sight. They saw the glider descending into the home airfield downwind leg so he made a radio call to alert the duty instructor to the incursion. On completion of the radio call he noticed a white 3 axis microlight heading on a collision course towards them, approximately 70-100ft above. He took control from the trainee and pitched the ac down and then flew a RH turn to keep the microlight in sight; no avoiding action was seen from the microlight. The registration underwing was observed as the ac flew over their position. He assessed the risk of collision as high until he manoeuvred his ac and thought that he had been distracted by the other glider and may have unwittingly reduced his scan while concentrating on it.

THE CT2K PILOT reports heading 095° at 100kt on track Northleach/Charlbury having altered course to the right to remain well clear of Little Rissington. He saw ac on the ground at Little Rissington and saw and avoided at least 30 gliders in the area of Northleach but he did not see the traffic that filed the Airprox. Since the CT2K flies nose high in the cruise, he did from time to time lower the nose and search for traffic; however he did not see the Grob 109. Given the intensity of the traffic he tried to keep a good look out throughout.

UKAB Note (1): A contact squawking 7000 NMC, presumed to be the Vigilant, is seen on the recording of the Clee Hill radar manoeuvring in the area at the time that the incident was reported to have occurred. A primary contact pops up for 1 sweep at 1505:43, very close to the Vigilant. There was however not enough information to d

UKAB Note (2): The CT2K pilot was in receipt of a FIS from Brize Norton but was not squawking and was not identified by them. The recording of the RT shows that he was advised of activity in the area of Little Rissington and advised that he would remain clear.

HQ AIR CADETS comments that this was an open and honest report by the Vigilant Motor Glider pilot, showing how easy it is to become distracted by one ac at the expense of looking out for other hazards. It was fortunate that the Microlight was seen and avoiding action taken by the Vigilant instructor, as it would appear that the pilot of the Microlight was unaware of his presence.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings, and reports from the Vigilant operating authority.

The Board noted that both ac had been operating legitimately in Class G airspace and therefore the pilots had an equal and shared responsibility to see and avoid each other. A glider specialist informed the Board that this area would be very congested, with perhaps up to 100 gliders on a summer Sunday when good conditions prevailed. The Board noted that since this incident had involved a motor glider as opposed to a sailplane, it had not benefited from any specific right of way under the Rules of the Air.

For whatever reason, perhaps that it was below the engine cowling, perhaps because of its colour, the CT2K pilot had not seen the Vigilant at any stage. However the vigilant Vigilant pilot saw the CT2K just in time to take late but nonetheless effective avoiding action as soon as he became aware of the approaching CT2K. The Board noted and commended the honest report by the Vigilant pilot: he may have been distracted, paying over-much attention to the glider which appeared to be getting too close to the glider operating site.

Due to the late pick-up of the CT2K, the non-sighting of the Vigilant and the resulting close pass distance, the Board considered that the safety of the ac had not been assured.

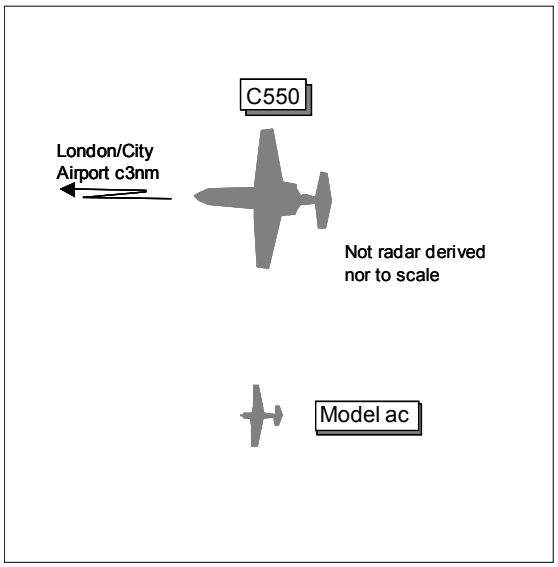
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the CT2K pilot and late sighting by the Vigilant pilot.

Degree of Risk: B.

AIRPROX REPORT NO 148/05

Date/Time:	21 Aug 1407 (Sunday)	
Position:	5130N 00008E (3nm E London City - elev 19ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	C550 Citation	Model ac
Operator:	Civ Comm	Civ Club
Alt/FL:	1500ft↓	
	(QNH)	(NK)
Weather	VMC CAVK	NK
Visibility:	>10km	
Reported Separation:		
	Nil V/70-100m H	NK
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C550 CITATION PILOT reports heading 280° at 118kt inbound to London/City and in receipt of an ATS from London/City Tower on 118·07MHz squawking an assigned code with Mode C. The visibility was >10km in CAVOK VMC and the ac was coloured white with all external lighting switched on. About 2nm final for RW28 whilst descending through 1500ft, he first saw a model ac 500m away which was carrying out various rapid manoeuvres. He continued his approach without taking avoiding action for although the model ac was manoeuvring, it maintained a position to the S of his flightpath. He estimated the model had a 3-4ft wingspan and that the CPA was 70-100m on his port side with nil vertical separation, assessing the risk as medium.

THE MODEL AC PILOT was contacted post incident and was reluctant to submit a report. During discussion with the UKAB Secretariat about the incident, he reported that he was carrying out general handling, not aeros, and said that the minimum separation distance was about 200m. A report form was sent - its return is still awaited.

THE LONDON/CITY ADC reports the pilot of the C550 reported a near miss with a model ac whilst flying on the approach to RW28 at 2·5nm from touchdown. At the time the ATM was u/s. The pilot initially reported the model was about 200m away whilst descending through 1600ft but subsequently advised that it was possibly less then 100m away and that he had flown through the level of the model which was actively manoeuvring and doing aerobatics. A police helicopter was operating locally and its pilot agreed to investigate. He was able to easily identify the launch site and after landing obtained the model ac operator's details.

THE MODEL FLYING CLUB COMMITTEE reports that a formal investigation into the incident took place. Following this, the Committee deliberated all of the facts and reports from several eyewitnesses and concluded that the member concerned had been aware of his actions, had contravened several club rules and his actions had brought the club into disrepute. The member was subsequently expelled from the club. A newsletter was published highlighting safety requirements, boundaries and height restrictions and a separate sheet was sent to all members informing them of the dangers of flying at excessive height. Club members are expected to abide by BMFA guidelines subject to any variations stipulated in the Club rules.

ATSI reports that RT recording reveals that the pilot of the C550 reported, at 1407, a 'near miss' with a model aeroplane at about 1600ft. He later went on to say that it passed 200m away and described it as a biplane with blue fuselage and yellow wings, not huge but about 3-4ft across.

UKAB Note (1): The radar recording does not show the Airprox. The C550 is seen established on the London/ City ILS and passing overhead the Model Flying Club site at 1407 descending through 1600ft QNH 1022mb but no other radar returns are seen in the area.

AIRPROX REPORT No 149/05

UKAB Note (2): The ANO Article 73 Endangering safety of an aircraft states *"A person shall not recklessly or negligently act in a manner likely to endanger an aircraft, or any person therein"*.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the C550 pilot, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities. The model ac operator had briefly spoken with the UKAB Secretariat but had not submitted a written report.

Members applauded the actions taken by the Model Flying Club Committee following this incident. It was clear that the operator had flown his model ac at excessive height and into conflict with the C550 which had caused the Airprox. Looking at risk, with only one viewpoint of the incident - that from the C550 cockpit - the crew were undoubtedly surprised to encounter a model ac at their level on final approach. They had visually acquired the model ac about 500m away, monitored its manoeuvring and had elected to continue their approach as the model ac was maintaining a position to the S of their flight path until it was seen passing clear on their LHS. This sighting was felt to be timely enough for the C550 crew to have taken any avoiding action, if necessary should the situation have deteriorated, and was enough to persuade the Board that safety had been assured during the encounter.

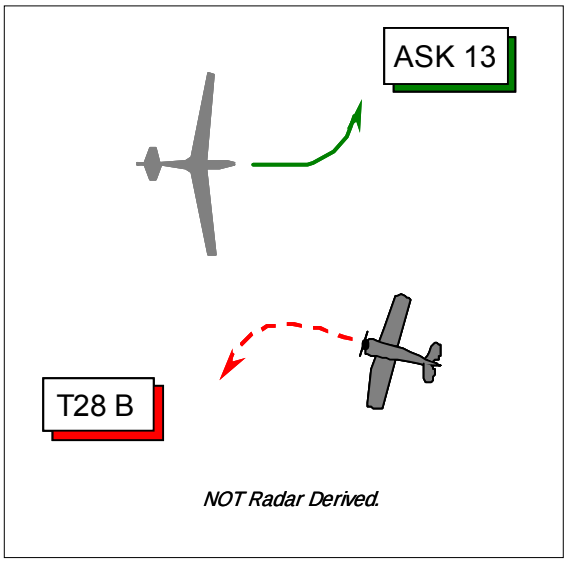
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The model ac operator flew his model at excessive height into conflict with the C550.

Degree of Risk: C.

AIRPROX REPORT NO 149/05

Date/Time:	7 Aug 1352 (Sunday)	
Position:	5141N 00210W (1½nm SW of Aston Down Glider Site - elev 600ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ASK 13 Glider	N American T28
Operator:	Civ Club	Civ Pte
Alt/FL:	1200ft (aal)	2000ft amsl
Weather	VMC CLBL	VMC CAVOK
Visibility:	50km	30nm
Reported Separation:	Nil V/250m H	200ft V/400ft H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 13 GLIDER PILOT reports his ac has a red fuselage and wingtips with white wings; a radio is not fitted. He had launched from Aston Down glider site and was inbound back to the site gliding straight and level at 1200ft above the Aston site, elevation 600ft amsl, toward HIGH KEY some 2500ft clear below some fair weather Cu, with the sun at 4 o'clock 'high'. Approaching a position 1½nm SW of Aston Down on a heading of 090° at 45kt, the other ac - an orange/dark olive camouflaged low-wing single engine WWII type [the T28] was first seen at a range of about 500m in his R 2 o'clock flying on "a collision course" from slightly below the horizon relative to his glider. After "about 1sec" it appeared that the T28 pilot had not seen his glider so he manoeuvred to make it more

conspicuous in the other pilot's view by banking steeply to the L and then immediately back again to check the T28's course. As he rolled back to 'wings level', the T28 was at 3 o'clock and its pilot was seen to take avoiding action by turning steeply to port, passing about 250m away at the same height. No further action was necessary on his part - the incident took only a few seconds and he was unable to get a better look at the ac. He opined that if he had not taken action then the T28 would have passed close behind his glider.

UKAB Note (1): The UK AIP at ENR 5-5-1-1, promulgates that Aston Down glider launching site is active during daylight hours for winch launches, which may attain a height of 3000ft above the site elevation of 600ft amsl, and aerotows.

THE NORTH AMERICAN T28B FENNEC (TROJAN) PILOT reports that his ac has a desert camouflage scheme but the HISLs were on. He had departed from Kemble with a passenger in CAVOK weather and was in communication with Kemble INFORMATION on 118·9MHz and squawking A7000 with Mode C. Heading 290° at 200kt, in a level cruise at an altitude of 2000ft about 2nm SW of Aston Down, there was a lot of glider activity on this Sunday afternoon when suddenly he saw a white glider with red markings in his 12 o'clock - slightly higher at 200ft above his T28 in a shallow L bank - but did not specify the acquisition range. To avoid the glider the T28 pilot banked sharply to the L and "pushed", achieving about 300ft below the glider, which passed some 400ft to starboard at the closest point.

Flying in very good VMC at the time, with a visibility of about 30nm, he opined the glider was very difficult to see in the bright sunlight. Although he said to his passenger "that was close", he assessed the risk as *"moderate",* adding *"he did not feel a collision was imminent"*.

UKAB Note (2): This Airprox was not shown on recorded radar.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available only included reports from the pilots of both ac.

Whilst the reporting ASK 13 glider pilot in this Airprox was actually on recovery back to Aston Down when he encountered the T28B, the Board's glider pilot Member was keen to emphasise that the detail contained in the UK AIP (UKAB Note (1) above) concerning Aston Down's winch launching parameters should not be taken as an indication that gliders could only be encountered below that height. Clearly aerotows could take place to any appropriate altitude – sometimes many thousands of feet above that of the winch launch - as dictated by the nature of the sortie and the prevailing weather conditions, a point worth emphasising here for the general edification of pilots who have little or no experience of gliding. Moreover, other Members added that the entry in the UK AIP and graphics on CAA VFR charts was to highlight the dangers inherent at winch launching glider sites – specifically that associated with the cable - and not that it was merely a glider operating area.

The Board recognised that the close proximity of the T28B pilot's base of Kemble to Aston Down glider site increased the potential for encounters with gliders significantly and it was apparent that this was a busy section of Class G airspace where see and avoid prevails. It was clear that this Airprox was fundamentally a sighting issue and it appeared that the ASK13 glider pilot had spotted the T28B some 500m away and before the latter's pilot had seen the glider. This was still a somewhat late spot by the glider pilot but his attempts at making his glider more conspicuous - by presenting the plan form to the other pilot - was eminently sensible and appears to have been successful. Whilst he had turned L away from the T28B for a short while, notwithstanding the provisions of the 'Rules of the Air', some Members wondered if it would have been preferable for the glider pilot to have maintained a divergent course for a little longer. This would have put more distance between his glider and the T28B whose course in the FIR would have been somewhat unpredictable. However, it was also clear that the glider pilot would not wish to encroach too far to the N at this height, towards the glider launch site itself. The glider pilot's manoeuvre probably drew the T28B pilot's attention to his ac as the latter himself reports that he spotted the glider in a shallow L bank and then turned and descended robustly to avoid it. Consequently, the Members concluded that this Airprox in the vicinity of the Aston Down glider launching site was the result of a late sighting by both pilots.

Turning to risk, the absence of any recorded radar data prevented any independent determination of the separation that pertained here. Nevertheless, it seemed to some Members that whilst the avoiding action taken was effective it was a bit too close for comfort. Conversely, other Members considered that the combined actions

of both pilots had effectively removed any risk of a collision. Taking note of the pilots' own assessments the Members were very evenly divided on this issue and so a vote was taken. By the very narrowest of margins it was finally concluded that this was a risk-bearing encounter and that the safety of the ac involved here had not been assured.

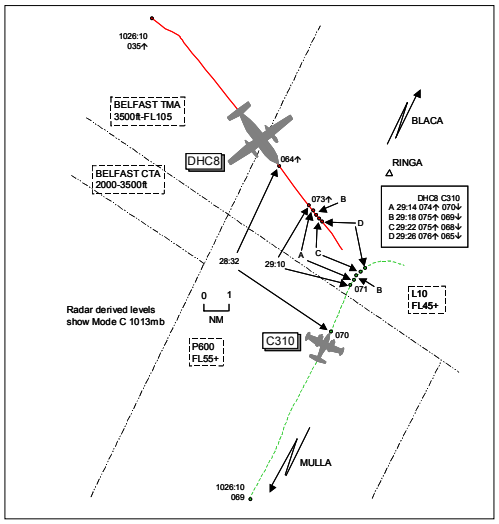
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by both pilots in the vicinity of a glider launching site.

Degree of Risk: B.

AIRPROX REPORT NO 150/05

Date/Time:	25 Aug 1029	
Position:	5421N 00538W (27nm SE Belfast)	
Airspace:	AWY L10/P600	(Class: D)
Reporter:	Belfast International APR	
	First Ac	*Second Ac*
Type:	C310	DHC8
Operator:	Civ Comm	CAT
Alt/FL:	FL70	↑
Weather	VMC	VMC
Visibility:		
Reported Separation:		
	Not seen	2nm H
Recorded Separation:		
	700ft V/2·65nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BELFAST INTERNATIONAL APR reports that as the DHC8 was climbing out from Belfast/City its track put it into conflict with the subject C310. As the DHC8 was passing FL65 he transferred the flight to ScOACC but a few seconds later realised that standard separation would be lost. He gave avoiding action to the C310 and after separation had been restored he cleared the C310 pilot to resume his own navigation.

THE SCACC ANTRIM SECTOR CONTROLLER reports working alone on the sector and the DHC8 was transferred to him on a standing agreement from Belfast International ('Aldergrove'). It was immediately apparent that this flight was in conflict with a C310 which had previously worked his sector before it was transferred to Belfast. The DHC8 crew reported passing through the level of the conflicting C310 and also stated that they had *"a traffic"* which he believed related to a TA on TCAS. He did not pass TI, as he thought the crew would be concentrating on any TCAS alert, but he did give further climb in order to expedite a resolution of the problem. The C310 was also observed to descend and turn, presumably following instructions from Aldergrove.

THE C310 PILOT reports en-route from Dublin to Prestwick at FL70 and in receipt of a RCS from Belfast/ Aldergrove squawking an assigned code with Mode C. He was not aware of being involved in an Airprox but did recall being told to turn and descend by ATC which he assumed was a 'regular' instruction.

THE DHC8 PILOT reports that from his perspective he did not assess the occurrence reportable under his company ASR scheme. He was aware of a manoeuvring light twin to the L of their ac which he estimated never got closer than 2nm. Briefly the other ac generated a 'proximate traffic' symbol on the TCAS display, as he noted turns as well as climbs/descents, but did not assess this ac as prejudicial to the safety of his ac.

ATSI reports that the Belfast International APR described his workload as light to moderate at the time of the Airprox and he had been in position as the combined APP/APR for about 25min. Another controller was available in the Approach Control room if it had been considered necessary to open another radar position.

The C310 was routeing N'bound on Airway P600 (Class D airspace) at FL70. The airspace between BLACA and MULLA on P600 at and below FL90 is delegated to Belfast. Accordingly, the ScOACC Antrim Controller had telephoned the Belfast International APR to coordinate this flight, which, the controller recollected, was identified approaching GELKI. He said that he placed its previously printed fps in his active display, having correctly annotated its level. The C310 flight established communication with the Belfast International APR, at 1024, reporting at FL70. The pilot was instructed to *"continue on track"*.

In accordance with local procedures between Belfast International and Belfast City airports, the latter had requested a departure release from RW22 for the DHC8. This ac, routeing via Airway L10 to Manchester, was released climbing to 3000ft routeing to RINGA. At 1024:20 the DHC8 flight made its initial call on the Belfast Approach frequency reporting passing 2400ft in a L turn to RINGA. The flight was identified and the pilot was instructed to *"continue on the noise abatement track"*. The noise abatement procedure, applicable to DHC8 ac departing RW22, is to 'climb straight ahead to altitude 2000ft before turning, thereafter as per the clearance issued by ATC'. ***NB*** Airways L10 and P600 cross at RINGA.

At 1025:50 the DHC8 was cleared to climb to FL90, the agreed level for transfer to ScOACC. The APR said that he assessed that, as the C310 was comparatively slow, the DHC8 would pass well ahead of it. Twenty seconds later, the latter ac was instructed to turn R heading 150°. This turn was to position the flight towards the agreed radar aiming point for City departures via L10 i.e. a position in the airway, S of RINGA, prior to transfer to ScOACC. The APR still believed that the two flights would not conflict. The radar recording of the event, timed at 1026:10, shows the two ac 19·5nm apart. The R turn positioned the DHC8 towards the C310. The APR said that he then turned his attention to other traffic further N on the radar display, notably an inbound to RW25 that was in the final stages of being vectored on to the ILS. Subsequently, returning his attention to the DHC8, he noticed it passing about FL65 and his first reaction was to transfer the ac to the Antrim Sector so that it could be given continuous climb. This intention was carried out at 1028:30, when the two ac were about 6·5nm apart, but it did not take into account the presence of the C310. He could not readily explain why he had forgotten about this flight. He confirmed that it would have been showing on the radar display and the fps was still in position in the display. Having transferred the DHC8, the APR immediately realised the potential confliction between the subject ac. He straightaway instructed the C310 to turn R heading 140° and descend to 6000ft. Unfortunately he used an incorrect c/s i.e. the correct company prefix but the wrong suffix i.e. XYZ6J**C** not XYZ6J**A**. Receiving no response, he called the flight again but still using the incorrect c/s. He could offer no definitive reason why he had not correctly addressed the flight on both occasions. However, this second time, the pilot of the C310 replied saying that he was on frequency. By now the distance had reduced to approximately 4nm. The turn and descent instructions were reissued, this time with the prefix 'avoiding action'. The APR explained that he did not use the term initially because he believed separation would have been maintained. However, because of the delay, the necessity for swift action became more essential and he decided to use the phrase 'avoiding action' when two-way communication was re-established. By the time the pilot of the C310 had acknowledged the avoiding action instructions (1029:10), the DHC8 had climbed through its level, 3·7nm away. No TI was passed to the C310 pilot regarding the DHC8. As the horizontal separation decreased, vertical increased so that by the time (1029:26) they were 2·5nm apart, vertical separation existed (point D on the diagram).

[UKAB Note (1): The point of minimum separation is at 1029:22, point C on the diagram, with the DHC8 climbing through FL075 with the C310 descending through FL068, lateral separation at 2·65nm.]

When the DHC8 flight contacted the Antrim Sector, the pilot reported passing FL70. The Antrim SC reported that he had realised the confliction between this ac and the C310 which had been working his sector prior to handover to Belfast. The pilot of the DHC8 then reported *"we got a traffic traffic"*. The Antrim Controller said that he understood that this was in reference to a TCAS alert and cleared the flight to climb to FL150, in order to resolve the confliction more quickly. He did not pass TI 'believing that the pilot would be concentrating on any TCAS alert'. No further transmissions were made by either pilot, on their respective frequencies, concerning the encounter.

Although the Belfast International MATS Part 2 allows radar separation of 3nm, within 42·5nm of the airport, in the circumstances of this Airprox the requisite separation was 5nm.

AIRPROX REPORT No 150/05

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 initially discussed an apparent anomaly between the DHC8 crew's written report stating that the C310's passage had caused a 'proximate' traffic indication on their TCAS display but the crew had called *"we got a traffic traffic"* on the RT which would indicate receiving a TCAS TA alert. After further reference to the RT transcript, the words 'traffic traffic' were confirmed as being spoken by the DHC8 crew, not a TCAS voice annunciation in the background. The words used may have been the DHC8 pilot reiterating to the controller his receipt of a proximate 'traffic' indication on TCAS but this had led the Antrim SC to believe that TCAS had generated a TA.

TI on the C310 was not passed to the DHC8 crew but Members believed that it would have been useful, owing to the known deficiencies/inaccuracies of the TCAS equipment in azimuth, as it may have aided the DHC8 crew to visually acquire the crossing C310. However, at the end of the day, both flights were operating under IFR where standard separation was to be afforded by ATC and the Belfast International APR's turn issued to the DHC8 onto 150° had vectored the subject ac into conflict which had caused the Airprox.

Even though the C310 presence had initially gone unnoticed to the Belfast APR when he transferred the DHC8 flight to ScACC, he had then seen potential confliction immediately thereafter and taken remedial action to resolve it, although the outcome was delayed owing to his use of an incorrect c/s. Commendably, he used the 'avoiding action' phrase when the subject ac had closed further and this had elicited the required response and action from the C310 pilot. When the DHC8 flight called on the Antrim SC's frequency, it was already climbing through the C310's indicated level, so he had issued further climb to FL150 to resolve the confliction following the crews '*traffic traffic"* transmission. These combined actions by all parties, in conjunction with the geometry of the encounter, were enough to allow the Board to conclude that any risk of collision had been effectively removed.

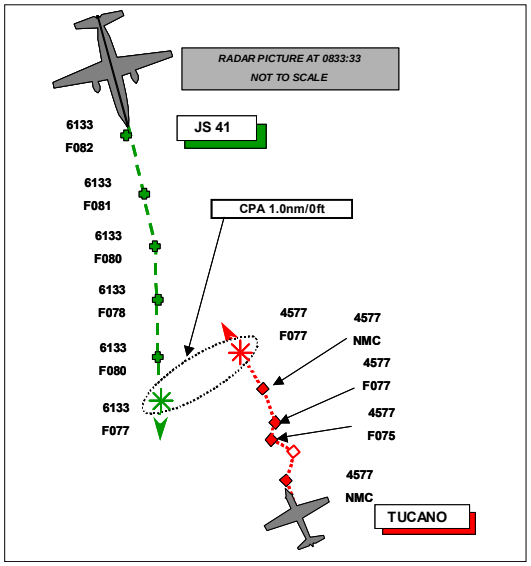
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Belfast APR vectored the DHC8 into conflict with the C310.

Degree of Risk: C.

AIRPROX REPORT NO 151/05

Date/Time:	25 Aug 0833	
Position:	5417N 00051W (8nm SW of Fylingdales)	
Airspace:	Vale of York AIAA(Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Jetstream 41	Tucano
Operator:	CAT	PTC
Alt/FL:	↓FL80	NR (RPS 995mb)
Weather	VMC CAVOK	NR
Visibility:	NR	30km
Reported Separation:	0 V/½-1nm H	Not seen
Recorded Separation:	0V/1nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports flying a scheduled passenger flight from Aberdeen to Humberside with HISLs selected on squawking as directed and in receipt of a RIS from London Military. They were heading south from ALASO [14nm N of NEW] at 205kt and passing FL80 in the descent. Having contacted London Military at ALASO, asking if *"Vale of York area was busy"* and told by the controller that it was *"very quiet this morning"*, they requested a RIS. North of York, a different controller notified them of traffic 12 o'clock 10nm which they saw on the TCAS at about 8nm in their 11 o'clock. She saw the ac and thought that it was a Tucano doing aerobatic manoeuvres so she turned 15° to starboard. As the Tucano bottomed out of a loop it turned towards them at about the same level and they had a TCAS "Traffic" then a "Descend" command. As the autopilot was disengaged to pitch the ac down, another TCAS command was issued to "Climb". As the ac was pitched from the nose down attitude to a nose up attitude, she looked out to port and saw the other ac in relative level flight move from port to behind. At that point the TCAS command was cleared and she resumed their descent, assessing the risk as moderate.

THE TUCANO PILOT reports flying with another QFI on a general handling sortie squawking 4577 [Vale of York conspicuity] and listening on a Linton Ops frequency. At the reported time of the Airprox he was conducting aerobatics in the Vale of York AIAA having pulled up from low level some time before. He was unaware of any potential Airprox throughout the flight and could not recall the sortie details as he was contacted well after the event. [The first Tucano pilot contacted proved not to be the one involved in the Airprox].

MIL ATC OPS reports that they had nothing to add to the following Unit Report:

The JS41 was transiting the Eastern part of the Vale of York AIAA inbound to Humberside receiving a RIS from LATCC(Mil) Controller13 (Con13). At 0830·20, the JS41 pilot reported approaching FL100 in the descent and Con 13 transmitted:

Callsign	Time	Narrative
Con13	0830·23	*"JS c/s roger, descend report level FL65"*
JS41	0830·25	*"Descend report level FL65, c/s"*
Con13	0830·30	*"JS c/s, traffic right one o'clock, 20 miles, crossing right to left, indicating FL55"*
JS41	0830·45	*"Roger, JS c/s "*

AIRPROX REPORT No 151/05

Analysis of the Great Dun Fell Radar recording shows the first appearance of a contact (the Tucano) squawking 4577 just N of UMBEL at FL39. Subsequent monitoring shows the contact in a slow climb. The contact was called again at 0832·30:

Callsign	Time	Narrative
Con13	0832·30	*"JS c/s traffic twelve o'clock, 10 miles, manoeuvring, indicating FL80"*
JS41	0832·35	*"Visual with that traffic"*

Since the JS41 pilot stated that she had acquired the conflicting traffic visually, Con13 did not offer further TI. The 4577 squawk continued to manoeuvre in the JS's 11 o'clock position, with both ac indicating between FL80 and FL77, for 3 radar sweeps and while they were separated laterally by 1.3–1nm. Thereafter the Tucano took up a more Northerly heading and the lateral separation increased. The JS41 pilot did not state at any time that she had any concern over the conflicting ac and left the frequency without reporting an Airprox.

UKAB Note (1): The UKAIP at ENR 5-2-2 promulgates the Vale of York AIAA and advises pilots transiting the area to maintain constant vigilance and obtain a radar service.

HQ PTC had little to add, believing this to be a conflict in the AIAA.

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 noted that both ac had been operating legitimately in Class G airspace and therefore the pilots had an equal and shared responsibility to see and avoid each other. Members also noted that this part of the FIR is annotated as an AIAA since it is generally very busy with military ac often manoeuvring rapidly through large portions of airspace and often not in receipt of an ATC service due to the nature of their flying exercises; indeed this had been the case with this incident. Specialist Members were not surprised that the Tucano pilot did not see the JS41: when he had commenced his aerobatics the JS41 was over 10nm away, head-on and was descending to the (top) altitude at which he was operating. During his manoeuvring he would have been continuously clearing his flight-path ahead.

As a result of accurate TI from London Military, the JS41 pilot saw the Tucano at 8-10nm manoeuvring and turned right through 15° but this had not been enough to prevent a TCAS RA even though the Tucano had been about 1nm away. Since before the avoiding turn the JS41's flightpath and the Tucano's operating 'box' could have been considered to be (just) in conflict this incident had been an 'FIR Conflict' rather than a 'Sighting Report'. The Board assumed however, that since she did not take any further avoidance on the Tucano, the JS41 Captain had not considered the situation to be in any way hazardous and the safety of the respective ac had not been compromised.

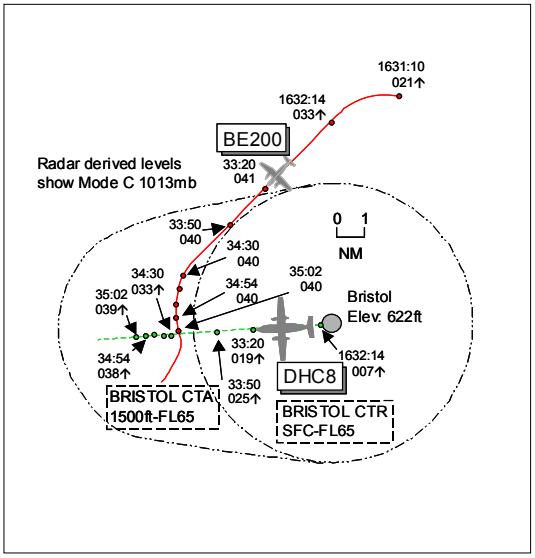
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the Vale of York AIAA.

Degree of Risk: C.

AIRPROX REPORT NO 152/05

Date/Time:	23 Aug 1635	
Position:	5122N 00253W (6nm W Bristol - elev 622ft)	
Airspace:	Bristol CTA	(Class: D)
Reporter:	Cardiff APR	
	First Ac	*Second Ac*
Type:	DHC8	BE200
Operator:	CAT	Civ Comm
Alt/FL:		↑FL50
Weather	NK	VMC CLNC
Visibility:		>10km
Reported Separation:		
	'Adequate'	Nil V/2nm H
Recorded Separation:		
	200ft V/1·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CARDIFF APR reports that as Bristol were operating on RW27, a silent handover procedure was in operation for all traffic which will work Cardiff climbing out from Bristol straight ahead to FL60 - the DHC8 had been prenoted as a pending departure through BCN with further climb above FL60 subject to Cardiff. Filton telephoned and informed the ATSA that the BE200 was taxying and would be working Bristol International first, routing S'bound, before working Cardiff. Filton were told to ensure that Bristol International kept him informed of the BE200's intentions. The Cardiff frequency 125·85MHz was busy, as only 1 controller was available to provide radar services, and frequencies 125·85,126·62 and 277·22 were all cross-coupled but several pilots reported that the quality of transmissions were weak. The Bristol ATSA rang asking how the APR would like the BE200 which was at the time maintaining FL40 in the Bristol CTA – the APR couldn't remember if the DHC8 was already working the unit but it was seen to be airborne. The controller's initial reaction for the BE200 had been for it to be given straight ahead (from Filton's RW27) to FL60, not aware that it was already airborne, as it was wearing a Bristol squawk. The Cardiff ATSA pointed out its position and level in the Bristol CTA so a clearance was passed, through the Cardiff ATSA to the Bristol ATSA, that the BE200 would be taken maintaining FL40 when it was 'clean' of the DHC8. The DHC8 was given climb to FL150 when the flight called climbing to FL60. The controller continued to observe the BE200 and expected the Bristol APR to vector it behind the DHC8. However, as it continued to track towards the DHC8, which had a poor ROC, the APR passed TI to the DHC8 crew but no avoiding action, believing the ac's heading was the most likely to resolve the confliction soonest. The DHC8 crew advised that they had the traffic on TCAS and intended to continue straight ahead, but did not specify whether they had received a TA or an RA. The APR immediately telephoned the Bristol APR who answered saying that he was turning the BE200 onto S. The separation was <200ft and about 1nm. When asked, the DHC8 crew said they did not want to file a report, and the flight was then transferred to LACC S5. The BE200 flight was eventually transferred to Cardiff from Bristol and it continued normally before being transferred to Exeter.

THE BRISTOL INTERNATIONAL APR reports the DHC8 departed at 1632 climbing straight ahead from RW27 to FL60 whilst the BE200 departed Filton RW27 climbing straight ahead to altitude 3000ft. The BE200 was identified and given a L turn onto heading 230° and climb to FL40, it's pilot requested FL100 to cruise. His plan was to climb the DHC8 through, and ahead of, the BE200 and then climb the BE200 but he made an error of judgement as the BE200 accelerated level at FL40 so that lateral separation was not achieved. The DHC8 had been transferred from TWR to Cardiff Radar by the time of the incident. The BE200 flight was given a L turn onto 180° and passed TI and the crew reported visual.

The Bristol International METAR was EGGD 1550Z 26013KT 9999 FEW020 17/11 Q1020=

AIRPROX REPORT No 152/05

THE DHC8 PILOT reports that he was aware of the incident and was happy that adequate separation had been afforded and did not see any requirement to file a report. During the event, he only received a TA alert and subsequently acquired the other ac visually.

THE BE200 PILOT reports flying solo enroute to Newquay International IFR and in receipt of a RCS service from Bristol on 136·07MHz squawking an assigned code with Mode C. Whilst on a radar heading at 180kt he was asked to turn L onto heading 180° and to level at FL50, he thought. He then saw a Dash 8 pass 2nm in front of his ac at the same level, climbing. The controller commented that he had not expected his ac to speed up so much after levelling-off. He assessed the risk as slight/very low.

ATSI reports that at the time of the Airprox, the BE200 was in communication with the Bristol APR and the DHC8 was in communication with the Cardiff APR. The Bristol APR could not recall either his workload or the traffic loading at the time of the Airprox. However, given the RT recordings and the responses of the Bristol APR, it is assessed that both were likely to have been 'moderate'.

The Bristol APR was operating on the Approach Radar position and the Lower Airspace Radar Service (LARS) position was also manned. Shortly before 1626, discussion took place between the Bristol and Cardiff ATSAs regarding the impending departure of the DHC8, which would be routeing to BRECON, and requesting FL160 as its cruising level. Almost immediately afterwards, the Filton ATSA telephoned the Bristol Approach ATSA and advised of the pending departure of the BE200. The Filton ATSA advised that the aircraft was requesting to cross CAS at EXMOR, at FL120, bound for St Mawgan. At 1628:15, Filton advised that the BE200 was ready for departure from RW27. The Bristol APR issued a clearance to climb on RW heading to 3000ft and to call him when airborne. A squawk of 4637 had been passed previously.

The BE200 flight established contact with the Bristol APR at 1631:10, and was instructed to squawk ident. The APR advised the pilot that he was under a Radar Advisory Service and to turn L heading 230° and climb to FL40. MATS Part 1 requires controllers to inform pilots that they are identified and, under such circumstances, pass their position but this was not done. Although the Filton ATSA had passed the information to the Bristol ATSA, the Bristol APR was not aware of the requested cruising level for the BE200 and so, at 1631:50, asked the pilot for this information, who advised FL120 or FL100. Shortly after this transmission, the Bristol ATSA contacted the Cardiff ATSA to ascertain how they would like the aircraft prior to transfer. Following an initial degree of confusion, as the Cardiff APR thought that the BE200 was not yet airborne from Filton, a Cardiff squawk was passed and Bristol was advised to keep the aircraft at FL40 and transfer it to Cardiff once clear of the DHC8. It had already been agreed that the DHC8 would depart from RW27 at Bristol in accordance with the standard coordination procedure with Cardiff, i.e. climbing straight ahead to FL60, released for climb and to be transferred from Bristol Tower direct to the Cardiff APR.

By the time this discussion had been completed the Bristol APR transmitted *"(BE200 c/s) I'll be taking you through my controlled airspace behind departing traffic just airborne now a mile to the west of Bristol airport"*. The DHC8 flight called the Cardiff APR at 1633:20, when it was 2·7nm W of Bristol, and reported climbing straight ahead to FL60. The Cardiff APR instructed the crew to continue straight ahead and climb to FL150. At this time, the BE200 was just about to enter the Bristol CTA and was in the 3 o'clock position of the DHC8 at a range of 4·8nm. The Bristol APR instructed the BE200 to change squawk to the one assigned by Cardiff but did not advise the pilot that he was now under a Radar Control Service.

Shortly afterwards, at 1634:10, the Bristol APR transmitted *"(BE200 c/s) that traffic's a Dash Eight about to climb through your actually if you turn left heading one eight zero degrees for a short while please I'll take you behind him"*. The pilot acknowledged the heading change and almost immediately afterwards reported visual with the DHC8. At the same time, the Cardiff APR was passing TI to the DHC8 crew on the BE200 prior to the DHC8 crew reporting a TCAS TA. Whilst this information was being passed, the Cardiff APR telephoned the Bristol APR in order to establish what was happening, and on answering the phone the Bristol APR immediately said *"I am turning left heading One Eight Zero to go behind"*. By now (1634:30) the BE200 was in the 4 o'clock position of the DHC8 at a range of 2·2nm with the BE200 still maintaining FL40 and the DHC8 passing FL33 climbing. The effect of the L turn from 230° to 180° ensured that the BE200 would pass behind the DHC8, however, as the BE200 crossed behind separation reduced.

[UKAB Note (1): The CPA occurs just before the BE200 steadies on 180° at 1634:54 with separation of 1·3nm horizontal and 200ft vertical. On the next sweep 8sec later the BE200 passes through the DHC8's 6 o'clock range 1·5nm and 100ft above.]

Before lateral separation was restored and as the DHC8 was passing FL40, the Bristol APR instructed the crew of the BE200 to "*..turn right heading Two Four Zero degrees report that heading with Cardiff One Two Five decimal Eight Five request higher with them*". When the pilot of the BE200 contacted the Cardiff APR the ac was in the 6 o'clock position of the DHC8 at range of only 1·9nm and 100ft below the DHC8. The effect of the turn instruction, as issued by the Bristol APR, meant that the track divergence between the two ac had reduced from 90° to only 30°, thus prolonging the time before lateral separation would be re-established. At 1635:50, the radar recording shows that lateral separation of 3nm had been achieved together with a vertical separation of 900ft.

The Bristol APR advised that IFR departures from Filton routeing to the SW were not very frequent, occurring perhaps once a week. A common way of dealing with them was to treat them as airways joining traffic, which would route S'bound. Accordingly, a typical clearance would be to climb straight ahead to FL60 and coordinate the flight with Cardiff. On this occasion the Bristol APR reported that he had looked at the routeing and selected a lower level, in this case 3000ft, and would allocate an appropriate heading later. When the BE200 flight called it was identified and placed under a RAS, however, the APR advised that he had not told the pilot his position, as the pilot should know where he was having only just taken off. The APR stated that he would have had a fps on the DHC8 within 2min of the crew requesting start up and so it formed part of his overall traffic picture. He also believed that he had briefly checked the radar again when the DHC8 was airborne, having been released by him, to update his plan. When asked, the APR advised that he did not consider instructing the Tower to transfer the DHC8 to his frequency rather than direct to Cardiff as had originally been planned.

The Bristol APR was intending to provide lateral separation between the BE200 and the DHC8 but incorrectly believed that he could use 3nm as both ac "*… were identified*". Examination of the Bristol MATS Part 2 details the standard clearances for departures routeing BRECON - N864, however, the conditions relating to such departures (i.e. silent handovers) are not explicitly specified. The Cardiff MATS Part 2, APR 3.3 para 3.3.5.1.3 (Silent Handovers – General Conditions – All routes) states: '*The receiving ATSU will normally continue the flight in the same general direction and in the anticipated manner as when transferred; for outbound flights this includes a turn towards the airways joining point. Departures will be released for climb ….*'. From this it is clear than the Cardiff APR was authorised to turn the DHC8 on track for BRECON, a R turn of approximately 60°, and climb it whenever she wished. As the precise timing of these actions were not known to the Bristol APR he was required to regard the departure as identified traffic the intentions of which were unknown and seek to achieve either 5nm lateral separation or 5000ft vertical. Additionally, the Bristol MATS Part 2 specifies the conditions under which 3nm lateral separation may be used (*Both aircraft under the control of the same radar controller or two controllers in the Bristol Approach room; one aircraft under the control of Bristol and the other under the control of Cardiff which are either separated by the 3nm buffer zone [not applicable in this instance] or which have been subject to prior coordination between the Cardiff and Bristol radar controllers*) and none had been met in this Airprox.

Analysis of the radar recording shows the BE200 levelled at FL40 at approximately 1632:30, when the DHC8 was airborne passing 1000ft. The groundspeed of the BE200 increased from 175kt to 220kt over the next 2min, which should not have been unexpected given the performance of a BE200. The surface wind was reported as 260/15 and accordingly, the DHC8's groundspeed was in the order of 135kt. At the time the crew of the DHC8 called the Cardiff APR, it is evident from the radar that lateral separation of 5nm would not be achieved. The Bristol APR stated that he first recognised the heading of 230° allocated to the BE200 would not achieve separation at approximately 1633:50. At that time, the BE200 was in the 3 o'clock position of the DHC8 at a range of 3·8nm, with the BE200 maintaining FL40 and the DHC8 passing FL025.

The Bristol APR stated that he failed to appreciate or recognise the change in speed of the BE200, however, enquiries have revealed that a typical cruising speed for a BE200 at FL40 would be in the order of 170-200kt IAS. At 1634:40, just after the pilot of the BE200 had reported visual with the DHC8, the Bristol APR transmitted *"(BE200 c/s) thanks I'm taking you behind the traffic and I'm going to allow for the fact you're going to speed up as you level off and once you've gone behind I'll put you back towards Exmor"*. This would indicate that the Bristol APR did recognise the speed differential albeit at a very late stage.

The Bristol APR did pass TI but did not use the phrase 'avoiding action'. However, this was not achieved until separation had reduced to approximately 3nm. His instruction to the pilot of the BE200 to turn R onto 240°, after

it had passed behind the DHC8 and before separation had been restored, delayed the re-establishment of lateral separation. He could not account as to why he transferred the aircraft to Cardiff whilst still not separated from the DHC8.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members could add little to the ATSI report. The Bristol APR had earlier turned the BE200 onto a converging SW'ly track, in accordance with his plan that the DHC8 would pass ahead of it, but believed, erroneously, that 3nm separation should be applied between the subject IFR ac. He had not realised the deteriorating situation until just under 4nm separation existed, only then turning the BE200 L onto a S'ly heading to *"...take you behind him"*. ATCO Members agreed that various options had been open to the Bristol APR from the outset to ensure the subject ac were afforded the requisite separation in accordance with MATS Part 2, one of which was to work the departing DHC8, thereby having both ac on the same frequency. However, the course of action taken by the Bristol APR had led to him vectoring the BE200 into conflict with the DHC8 which had caused the Airprox.

The Cardiff APR was concerned about the BE200's flight path and had passed TI to the DHC8 crew who saw it visually prior to receiving a TA alert. The Bristol APR had told the BE200 pilot of his intentions, with respect to passing behind the DHC8, and the pilot had reported visual with it after commencing the L turn. The Bristol APR had then turned the BE200 R, which delayed the resolution of the incident, and transferred the flight to Cardiff whilst not separated. However, the L turn executed by the BE200 pilot when combined with the visual sightings by both crews was enough to persuade the Board that any risk of collision had been effectively removed.

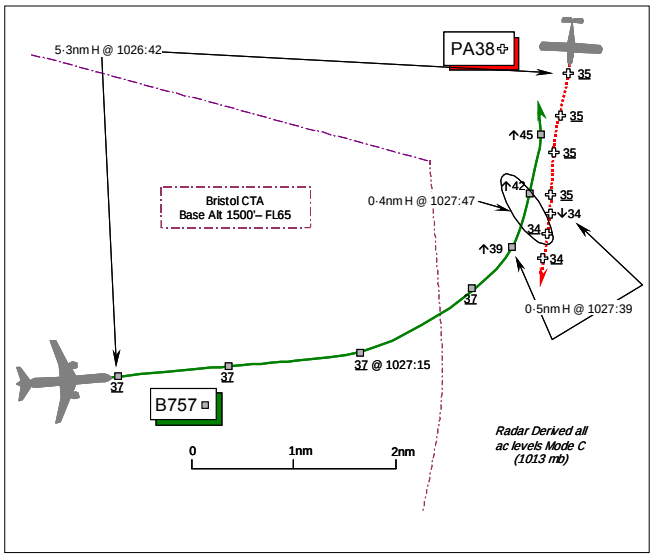
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Bristol APR vectored the BE200 into conflict with the DHC8.

Degree of Risk: C.

AIRPROX REPORT NO 153/05

Date/Time:	30 Aug 1027	
Position:	5125N 00225W (3½nm W of Charmy Down)	
Airspace:	London FIR	(Class: D/G)
Reporter:	Bristol APR	
	First Ac	*Second Ac*
Type:	B757-200	PA38
Operator:	CAT	Civ Pte
Alt/FL:	↑FL40	3500ft QNH (1021mb)
Weather	NR	VMC CLBC
Visibility:	NR	>10km
Reported Separation:	500ft V/0·5nm H	500ft V/500ft H
Recorded Separation:	0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APPROACH RADAR CONTROLLER (APR) reports that the B757 was outbound from Bristol to Newark NJ and the PA38 was in transit from Sleap to Exeter. At 1023 a release was issued to the ADC for the B757 to depart straight ahead from RW09 in the climb to FL40, because of traffic in the BRI hold descending to FL50. When the B757 was airborne two mins later at 1025, the PA38 (working Bristol LARS) was passing 11nm E Bristol, N – S, and co-ordinated by LARS at a transit altitude of 3500ft QNH (1025mb). By 1027 the B757 crew had not checked in so a call was made to them but no reply was received. He used the intercom to the Tower to ask for the B757 to be transferred to 136·07MHz whereupon the ADC replied that he had "put the [B757 C/S] over early". Once again he called the B757 but still no reply was forthcoming. The B757 crew then checked in on his frequency and was given an avoiding action turn onto 270° and the position of the PA38 passed whereupon LARS was asked to descend the PA38. An instruction was then given to the B757 crew to climb to FL100 with further traffic information given about the PA38. The B757 started to climb and the PA38 began to descend; however the respective radar returns and the SSR labels began to merge. As the SSR labels "de-garbled" the B757's Mode C was indicating FL38 whilst the PA38 indicated FL33. The B757 was then climbed to FL140 as per the standing agreement for traffic joining airways at AMMAN. The B757 pilot made no comment about the incident. At 1030, the B757 was transferred to Cardiff RADAR on 125·85MHz.

THE B757-200 PILOT did not render a CA1094 Airprox form but from the written account submitted reveals that he was departing from Bristol Airport level at an altitude of 4000ft [the clearance was to FL40], straight out on RW09 when he as the PNF – the Captain – noticed a speed excursion due to inoperative autothrottles. The throttles were brought back whereupon the 1st Officer simultaneously queried a frequency change given by Bristol TOWER that was not the published frequency. He as the PNF then selected the new frequency but was distracted from switching across whilst discussing power settings with the 1st Officer. When the PNF checked-in on the old [incorrect] frequency he was told to switch to the new frequency given by TOWER. He immediately switched to Bristol DEPARTURE on the new frequency and was given instructions to "immediately turn left to 290° and climb to 160", he thought. Whilst he was acknowledging these instructions traffic was observed on TCAS which immediately turned to yellow, then red and within 2 or 3 sec the TA had change to an RA with "full aural and visual command sector". "Avoidance techniques were employed" and the conflict was safely resolved. ATC informed them that the minimum vertical separation was within 400ft, with which he concurred. The situation was normal thereafter.

THE PA38 PILOT provided a very comprehensive account reporting that he was in transit from Sleap to Exeter in his Tomahawk, which is painted white with dark blue stripes; the HISLs were on. He was in receipt of a FIS from Bristol RADAR on 125·65MHz and squawking the assigned code of A4615 with Mode C selected on. Flying in VMC in level cruise at 3500ft QNH (1021mb) he was some 1000ft below and 2km clear of cloud with an in-flight

His route was planned well clear of CAS in order to avoid commercial traffic out of Bristol and he was approaching a position some 11nm E of Bristol Airport, heading 174° at 95kt, when the white B757 was first spotted, which was just before he was advised about the airliner by RADAR. The B757 was about 3½nm away in his 2 o'clock - initially in a shallow climb - before the RoC increased and the ac turned L. It was initially unclear to him whether the B757 was going to turn at all but he did not want to take avoiding action horizontally as the B757 was "flying towards him at right angles". To avoid the airliner he descended about 200ft until it was clear that the B757 was turning away from him but the B757 crew seemed very late to react. He maintained visual contact with the B757 all the time, the minimum horizontal separation being about 500ft and vertical separation 500ft. The risk was assessed as *"50%"*. He stressed that he was surprised that the B757 crew did not act sooner on warnings from TCAS and that the airliner was allowed to stray from CAS.

UKAB Note (1): A report was not provided by LARS relating to this Airprox.

UKAB Note (2): The Clee Hill Radar recording shows the B757 departing from Bristol at 1026:42, level at FL37 Mode C (1013mb), just before the crew called the APR, as the PA38 is shown southbound maintaining FL35 [deemed unverified] Mode C. The B757 is shown in the L turn at 1027:15, in conformity with the turn instruction issued by the APR some 25 sec earlier. The first indication that the B757 crew has initiated a climb is at 1027:39 as the airliner passes FL39 at a range of ½nm from the PA38, which evinces a descent of 100ft to FL34 and indicative of the PA38 pilot's reported avoiding action. Minimum recorded horizontal separation of 0·4nm is illustrated on the next sweep as the B757 climbs through FL42 some 800ft above the PA38. By interpolation between radar sweeps it is evident that the B757 passed 0·27nm – in the order of 540yd – to starboard of the PA38 and not less than 500ft above it at the closest point.

ATSI reports that the B757 was taxying for a RW09 departure at Bristol. At 1022:05, the TOWER requested a release from the APR on the B757 and this was approved to climb straight ahead and maintain FL40 on reaching. This was correctly read back by the B757 crew. At 1022:35, the PA38 called the Bristol LARS controller who subsequently identified the ac 7nm E of Filton and placed the flight under a FIS. The pilot did not pass his level nor did the LARS controller request it and no pressure setting was passed nor stated. Consequently, the PA38's Mode C was not verified.

The LARS controller informed the APR of the position and details of the PA38, stating at 1023:15 that the ac's level was 3500ft. Shortly before this, TOWER cleared the B757 for take-off and, at 1025:10, the crew was instructed to contact Bristol RADAR on *"one three six decimal zero seven".* The crew initially read back *"er twenty six seventy seven for* [B757 C/S]" - 126·77MHz and TOWER corrected this to *"one three six decimal zero seven"* - 136·07MHz which the B757 crew then read back accurately. At this point the B757 was 2·5nm E of Bristol with the PA38 to the E of Bristol's CTA, southbound and in the B757's 10 o'clock - 10·4nm. By 1026:20, the B757 crew had still not made contact with the APR who had called the flight but received no response. The APR contacted TOWER and asked where the ac was to be told that the flight had already been transferred to RADAR's frequency.

Both TOWER and the APR called the B757 on their respective frequencies and, at 1026:35, the crew replied still on the TOWER frequency so they were instructed to switch to RADAR. The B757 was now 7·9nm E of Bristol, indicating FL37 Mode C with the PA38 in its 10 o'clock - 4·7nm indicating FL35. At 1026:50, the B757 crew established contact with the APR who transmitted "[B757 C/S] *turn left left immediately heading 290 degrees traffic in your left 10 o'clock range of 4 miles crossing from left to right same level*". The prowords 'avoiding action' were not used. The B757 crew acknowledged this and commenced a L turn which took the ac towards the conflicting traffic. At the same time, the LARS controller passed traffic information to the PA38 pilot about the B757. The Mode C readout of the B757 indicated FL37 and that of the PA38 FL35. At 1027:17, following a prompt from the TOWER, the APR transmitted "[B757 C/S] *avoiding action climb now flight level 100 turn right in fact continue left turn heading 270 the traffic now is just passing through your 12 o'clock 1½ miles*". The B757 commenced its turn during which it left CAS and the two ac passed starboard to starboard at a range of ½nm with the B757 500ft above the PA38. With the benefit of hindsight, a turn to the R would have taken the B757 away from the converging PA38: however, there is little doubt that the two ac would still have flown into close proximity.

[UKAB Note 3: A review of the RTF transcript for the APR's frequency of 136·07MHz reveals that further traffic information was passed by the APR before 1028, *"…the traffic's showing 500 feet below you just passing behind you now"* whereupon the B757 crew responded *"…we had him in sight..".* Later, after the APR instructed the B757 crew to climb to FL140 at 1029, the B757 crew was advised *"…you have left controlled airspace and it's now a radar advisory service".*]

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 a report from the appropriate ATC authority.

It was readily apparent to the Board that the difficulties reported by the APR stemmed from the problems encountered by the B757 crew with the auto throttles, which was the catalyst to this Airprox and ultimately delayed the crew's frequency change. From the B757 pilot's account the rectification of this issue had apparently caused a significant distraction to the B757 crew at a critical stage during their departure from Bristol. CAT pilot Members suggested that there was an underlying CRM issue here because difficulties with the auto throttles should not have diverted both pilots' attention to the point that it did. An experienced CAT pilot postulated that if there was any training going on in the B757's flight deck and if the Captain was trying to emphasise a training point to the other pilot when the auto throttle problem was detected then this might have had some impact on the overall time that it took to correct this abnormal situation. However, this was speculation and the end result of this reported difficulty was the considerable amount of time that it took the crew to finally establish RT communication with RADAR.

From the PA38 pilot's perspective, he had wisely contacted LARS in good time who had placed the flight under a FIS but – as the ATSI report had made clear - without establishing the ac's actual altitude/level as the pilot had not included this information in his initial transmission nor had the controller queried it. The absence of a report from the LARS controller did not help to resolve this point but clearly the lack of a confirmed cruising altitude did not provide LARS with all the information about the flight that was required. As it was, the PA38's Mode C had indicated to the controller the ac's level but as the Mode C had not been verified it was not wise to pass this on, apparently as 'traffic information', to the APR. However, the APR had reported that LARS had 'co-ordinated' the ac's altitude as 3500ft (1025mb), which if he had, was clearly extremely unwise without establishing the actual altitude being flown and the pressure setting in use. Nevertheless, the LARS controllers 'informed guess' was not too wide off the mark and the PA38 pilot's written Airprox report had stated that he was flying at 3500ft, which the radar recording confirmed, albeit not apparently on the Bristol QNH. The PA38 pilot reports that he spotted the B757 some 3½nm away before traffic information was transmitted by LARS. His decision to ensure vertical separation visually by descending below the airliner was sound - 100ft was evinced on the radar recording that had also shown that the airliner had passed no closer than about 540yd away to starboard at the closest point and somewhat more than he estimated.

It was pointed out that although the B757 pilot had read-back correctly their cleared level of FL40, the pilot had actually reported climbing to 4000ft. This suggested that whilst the B757 crew's attention had been diverted rectifying the technical malfunction they had not reset their altimeters to the SAS for flight under IFR above the transition altitude (TA - 3000ft). The recorded radar data showed that they had levelled their ac at 3700ft (1013mb), some 300ft below their cleared level and outside the tolerance (+/- 200ft) whereby the ac could be considered to be at the assigned level of FL40. This appeared, technically, not to be in compliance with their ATC clearance and was a salutary lesson for crews who do not frequently fly in the UK, where the TA does vary significantly from airport to airport.

Some pilot Members questioned whether the departure clearance issued to the B757 crew was sound. It was clear this would not have afforded standard separation above the PA38, which was known traffic to the APR, if the B757 exited the CTA into Class G airspace to the E, but that was apparently not the controller's intent. The resultant delay in conforming to TOWER's instructions, and switching to RADAR promptly, denied the APR the ability to transmit to the B757 crew avoiding action any earlier. It was evident that from the time that the crew was first instructed by TOWER to switch to RADAR it took a total of 1min 40sec before the APR could communicate his L turn instruction, within which he advised the crew that the PA38 was 4nm distant, but did not emphasise that this was an avoiding action turn. Experienced terminal controller Members also suggested that an avoiding action climb might have been preferable initially, potentially restoring separation against the PA38 somewhat quicker as the B757 was already indicating 200ft above the former and it still took in excess of 20sec before the turn began to take effect and about the same time that the avoiding action climb was transmitted to the B757 crew. It was fortunate that the alert TOWER controller had prompted the APR when he did. However, it seemed that the B757 crew was slow to comply with this instruction also as it took a further 24sec before the Mode C reflected the climb. Consequently, in the Board's view, it seemed that the B757 had flown further E than the APR had intended and evidently exited the CTA to the E. This did not enable the APR sufficient airspace to effect the requisite separation that he was seeking to achieve under the RAS in the 'Open FIR'. It seemed to some Members that the APR was unwise in continuing to turn L in compliance with the intended routeing to join CAS at AMMAN, rather than

resolving the conflict as soon as practicable by possibly turning R instead. The Members concluded, however, that the APR had been unable to intervene any earlier than he did. Therefore, the Board agreed that this Airprox had resulted because whilst distracted by a technical issue, the B757 crew did not comply with ATC instructions issued, thereby leaving CAS and flying into conflict with the PA38.

It had been suggested that a R turn away from the PA38 might have been preferable here when the APR was able to act, notwithstanding the traffic that was apparently in the BRI hold descending to FL50. FL40 would still have afforded standard separation although it might have denied the B757 crew any opportunity to sight the PA38 whilst 'belly-up' in a R turn. With that in mind the Board noted that the RT transcript had reflected that the B757 crew had fortunately spotted the PA38 visually whilst in the L turn. Moreover, the B757 pilot's account had also shown that his ac's TCAS had detected the PA38 and commanded what seemed to be a CLIMB, but the exact nature of this RA was unclear. The end result of the APR's L turn instruction, avoiding action climb and the action taken by the B757 crew on sighting the PA38 coupled with the latter pilot's descent was that the B757 passed some 0·27nm abeam the PA38 starboard to starboard. By that stage, however, not less than 500ft separation had been achieved above the PA38. These combined actions convinced the Board that any risk of a collision had been effectively removed.

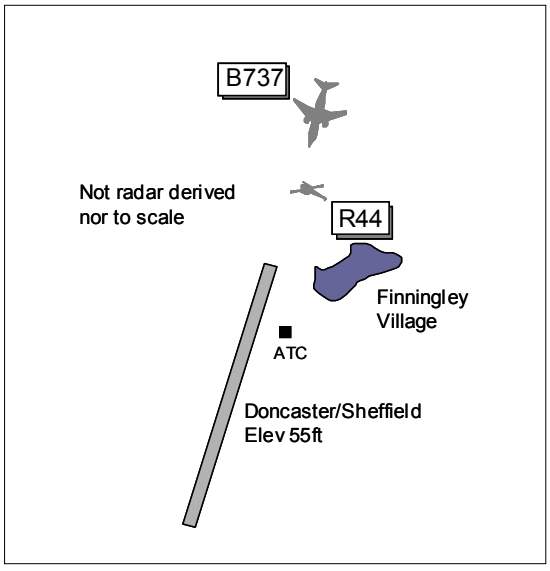
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Whilst distracted by a technical issue, the B757 crew did not comply with ATC instructions thereby leaving CAS and flying into conflict with the PA38.

Degree of Risk: C.

AIRPROX REPORT NO 154/05

Date/Time:	31 Aug 0912	
Position:	5330N 00100W (1·2nm FIN APP RW20 Doncaster/Sheffield - elev 55ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-300	Robinson R44
Operator:	CAT	Civ Pte
Alt/FL:	450ft↓ (QNH 1013mb)	500ft (QNH)
Weather	VMC HAZE	VMC HAZE
Visibility:	5000m	2000m
Reported Separation:	Nil V/300ft H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 201° at 135kt inbound to Doncaster/Sheffield Airport (DSA) IFR and in receipt of an ATS from Doncaster Tower on 128·77MHz squawking 6170 with Mode C. After being radar vectored onto the ILS RW20, TI was given on a helicopter which was instructed to remain clear to the E of the RW20 threshold. The traffic was seen on TCAS showing NMC near the threshold but it could not be positively identified, as the in-flight visibility was 5000m in haze. A TA alert was received (no range stated). After descending through 450ft QNH 1013mb the traffic was sighted, a white/blue coloured Robinson type, 15° L of the nose range 400ft crossing L to R at the same level. No avoiding action was taken since the helicopter was clearly passing perpendicular to their track (albeit extremely close) and any go-around would have created significant wake vortex and jet blast

without any appreciable level change in the short distance. He estimated the CPA was 300ft horizontally as the helicopter cleared to their R and he assessed the risk as high

THE R44 PILOT reports flying solo on a direct track between a private site near Lincoln to another site near Castleford VFR at 110kt and 500ft QNH and in receipt of a FIS from DSA Tower. The visibility was 2000m in haze in VMC and the helicopter was coloured blue/white with a tail strobe light switched on. He was following instructions from ATC and was asked to report abeam the airfield, which he did, and was squawking as requested. He was then asked to keep a lookout for a B737, which he did not see, but he was not asked to change direction, he thought.

THE DONCASTER/SHEFFIELD ADC reports that the APR called to advise that the B737 was at 12nm and to prenote the transit of the ATZ by the R44. The R44 pilot called on frequency and was instructed to report at the airfield boundary. About 1min later the B737 flight called at 6nm and was instructed to continue approach. He then requested a position report from the R44 pilot who replied '4 mile E of the field'. He passed TI on the B737 and told the R44 pilot to route towards the RW20 threshold and to report the B737 in sight; TI was passed to the B737 crew on the R44. He saw the R44 low level to the NE of the airfield over Finningley village so he instructed its pilot to hold E of the airfield and to report the B737 in sight, with the intention of crossing the R44 behind the B737; this was acknowledged. He cleared the B737 to land but then saw the R44 had continued W'bound and was now in a position (on the final approach path 2nm N of the field) where a hold/orbit would have been counter productive. He passed TI to the B737 crew who reported visual with the R44 and continuing their approach.

The DSA METAR shows EGCN 0850Z 16004KT 120V190 5000 SCT070 20/17 Q1014= and the 0920Z 17004KT 130V200 5000 SCT070 22/17 Q1013=

UKAB Note (1): The DSA RT transcript shows the following exchanges after the ADC had requested a range report from the R44 pilot who stated 4nm due E at 0910:40: -

ATC *"R44 c/s roger if you position towards the runway er two zero threshold to cross at the two zero threshold you'll be crossing behind a seven three seven traffic currently four mile final"*.

R44 *"Copy that R44 c/s"*.

ATC *"B737 c/s clear to land runway two zero surface wind one eight zero at less than five knots you may get a helicopter on TCAS currently at four miles east of the field to route er to the northwest"*.

B737 *"B737 c/s roger and we're clear to land runway two zero"*.

ATC *"R44 c/s report visual with the seven three seven"*.

R44 *"Negative at this minute er R44 c/s"*.

ATC *"R44 c/s roger I have you visual to the east of the field just remain to the east of the field until visual with that traffic"*.

R44 *"R44 c/s"*.

About 30sec later, ATC transmits: -

ATC *"B737 c/s that helicopter traffic er just ahead of you looks like he's crossed the final approach track"*.

B737 *"We're visual we're passing fairly close but we're continuing"*.

ATSI reports that the RT transcript appears to corroborate the DSA ADC's report. TI was issued to both flights and positive instructions were passed to the pilot of the R44 i.e. *"...just remain to the east of the field until visual with that traffic* (the B737)*"*. The only comment to make is that no read back of the instruction was obtained from the R44 pilot, only an acknowledgement. In view of his written comments did the R44 pilot fully assimilate what he was being instructed to do? Readbacks, MATS Part 1, Appendix E, Page 8/9 refers.

UKAB Note (2): The MATS Part 1 Appendix E Communication with Aircraft page 8/9 para 4.6 Acknowledgement of Messages states *"Pilots are expected to acknowledge all messages. In all cases the sole use of the aircraft's callsign is sufficient. However, an acknowledgement only is not acceptable when a complete or abbreviated read back is required"*. Para 4.7 Pilot Read Back of RTF Messages states *"Pilots are required to read back in full messages containing any of the following items".* These include in para 4.7.1 *"heading instructions; airways or route clearances; approach clearances; runway in use; clearance to enter, land on, take-off, backtrack, cross or hold short of any active runway"*. Para 4.7.2 states *"Controllers are to prompt a pilot if a read back is not immediately forthcoming"*.

UKAB Note (3): The UK AIP at ENR 1-1-3-2 General Flight Procedures contains brief details of the requirements for pilots acknowledgements of RT messages and when items must be read back in full. These procedures are fully explained in CAP413 Radiotelephony Manual which mirrors the MATS Part 1 with the addition in Chap 2 Page 10 Para 1.11 Acknowledgement of Receipt which states *"Acknowledgements of information should be signified by the use of the receiving stations' callsign or Roger callsign, and not by messages such as: 'callsign-copy the weather' or 'callsign-copy the traffic'"*.

UKAB Note (4): The Airprox occurs below recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

From his report and the RT transcript, it was clear that the R44 pilot had not assimilated the DSA ATC instructions. The ADC had seen the R44 to the NE over Finningley village and told its pilot *"...I have you visual to the east of the field just remain east of the field until visual with the traffic"*. The R44 pilot had only read back his c/s without including the instruction to hold. ATCO Members wondered if the R44 pilot knew exactly where he was, relative to the airfield, as notwithstanding his acknowledgement of the instruction he had then continued on track. Prior to this instruction, the R44 pilot had been told to position towards the RW20 threshold as he would be crossing behind the B737 and he had reported *"negative.."* when asked if he was visual with the airliner. One ATCO thought that perhaps the ADC should have asked the R44 pilot earlier to report when he had the airfield in sight so that he could then be assured that the routeing to the RW threshold and subsequent instructions could be complied with. Also, with the benefit of hindsight, for clarity the ADC could have told the R44 pilot to 'hold present position', when he saw the helicopter, so that there would have been no doubt as to what was required. However, for whatever reason, the R44 pilot did not comply with ATC instructions and flew into conflict with the B737 on its final approach which he did not see.

The B737 crew were given an early TI call on the R44 by ATC after the helicopter pilot reported 4nm E of DSA. The helicopter was seen on TCAS but not visually acquired at that stage owing to the reduced visibility – the crew's ability to see the approaching small helicopter would probably have been hindered by glare from the sun's reflection off the haze layer in the R44's direction. Although a TA alert was received – no RA would have been received as the R44 was showing NMC - the B737 crew were surprised, when on short final, to see the R44 just L of their ac's nose crossing the FAT L to R at the same level. They had heard ATC pass instructions to its pilot to hold E of RW20 and updated TI on the helicopter was received at about the same time. Quickly judging from the relative flight paths that the subject ac were not going to collide, the B737 crew elected to continue their approach as the helicopter crossed and diverged clear to their R. Undoubtedly this had been a close call, with the B737 going unsighted by the R44 pilot, with the subject ac passing in close proximity which led the Board to conclude that safety had not been assured during the encounter.

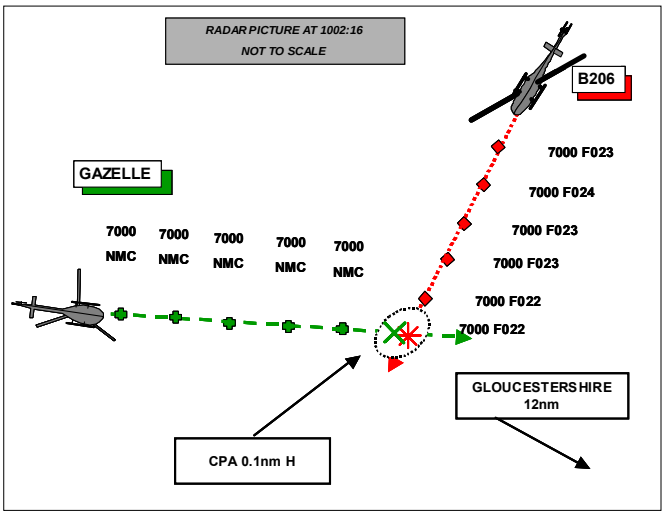
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The R44 pilot did not comply with ATC instructions and flew into conflict with the B737 on its final approach which he did not see.

Degree of Risk: B.

AIRPROX REPORT NO 155/05

Date/Time:	1 Sep 1002	
Position:	5204N 00220W (3nm NE Ledbury)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Gazelle	B206 JetRanger
Operator:	HQ DAAvn	Civ Pte
Alt/FL:	2000ft	2500ft
	(RPS 1009 mb)	(1019 mb)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>40km	unl
Reported Separation:		
	Level V/50ft H	Not Seen
Recorded Separation:		
	NR V/0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports flying a camouflage grey/green ac with HISLs and all other lights on, squawking 7000 but with no mode C fitted and in receipt of a FIS from Gloster APR. He was flying straight and level on a dual, simulated IF transit, heading 100° at 120kt and at an altitude of 2000ft on the RPS (1009mb) when suddenly he saw a JetRanger in the 1030 position appearing from behind the canopy frame. It was at the same level about 300m away and on a collision course. He immediately took control from the handling pilot and banked hard to the left and descended. He reported the incident to Gloucester who confirmed that the JetRanger had not seen him. He assessed that had he not taken avoiding action the ac would have collided.

THE B206 JETRANGER PILOT reports flying a dark blue and silver ac with HISLs and all other lights on, squawking 7000 with Mode C and in receipt of a FIS from Gloster APR. At the time of the incident they were heading 222° at 110kt but they did not see the other ac: he suspected that the HP's view might have been obscured by the doorpost. Having overheard the Gazelle pilot's message on initial contact with Gloster, he assessed that it would have been operating between 100ft AGL and a maximum of 2000ft so they climbed from 2000ft to 2500ft on the RPS of – "he believed" - 1019mb. They did not advise Gloster APR of this change from their previously reported altitude; he thought that this might have contributed to the incident.

ATSI reports that the Gazelle established communications with the Gloster APR soon after 0953. The pilot reported tracking E towards the M50/M5 motorway junction whilst climbing to 2000ft. A FIS was requested and provided by APR. At 0954:45 the JetRanger pilot contacted Gloster APR and reported en-route from Droitwich to Cardiff. He stated that he was 2nm NW of Worcester at 2000ft and requested a FIS. This was provided by Gloster APR who passed TI on the Gazelle and requested the JetRanger pilot to report passing abeam the airfield (i.e. abeam Gloucester Airport). At the time the JetRanger pilot called, he was 20nm NE of the Gazelle and tracking SW towards it. At 0955:30 APR passed TI regarding the JetRanger to the Gazelle pilot. At 1002:35, the pilot of the JetRanger reported *"(Callsign) west abeam the field"*. Analysis of the radar shows that the helicopter was actually just to the N of Ledbury, 13.5nm NW of Gloucester Airfield, and had already had the Airprox approximately one minute earlier. Shortly after 1003, the pilot of the Gazelle enquired as to whether the Gloster APR was still working the JetRanger and added that he would be filing an Airprox.

The radar recording shows the two helicopters tracking towards each other. The Gazelle is observed tracking E towards the motorway junction and the JetRanger on a steady SW track. The closest encounter occurs at 1002:16, when the JetRanger has crossed from left to right in front of the Gazelle at a distance of 0.1nm. Both aircraft were in receipt of a FIS and TI had been passed to both pilots about the presence of the other.

UKAB Note: The radar recording immediately prior to the Airprox shows the JetRanger at FL022/023/024 which equates to ~2500ft on an altimeter pressure setting of 1019mb. The Gazelle's altitude of 2000ft on 1009mb

converts to an equivalent flight level of FL022. Whilst the possibility of an incorrect altimeter subscale setting might therefore explain some features of this Airprox, it should be noted that in his initial call to Gloster APR the JetRanger pilot referred to '2000 on 1009' and when passed the RPS of 1009mb by the APR, the pilot correctly read this back.

HQ DAAvn comments that this report exemplifies the need for good lookout in all airspace despite alerts to both crews with sound ATC TI. Good position reporting is essential in TI and could have been a causal factor from the JetRanger. It is agreed that cockpit ergonomics and design and HP seating may have played a role in obscuration and late avoidance of each other. Salutary lessons for all Class G users.

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 noted that both ac had been operating legitimately in Class G airspace, therefore see and avoid was the sole means of collision avoidance. Members were informed that, due to the nature of the training being conducted, the Gazelle had not been operating in the UKLFS. The Board also observed that both pilots had sensibly opted for a FIS (from Gloster APR) and, as a result, had been given accurate and timely positional information on each other. Following this the JetRanger pilot had climbed to avoid (low-level) band where he thought the Gazelle would be operating, but, unusually, it was flying at a higher altitude.

The geometry of the incident had meant that the ac had been at about the same height and therefore on the horizon and there had been little or no relative motion of the other ac when viewed from the opposing cockpit. Further a Helicopter expert informed Members that it was probable that both ac had been obscured to their respective pilots by their cockpit frameworks. Notwithstanding these factors however, it was the view of the Board that both pilots could have seen the other ac sooner than they did and that the cause of this incident had therefore been a sighting matter. Since the JetRanger pilot had not seen the Gazelle and it's pilot reported that he had only seen the other helicopter when it was 300m away and therefore had not initiated avoiding action until the ac were very close, the Board considered that in this case safety had not been assured.

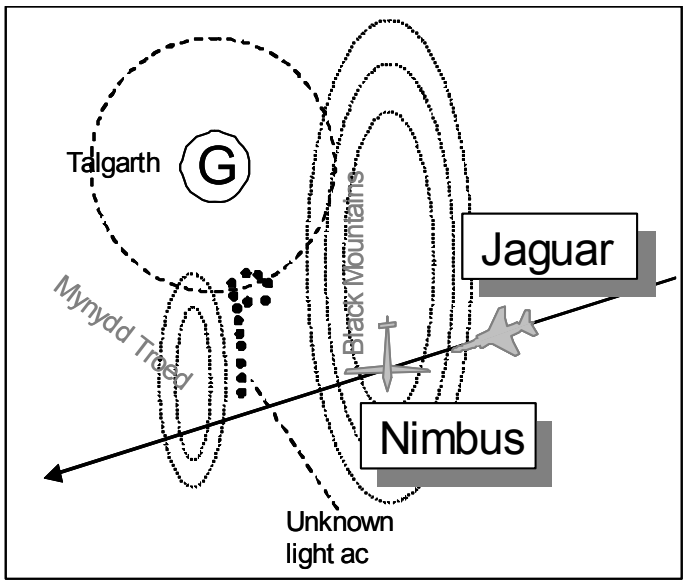
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the JetRanger pilot and late sighting by the Gazelle pilot.

Degree of Risk: B.

AIRPROX REPORT NO 156/05

Date/Time:	2 Sep 1035	
Position:	5156N 0308W (5nm SE Talgarth Gliding Site - elev 970ft)	
Airspace:	FIR/LFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Nimbus 2C	Jaguar
Operator:	Civ Club	HQ STC
Alt/FL:	2000ft	1190ft
	(QFE)	(Rad Alt)
Weather	VMC CLBC	VMC
Visibility:	>20nm	>10km
Reported Separation:		
	150ft V/200 yds H	300ft V/0·5nm H
Recorded Separation:		
	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER PILOT reports heading 172° at 62kt flying in a generally southerly direction above the most western ridge of the Black Mountains at 300ft agl. He saw a shadow ½ nm E of him and a dark coloured jet passed directly below him from left to right between him and the ground. There was no time for avoiding action and it was too close for comfort. He advised that there was a competition in progress at the time with the club CFI aerotowing gliders onto the lower ridge to the S of Talgarth (Mynydd Troed); the tug ac was not fitted with a transponder and nor is his glider.

THE JAGUAR PILOT reports heading 251° at 479kt. He was the aggressor ac against a pair of Jaguars and was leaving an engagement at low level. About 1 minute later, he saw an ac in the vicinity of the glider site (having concentrated his lookout into that area); it was white and on a S'ly heading and looked like a high wing, single engined ac. There was no risk of collision – although the ac would pass quite close to one another - so he rocked his wings to indicate to the other pilot that he had seen him.

UKAB Note: Radar recordings show the Jaguar breaking off from a head-on engagement with the pair and turning onto a WSW track to pass some 4nm S of Talgarth glider site. It passes just over 0·25nm ahead of a 7000 squawk which had orbited 2nm S of Talgarth and then steadied on a southerly track. There is no radar return from the glider. The speed of the 7000 squawk indicates that it was a light ac of some sort which may have been what the Jaguar pilot saw.

HQ STC comments that it is not obvious that the Jaguar pilot saw the glider. More likely, it was the 7000 squawk ac. That said, it may well have been a close pass with the glider pilot estimating his height at 300ft AGL and the Jaguar cresting the ridge at 250ft MSD.

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 operating authorities.

Members were advised that all of the Black Mountains, and the adjoining Brecon Beacons, were suitable for wave soaring in the appropriate wind conditions and that a general lookout for gliders was required in this area, rather than a lookout focused towards the gliding site. It was also pointed out that the gliding club had not advised their activity to RAF Low Flying Operations; doing this could have kept low flyers away for the day. There was the possibility that the activity level foreseen would not have been much more than on a normal good gliding day but notification of competitions should always be considered.

AIRPROX REPORT No 157/05

The Board was satisfied from the information given that the ac seen by the Jaguar pilot was not the reporting glider which he had directly underflown, and that the cause of the Airprox was that the Jaguar pilot did not see the glider. Because of this, and the closeness of passage, Members assessed that the safety of the ac had not been assured.

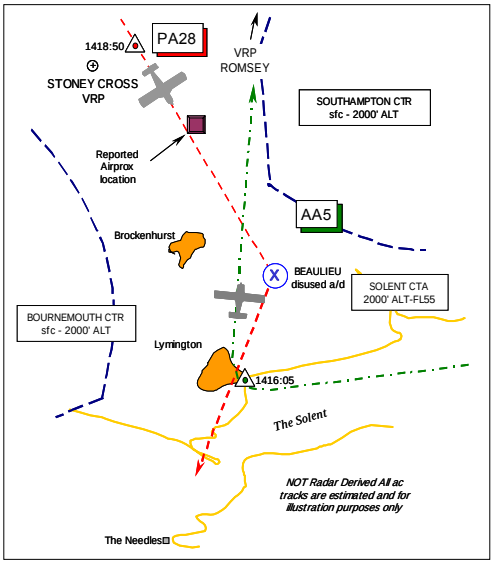
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Jaguar pilot.

Degree of Risk: B.

AIRPROX REPORT NO 157/05

Date/Time:	3 Sep 1420 (Saturday)	
Position:	5053N 00134W (Between Lymington and Romsey VRP)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	AA5	PA28
Operator:	Civ Pte	Civ Club
Alt/FL:	1800ft (QNH 1026mb)	1800ft (QNH 1025mb)
Weather	VMC Haze	VMC Haze
Visibility:	>10nm	5km
Reported Separation:	50ft V	Not seen
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AA5 PILOT reports his ac is coloured white with brown accents and the wing-tip strobes were on whilst in transit on a solo VFR flight from Bembridge to Thruxton in VMC under high cloud and a hazy sun with an in-flight visibility of 10km+. He was in receipt of a FIS from SOLENT APPROACH on 120·225MHz whilst squawking A7000 with Mode C. TCAS is not fitted.

SOLENT was first contacted at Ryde and he requested a FIS routeing Lymington, Romsey, Chilbolton and thence onward to Thruxton. He reported turning northbound upon reaching Lymington harbour, which was acknowledged by the controller "report Romsey remain outside controlled airspace".

Heading 015° near Lyndhurst at 120kt, flying in a level cruise at 1800ft (1026mb) a single engined low-wing monoplane was first spotted *"very close"* in his L 10 o'clock flying straight toward him at the same altitude – within 50ft. He only saw the other ac – a PA28 or AA5 - for a matter of sec (he only had a head-on view) before he dived to the R to avoid it. The other ac passed within 50ft vertically at the closest point with a *"high"* risk of a collision.

He believed that there had been a change of controller at SOLENT APPROACH in the few minutes between reporting at Lymington and advising of the Airprox. In his view the workload of Solent Controllers at weekends is high with commercial traffic and private flyers so he suggested that perhaps a new dedicated frequency should be created covering either commercial or private for the whole of the Southampton/Bournemouth control zones. At busy times he opined that it is difficult to make RT contact with SOLENT and that some pilots only maintain a listening watch in this area whilst remaining clear of regulated airspace. He added that this could only lead to ac becoming constrained by the [controlled] airspace and closely squeezed together.

UKAB Note (1): In a subsequent telephone call the AA5 pilot reaffirmed that it all happened so quickly that he was unable to estimate the minimum separation at the time of the Airprox. After the avoiding action dive was initiated he lost sight of the PA28, he only remembers seeing the registration on the ac but was unable to read it.

THE PA28 PILOT reports his ac has a white colour-scheme with brown/yellow stripes and the HISLs were on whilst flying VFR from Old Sarum to The Needles and back. He departed Old Sarum at 1400UTC routeing via Alderbury; Beaulieu disused aerodrome and thence to The Needles cruising at an altitude of 1800ft Portland RPS (1025mb) with an in-flight visibility of 5km in Haze. A squawk of A7000 was selected with Mode C. Switching from OLD SARUM RADIO to BOURNEMOUTH APPROACH on 119·475MHz some 3nm S of Alderbury, he was under a FIS from APPROACH at 1800ft. The controller advised him of the Portland RPS; not to fly above 2000ft; to report when abeam Stoney Cross and other reporting points abeam Beaulieu and over The Needles. The whole flight was conducted at 1800ft and although traffic information was received on traffic S of Beaulieu he did not see the reporting pilot's ac. Regular 'FREDA' checks and visual scans were maintained but the only traffic seen was between Beaulieu and The Needles.

UKAB Note (2) In a subsequent telephone conversation the PA28 pilot confirmed that he had not seen the reporting pilot's ac, adding that he normally flies with the landing light on to aid conspicuity. However, he could not recall if he had done so on this particular flight.

ATSI reports that the pilot of the AA5 contacted SOLENT APPROACH at 1410:05 and reported that he was flying from Bembridge to Thruxton. The ac was passing Ryde Pier and routeing via Cowes and Lymington at an altitude of 1700ft. The pilot requested a FIS which the SOLENT controller agreed to provide so instructed the pilot to report abeam Lymington and passed some traffic information. At 1416:05, the pilot reported Lymington and turning N for Romsey.

Meanwhile, the PA28 pilot contacted BOURNEMOUTH APPROACH at 1415:50, advising that he was operating to and from Old Sarum and routeing SE-bound via Stoney Cross, Beaulieu and then across to The Needles before returning on the same route VFR. The pilot requested a FIS, which was provided, and he advised that his altitude was 1800ft. At 1418:50, the pilot reported abeam Stoney Cross. The Bournemouth controller acknowledged this and then transmitted "*(PA28 callsign) there is a contact south of you well south of your position believed to be you tracking northbound indicating 1800 feet unverified*". Although no radar recording is available due to Pease Pottage being out of service, it is probable that this was the subject AA5.

Moments before 1421, the AA5 pilot advised SOLENT APPROACH that he had just *"..had a 'near miss' with a PA28...just to the N of Brockenhurst".* The pilot confirmed that he was flying at 1800ft but was now maintaining 1600ft. The SOLENT APPROACH controller informed him that he could see traffic on radar just W of Stoney Cross northbound but nothing else was showing. The pilot subsequently advised that he would be filing an Airmiss (sic).

The PA28 pilot did not acknowledge the traffic information passed by the Bournemouth controller and subsequently advised that he would be carrying out a few orbits overhead the Needles. No mention of the AA5 was made by him.

Both pilots were in receipt of a FIS from different ATSUs. The controllers both passed traffic information on known traffic to them thereby exceeding the basic requirements of MATS Part 1.

UKAB Note (3): This Airprox occurred outwith the coverage of recorded radar. Only one sweep of the Jersey SSR shows a A7000 squawk in the vicinity of Lymington at 1417:05, indicating 1400ft unverified Mode C (1013mb) which would equate to about 1790ft QNH (1026mb). This was 1min after the AA5 pilot reported at Lymington turning N for Romsey and so might well be the AA5 but no other contacts are shown in the vicinity whatsoever on any of the recorded radars over the relevant period.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was readily apparent to Members that this close quarters situation in the 'see & avoid' environment of Class G airspace below the Solent CTA and between the two closely located Class D CTRs was fundamentally a lookout

issue. With both pilots operating VFR under a FIS from two different ATSUs there was no responsibility placed on either controller to inform the other about their respective traffic and clearly it was up to each pilot to sight the other's ac in good time and effect visual separation as appropriate. Whilst both pilots had benefited from traffic information provided about other ac it was not certain that the information passed by Bournemouth to the PA28 pilot was about the AA5 which was approaching on his right-hand side and which had 'right of way' under the 'Rules of the Air' over the PA28. But the Board recognised that the 'Rules' can only work if you see the other ac in sufficient time to manoeuvre out of its way, which demands a disciplined scan and lookout regime. The difficulties of detecting another ac flying directly towards another with little relative movement to draw attention to it at a head-on aspect and of small cross-sectional area were well documented in previous Airprox reports and here it was evident from the PA28 pilot's frank account that he had not seen the AA5 at all. The AA5 pilot was very fortunate indeed that he had himself spotted the PA28 when he did and had time to dive rapidly out of the way for at these distances a moments indecision can spell disaster. The Board concluded unanimously that this Airprox had resulted from a non-sighting by the PA28 pilot and a very late sighting by the AA5 pilot.

This Airprox was a salutary lesson as to what can occur on a weekend afternoon in the narrow confines of Class G airspace below CTAs where there is little room for manoeuvre. This Airprox occurred below the coverage of the recorded radars operating at the time and consequently without such data it was not feasible to determine independently the minimum separation that pertained. That was not to say that the Board had any reason to doubt the veracity of the AA5 pilot's report, it was just that with only one pilot's view any assessment of the inherent risk was very difficult. Some Members thought that the AA5 pilot had seen the PA28 just in time, albeit that safety was not assured. However, the overwhelming view of the Board was that with only one pilot sighted to the danger from the other ac, the reported 50ft vertical separation coupled with the robust and probably instinctive avoiding action taken, an actual risk of a collision had existed in the circumstances reported here.

A useful learning point was also mentioned insofar as the Altimeter Setting Regions (ASRs) do not extend to the airspace beneath most airports' CTAs as stipulated in the UK AIP at ENR 1-7-1 para 3.7. Here beneath the 2000ft amsl base of the SOLENT CTA use had been made of the Portland RPS whereas Members stressed that for flight below the transition altitude the QNH of the local aerodrome should have been used. Whilst CAS infringement was certainly not an issue here, there was potential for encroachment into CAS, on forecast low-pressure days, when flying closely beneath CAS if using a pressure setting other than the actual Bournemouth or Southampton aerodrome QNH. The lesson here is that the use of the actual QNH would eradicate any potential for a problem of this nature.

Turning to the issue raised by the AA5 pilot of the provision of a single frequency for use by pilots operating VFR in the Class G airspace beneath CTAs, this was an interesting topic and the difficulties of the provision of an ATS in the FIR where several closely located ATSUs can potentially offer an ATS was discussed at length. Both Southampton and Bournemouth were providing an ATS here in the same airspace. Clearly each had a reason to do so but in the provision of a FIS would be unlikely to co-ordinate such traffic which would be fairly low in their overall list of priorities for service – lower than inbound IFR traffic for example. Some Members suggested that a directional flow system might also be beneficial – an experienced pilot Member recalled the now defunct cross-channel Special Rules Area – but the Board recognised the difficulty of establishing a more prescriptive regime for use by GA pilots in what was the 'Open FIR'. However, a controller Member cited the very successful provision of an ATS in airspace bounded by the Lands End Transit Corridor to ac transiting through or operating between Penzance, Land End and Scilly Isles. This was a good example of a more structured ATS provided to pilots in Class G airspace without being overly restrictive. Members did not underestimate the difficulties of reaching an accord between all airspace users but it was certainly worthy of review and the Chairman elected to discuss the issue with DAP.

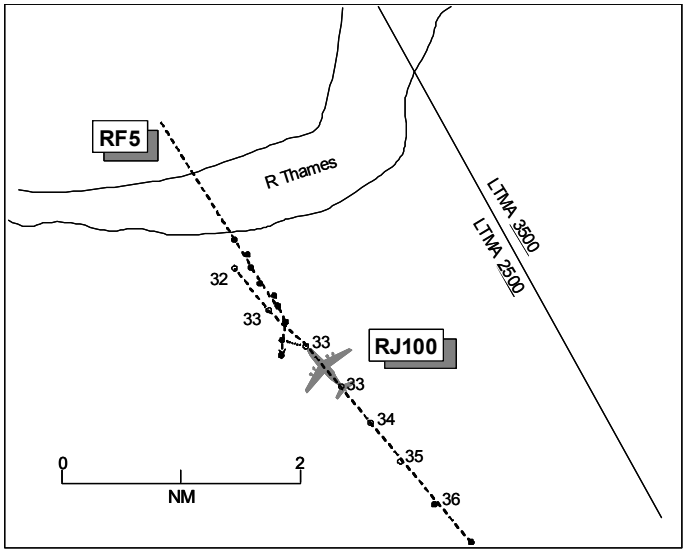
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the PA28 pilot and a very late sighting by the AA5 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 158/05

Date/Time:	5 Sep 1703	
Position:	5126 N 0025 E (10nm NW of Detling)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	RJ100	Fournier RF5
Operator:	CAT	Civ Pte
Alt/FL:	↓3000ft (QNH 1011mb)	3300ft (QNH)
Weather	VMC	VMC HAZE
Visibility:	50km	10nm
Reported Separation:	100ft V/0·3nm H	Little V/½nm H
Recorded Separation:	0.2nm H / V NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RJ100 PILOT reports heading 320° at 240kt; while on a radar heading to intercept the localizer at London City, cleared to 3000ft, he received a TCAS TA at 12 o'clock and 2nm. He saw the traffic and disconnected the autopilot. The other ac was seen to take avoiding action so he continued as cleared, passing 100ft below and 0·3nm to the right of the other ac which looked like a Grob. ATC issued no avoiding action.

THE FOURNIER RF5 PILOT reports heading 155° at 87kt en route from Wolverhampton to Lashenden via Princes Risborough and Stapleford. He was listening to London FIS on 124·6 Mhz and squawking 7000 without Mode C (not fitted). He had misread his chart (Edition 31 1:500,000) and was using 3500ft as his upper limit. While cruising at 3300ft QNH he saw the RJ100 at 1·5nm and made a steep descending turn to the right passing half a mile from it with very little vertical separation. He thought the risk of collision was medium to high.

THE THAMES RADAR CONTROLLER reports that the RJ100 was on a heading of 320° to report established on the localizer for RW28 at London City. It was descending from 4000 to 3000ft. When about 5-6nm NW of Detling the pilot advised that he had just had an Airprox with a Grob. He advised the RJ100 pilot that he could see a 7000 squawk with no Mode C about 4nm S of him. An effort was made to trace this 7000 squawk but he lost radar contact about 10nm further S.

ATSI reports that the RJ100 was descending to 3000ft under the control of Thames Radar, where the base of CAS was 2500ft. The pilot reported an Airprox with *"I think it was a Grob"* at 1704. The radar recording shows the RJ100 passing 3300ft at the time, as it merged with a 7000 squawk, without Mode C. Consequently, the Thames Radar Controller had no reason to believe that the 7000 squawk had penetrated CAS. There were no ATC causal factors.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board welcomed the RF5 pilot's frank report, from which the lesson of this Airprox can be identified for others. Members agreed that the time to choose what height to fly during a cross country was at the flight planning stage when charts could be studied more closely than in the air. The base heights of the portions of the LTMA relevant to this Airprox are very easy to determine from the 1:500,000 chart with it the right way up on a planning desk, but possibly less so with the map folded and orientated to a SE'ly track.

AIRPROX REPORT No 159/05

Members agreed that the cause of the Airprox was that the RF5 pilot, having misread his chart, penetrated Class A airspace without clearance and flew into confliction with the RJ100. The Board assessed that the sightings by the pilots, aided by TCAS, were early enough to enable both of them to remove any risk of collision.

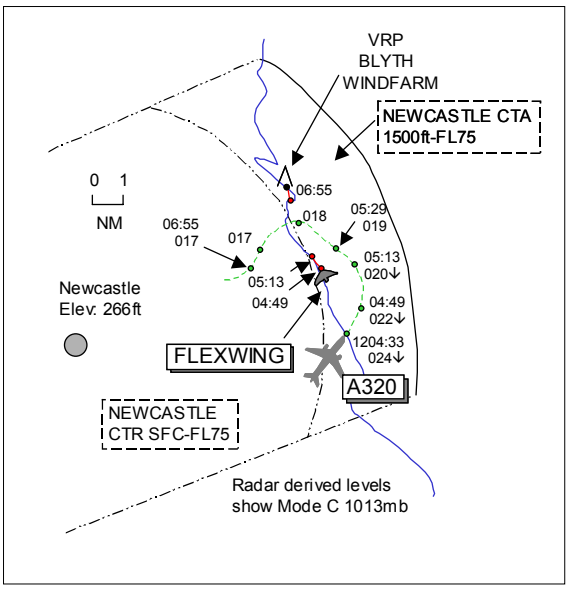
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The RF5 pilot, having misread his chart, penetrated Class A airspace without clearance and flew into conflict with the RJ100.

Degree of Risk: C.

AIRPROX REPORT NO 159/05

Date/Time:	4 Sep 1206 (Sunday)	
Position:	5506N 00129W (8nm FIN APP RW25 Newcastle - elev 266ft)	
Airspace:	CTA	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	A320	Pegasus Quantum Flexwing M/Light
Operator:	CAT	Civ Trg
Alt/FL:	↓2000ft (QNH)	1400ft (QNH 1023mb)
Weather	VMC HZBC	VMC CLOC
Visibility:	5000m	>10km
Reported Separation:	250-500ft V/0·25nm H	100ft V/500m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports heading 280° at 200kt inbound to Newcastle and in receipt of an ATS from Newcastle Approach on 118·5MHz squawking an assigned code with Mode C. The visibility was 5000m 1000ft below cloud in VMC and the ac's nav, anti-collision and strobe lights were all switched on. During vectors in CAS for an ILS to RW25 descending to 2000ft QNH they were given an intercept heading of 280° and were advised of the presence of a M/Light. During the turn a white coloured Flexwing M/Light was spotted by both crew members 2nm ahead and estimated to be at 1500-1800ft. The PF used the A/P and turned R onto 360° for avoiding action, flying through the LLZ, to initially parallel the M/Light before turning L in a safe arc to pass 0·25nm ahead of and 250-500ft above it, onto a heading of 180° to close the LLZ from the N. The PNF advised ATC of the manoeuvre which was acknowledged. ATC had RT and primary radar contact with the M/Light which was suggested to be outside CAS by its altitude. The Capt's concern was the affect of downwash from his ac with flap2 on the M/Light close below and he assessed the risk as low.

THE PEGASUS QUANTUM FLEXWING M/LIGHT PILOT reports flying a dual training sortie from Eshott airfield heading 360° at 50kt and in receipt of a FIS from Newcastle on 124·37MHz; no transponder was fitted. The visibility was >10km and the ac's wing was coloured white/blue and the trike was yellow; no lighting was carried. About 0·75nm S of Blyth Wind Farm ATC advised him of an inbound CAT ac which would pass over or close by although he didn't hear any RT calls from the other ac which he assumed was working Director on another frequency. He saw the airliner in his 5 o'clock position and informed ATC of the sighting. It was on a converging heading and he expected it to pass behind as it was approaching from the S to intercept the LLZ and he was just N of the extended C/L RW25. He was surprised to see the other ac as low as it was, estimating it to be at 1500ft

altitude. As the airliner approached his 4 o'clock ATC requested a level report, which he quoted as 1400ft QNH; his clearance was not above 1500ft seaward of the coast. Also at this time, he was further surprised to see the airliner turn R and overhaul him 500m on his RHS and 100ft above; he was just about to spiral down to the R before the other ac turned R. It then turned across in front from R to L and turned back towards Newcastle. He assessed the risk as low as he had constantly monitored the other ac's progress after he visually acquired it on an intercept heading.

THE NEWCASTLE RADAR 2 DIRECTOR reports the A320 was being vectored D/W LH for RW25 at 2000ft. Radar 1 told him of a M/Light transiting up the coastline under the CTA at 1400ft altitude. TI was passed to both crews who reported visual with each other's ac. The A320 flight was given a closing heading to intercept the LLZ but during this turn the crew adjusted the heading as they thought they were getting too close to the M/Light. The A320 flight then readjusted its heading to capture the ILS and continued its approach for landing. Neither crews expressed any comments on the RT and ATC were unaware of any report being filed.

The Newcastle METAR was EGNT 1150Z 16007KT 7000 FEW015 21/// Q1023=

ATSI reports that the M/Light was routeing N'bound, off the coast, below CAS of the Newcastle CTA (base 1500ft). It was being provided with a FIS by the Newcastle Radar 1 Controller. Information was passed to the M/Light pilot (just before 1203:30) about *"...inbound traffic descending above you inbound to the ILS"*. The pilot, subsequently, reported sighting the inbound traffic (just after 1204:30) and confirming his altitude as 1400ft.

Meanwhile, the Radar 2 Controller was vectoring the A320 LH D/W RW25 and it was given descent to 2000ft to ensure it remained 500ft above the base of CAS. (MATS Part 1, Section 1, Chapter 6, Page 4 refers.) Subsequently, TI was issued (just before 1204:30) about *"...a microlight just on the coastline currently in your ten o'clock at a range of two miles he's a thousand feet below your cleared level northbound"*. (This should have been 500ft.) The pilot reported visual with the traffic and informed ATC that he was going to take action to avoid it by a greater margin. Appropriate action taken by ATC.

UKAB Note (1): The Great Dun Fell radar recording does not show the Airprox owing to the intermittent radar return on the M/Light. The A320 is seen at 1204:33 squawking 3564 8·5nm E of Newcastle tracking NE descending through FL024 (2700ft QNH 1023mb). Sixteen seconds later the A320 commences a L turn towards final approach (following an ATC instruction to turn L onto 280° to establish on the LLZ) descending through FL022 (2500ft QNH) as a primary only return appears, believed to be the Flexwing M/Light, 1·8nm to its NW tracking 325° along the coast. The M/Light is last seen at 1205:13 near to the RW25 extended C/L with the A320 1·4nm to its ESE steady tracking 310° descending through FL020 (2300ft QNH). The A320 turns slightly R, just under 30sec later, briefly before commencing a L turn back towards final approach. The M/Light reappears at 1206:55 0·5nm S of Blyth Wind Farm VRP tracking 350° by which time the A320 is completing its turn onto final approach at FL017 (2000ft QNH).

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 discussion opened with the apparent disparate separation distances reported by both crews and what was revealed from the radar recording. The A320 had been given descent clearance to altitude 2000ft, 500ft above the base level of CAS, and was told that the M/Light was 2nm away and, erroneously, 1000ft [should have been 500ft] below his cleared level. The TI passed by the Radar 2 may have given the A320 crew the wrong impression so that when the M/light was visually acquired, it was indeed separated by less than the 1000ft expected. The A320 crew had stopped their L turn and indeed turned R to give the M/Light a wider berth before turning L into an arc to position back onto final approach, passing a reported 0·25nm ahead of and 250-500ft above the M/light. Pilot Members agreed that during the L-banked turn executed by the A320, the M/Light may have appeared closer when viewed downwards by the crew.

The M/light pilot reported following his clearance by flying up the coast not above 1500ft and was given generic TI on the A320 which he first saw in his 5 o'clock position, converging and estimating it to be lower than normal, just above him. He reported level at 1400ft altitude when asked. He was about to turn and descend, as he perceived that there was a potential confliction, until he saw the airliner turn away and overhaul him 500m to his R before

crossing ahead R to L, he estimated 100ft above. Members noted that the M/Lights pilot's estimate of the A320's level was not borne out from the radar recording which reveals the A320 in a slow descent passing FL018 (2100ft QNH) as it coasted-in in the area of reported Airprox position. This Mode C indicated that vertical separation would have been in the region of 600-700ft as the subject ac's flight paths crossed, slightly more than the 500ft minimum that could pertain owing to the CAS airspace layout. Members agreed that as the radar had shown the A320 flying through the area 500ft above the CAS base level, on the balance of probability the separation distance reported by the M/Light pilot had been mistaken. The Board felt that the subject ac had passed with at least 500ft vertical separation, as well as some lateral spacing, and this was all that should be expected in these circumstances. Members accepted that the A320 crew were concerned about their downwash affecting the M/Light and so would not have wished to fly too close to this light ac. This was enough to persuade the Board that this had been little more than a sighting report and that safety had been assured during the encounter.

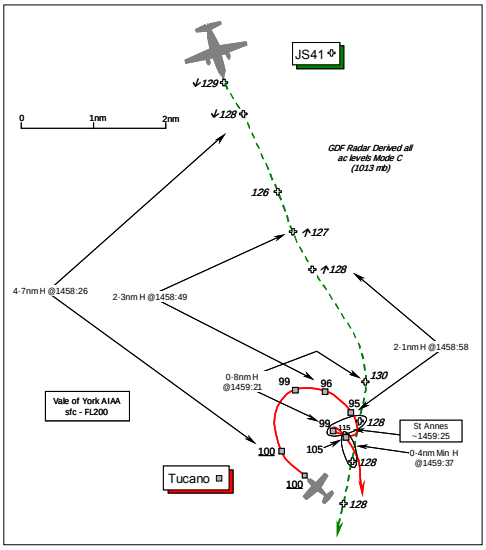
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 160/05

Date/Time:	6 Sep 1459	
Position:	5412N 00040W (25nm E of Topcliffe - Vale of York)	
Airspace:	Vale of York AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Jetstream 41	Tucano
Operator:	CAT	HQ PTC
Alt/FL:	FL126↓	FL90↑
Weather	VMC CLOC	VMC No Cloud
Visibility:	100nm	25km+
Reported Separation:	Nil V/½nm	2000ft V/½nm H
Recorded Separation:	1300ft V/0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports he was flying from Aberdeen to Humberside and in receipt of a RAS from LONDON MILITARY on 135·42MHz. The assigned squawk was selected with Mode C and TCAS is fitted.

Southbound through the Vale of York descending in "good VMC" at about 230kt, LONDON MILITARY instructed them to stop descent at FL130 as they were passing FL126. The controller then instructed them to turn L onto 090° as there was traffic to the W, but as they began to turn ATC instructed them to reverse into a R turn onto 220°. A Tucano was then spotted ½nm away to starboard doing aerobatics whereupon he asked to turn back onto 090° again coupled with a climb of 400ft to avoid it. When steady, he thought on an eastbound heading, the Tucano was seen doing loops through their level [as shown on the diagram included with the pilot's account] as it passed to starboard and then drew aft crossing astern into their 8 o'clock position until the ac vanished behind the engine nacelle. The risk was assessed as *"moderate"* and although they received a TCAS TA on the Tucano no RA was enunciated.

THE TUCANO PILOT, a QFI, reports that his ac has a black/yellow colour-scheme and the HISLs were on whilst conducting an airtest over the Vale of Pickering on variable headings at various speeds. He was operating in VMC where there was no cloud and an in-flight visibility of 25km+. Whilst not under any ATS he was squawking A4577 [a verified & validated Vale of York AIAA conspicuity code] with Mode C, but TCAS is not fitted.

Whilst conducting aerobatics from a base level of FL90, he had already commenced a loop when he first saw the Jetstream over his shoulder 1nm away and 3000ft above his Tucano. He rolled slightly to port and increased the G to tighten the manoeuvre so that he passed slightly to the side and well below the Jetstream. Minimum horizontal separation was ½nm but the vertical separation was so great - approx 2000ft above his ac - that he did not consider this encounter to be an Airprox and assessed the risk as *"none"*. A pertinent factor was that the Jetstream was approaching from astern as he started the loop and was thus not visible beforehand.

THE TUCANO PILOT'S STATION comments this Airprox highlights the increasing use of TCAS for initiating Airprox reports whilst flying in the 'Open FIR'. This was no more than a routine encounter in Class G airspace and the Tucano pilot took simple action to change his flightpath to increase the separation. It would appear that users of the 'Open FIR' are not aware that the Vale of York AIAA is busy airspace and, despite receiving a RAS, must expect frequent TCAS 'warnings' if they wish to exploit the advantages of direct routeings through a particularly busy piece of airspace. The intense nature of VFR ac operations, both military and civil, within the Vale of York AIAA appears to have faded from 'the corporate memory' and it would seem that the time is right for a well targeted publicity campaign to raise awareness of the diverse and intense nature of operations within this busy piece of airspace.

MIL ATC OPS reports that the JS41 was descending to FL55 into Humberside, through the Vale of York, under a RAS from LATCC (Mil) Controller 14 (CON14). At 1458:28 CON 14 instructed the JS41 crew "[JS41 C/S] *avoiding action stop descent FL130, traffic right 1 o'clock, 5 miles reciprocal heading indicating FL100*". The JS41 crew immediately responded "*we've just gone through 130 we're now at FL126*". CON 14 passed "[JS41 C/S] *roger when you're…(unintelligible word)… turn left heading 090, previously reported traffic now right 2 o'clock, 3 miles south oh – this is avoiding action turn right 200 previously reported traffic now 12 o'clock, 2 miles, crossing right/ left manoeuvring indicating FL95*". The JS41 crew replied "*Thank you we were turning left for 090, we're now turning right to 200 and maintaining FL130, climbing for that*". CON 14 informed the JS41 crew that the conflicting ac was manoeuvring. At 1459:37, the JS41 crew requested "*JS41 C/S, can we take a heading towards the west, please, because he's just going above and below us on the right hand side*"? CON 14 turned the JS41 right onto a heading of 270°. However, the JS41 crew declined the turn and advised CON 14 "*no, we'll turn towards the east…we turn left to 090*". The next call from CON14 informed the JS41 crew that they were clear of the conflicting traffic and they could resume own navigation to Humberside.

[UKAB Note (1): The Great Dun Fell (GDF) Radar recording does not illustrate this encounter well as the aerobatic manoeuvres performed by the Tucano during the latter stages of the encounter are not readily apparent because some returns are lost as the Jetstream closes on the manoeuvring ac. The JS41 is shown approaching the location of the Airprox in the Vale of York AIAA, tracking 160° squawking A6143 and descending. Simultaneously, the Tucano is S of the JS41, northbound, squawking A4577 and also descending. At 1457:56 the Tucano enters a L turn onto 340° whilst levelling at FL100 with the JS41 some 9nm NNW of the Tucano, descending through FL134. The diagram shows that at 1458:26, moments before CON14 issued the avoiding action stop descent, horizontal separation had reduced to 4·7nm with the Tucano still indicating FL100 Mode C as the JS41 descends through FL128. From this point the Tucano initiates a R turn whilst descending slightly to FL96 whilst the JS41 is 2·3nm N, having previously 'bottomed out' at FL126, and now reversed into a climb through FL127 but although slight turns are evident . The Tucano continues the R turn whilst indicating FL95 with the JS41 closing slightly to a range of 2·1 nm climbing through FL128. After this point contact on the Tucano is lost for several sweeps as the JS41 ascends to a maximum of FL130 by 1459:21, and the Tucano is shown briefly at FL99 about 0·8nm SW of the airliner. No Mode C is evident from the Tucano on the GDF, however, the recording of the St Annes source shows one sweep of the Tucano at FL110 whilst it is virtually stationary in azimuth 0·5nm SW of the JS41 at 1459:25, with successive returns showing FL115 and then FL112 respectively. The JS41's Mode C is not shown then but assuming it to be at FL128 minimum vertical separation was in the order of 1300ft. However, this is at odds with the JS41 pilot's account and RT report where it is reported that the Tucano climbed through the level of the JS41. On the GDF recording the JS41 passes 0·4nm E abeam the Tucano and opens to the S just before the Tucano sets a southerly course. Minimum horizontal separation of 0·4nm is maintained on the next sweep at 1459:37, when the JS41 is shown at FL128 due S of the Tucano which is indicating FL105. Separation thereafter

increases as the JS41 maintains FL128 and starts to outrun the Tucano, which descends southbound and draws astern.]

At the time of the Airprox, CON 14 was being manned by a trainee and mentor. The mentor reports their workload as high, working 3 tracks, one ac on UHF and 2 on VHF. CON 14 had to issue avoiding action, twice, to another ac climbing out of Newcastle, which had recently transferred to her frequency. She subsequently passed traffic information to another ac on her frequency and then returned her scan to the JS41 to find it was in confliction with the subject Tucano. CON 14 immediately attempted to stop the JS41's descent at FL130 to provide standard separation but unfortunately the JS41 crew had already passed through this level and reported at FL126. CON 14 then provided an avoiding action turn onto E reporting the conflicting Tucano 3 miles away. In the same transmission, she changed the avoiding action to a turn onto a heading of 200° as the Tucano's position had altered. The JS41 crew accepted the turn and reported in the climb to FL130. The Tucano reportedly took up a manoeuvring profile 1nm to the W of the JS41 and at 1459:37 the JS41 crew requested a westerly heading as they reported the Tucano going above and below them on the right hand side. CON 14 approved the westerly turn but the JS41 crew changed their intentions and requested an easterly turn instead, CON 14 agreed this. Although CON 14 was late in initially spotting the conflicting Tucano, she attempted to provide separation by firstly stopping descent and then turning the JS41. The turn onto 200° was sound at the time as the Tucano was in the JS41's 12 o'clock and appeared to be taking up a south easterly heading. However, the Tucano continued the right hand orbit which brought it back into confliction with the JS41. From the transcript it would appear that the JS41 crew became visual with the Tucano and were taking their own visual separation, advising CON14 which heading they required.

UKAB Note (2): The UK AIP at ENR 5-2-2, notifies the co-ordinates of the Vale of York AIAA and entreats pilots transiting the area to maintain constant vigilance and that a LARS is available from Leeming and Linton. Moreover, at remarks it warns of *"considerable military fixed-wing and rotary flying training, including in addition to airfield letdown procedures, exercises in stalling spinning steep turns and formation flying".*

HQ PTC strongly endorses the station comments. Encounters such as this are to be expected in an AIAA and all users should be aware of the increased likelihood of seeing other manoeuvring traffic in such an area and be prepared to take appropriate avoiding action.

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.

During their assessment of this Airprox, the Board noted the Tucano Station's comments on the diverse and intense nature of VFR ac operations within the Vale of York AIAA - both military and civil, the PTC Member commented - and controller Members familiar with this particular airspace are keenly aware of how busy it is. But contrary to the Station's view, in their wide ranging discussions the Board was briefed that some other civil operators do actively discourage their pilots from transiting through AIAAs. However, on some routes it is not feasible to avoid such areas and commercial operators should, and do, take due account of the risks associated with operating through Class G airspace. Other military Members pointed out that the increasing intensity of CAT ac operating scheduled routes through Class G airspace does impact on other airspace users and increase the potential for encounters such as reported here. Nonetheless, it was clear that the JS41 pilot had heeded the advice contained within the UK AIP and FODCOMs and obtained a RAS from LATCC (Mil). However, this Airprox illustrated clearly the difficulties inherent in the provision of an ATS to flights transiting through AIAAs – especially the unpredictable nature of VFR flights operating in Class G airspace – and the likelihood of avoiding action manoeuvres being transmitted with little advance warning.

In considering the provision of the RAS to the JS41 crew, it was evident from the comprehensive Mil ATC Ops report that CON14 had been busy with other traffic just before this Airprox had occurred and was evidently operating under a high workload. The Mil ATC Ops advisor said that although the confliction with the Tucano was detected late by CON 14 – traffic information was passed at 5nm just as standard separation was eroded - the controller had nevertheless instantly proffered avoiding action by stopping the JS41's descent. Whilst this might possibly have afforded sufficient separation against traffic indicating a level cruise at FL100 verified Mode C below the JS41's level stop at FL130, unfortunately and unbeknown to the controller at the time, this was just before the

Tucano pilot was about to initiate his R turn and start his aerobatic manoeuvres. Some suggested that the use of the aerobatic squawk – A7004 (deemed unverified) - might have made this more apparent to the controller but it was explained that the Mode C associated with the Vale of York AIAA conspicuity code is verified and thus more helpful to the controller when seeking to achieve vertical separation. Once the Tucano pilot had turned and then climbed then horizontal avoiding action was warranted. In some Members' opinion if the confliction had been spotted earlier and positive avoiding action then taken it might have forestalled the whole incident. The majority view was, however, that having spotted the confliction late, CON14 had done her best to offer what assistance she could with advisory avoiding action turns. At these close quarters controller Members understood that it would have been very difficult to maintain separation unless a turn had been executed immediately and robustly. As it was, even with the rapid reversal of the turn instructions as a result of the Tucano's manoeuvres at close quarters the radar recording evinced that the JS41 never steadied on either of the avoiding action headings. Thus the advisory avoiding action instructions had no practical effect. However, the prevailing good weather conditions allowed the JS41 pilot to spot the small Tucano and it appeared that having seen it from ½nm away the JS41 pilot was also relying on his own visual separation, which would undoubtedly have been more effective at these distances. Here the JS41 pilot had reported both on RT and within his written account that the Tucano had climbed through his level, above his airliner, but the recordings of the two radar sources did not replicate this. Whilst not doubting the veracity of the JS41 pilot's account, it was not possible to reconcile this anomaly with certainty due to the intermittent nature of the Tucano's Mode C whilst it manoeuvred. Some Members suggested that in all probability a succession of L and R banked turns by the JS41, coupled with the Tucano's aerobatics, might potentially have given a misleading impression of the vertical geometry of the situation. Moreover, CAT pilot Members noted that TCAS had not enunciated an RA and only warned of the Tucano's presence through a TA, perhaps indicating that the Tucano had not breached this important safety net. The Board was reminded that the Tucano fleet is being fitted with TCAS I from Feb/Mar 2006 with fleet embodiment anticipated by Mar 2007, which might have given the Tucano pilot earlier warning of the JS41 closing from the N. The Tucano pilot had reported that he had flown no closer than 2000ft below the JS41: however, the St Annes Radar recording suggested it was more of the order of 1300ft, just before the JS41 passed and possibly just at the point that the Tucano pilot spotted the airliner. Whilst it was evident that the Tucano QFI was legitimately conducting his aerobatics in Class G airspace, he had reported that he had not detected the presence of the JS41 before commencing his loop – so a relatively late spot on his part - but the JS41 is not a large passenger ac and approaching head-on might be difficult to spot. Nevertheless, once seen the Tucano pilot had taken positive action to avoid the JS41, flying no closer than 0·4nm astern. Whilst possibly not ideal, this had effectively resolved the situation from his perspective and had probably forestalled any potential for TCAS to trigger an RA. Therefore, after weighing all the relevant factors carefully, the Board concluded unanimously that this encounter between the JS41, operating under IFR, and the Tucano was a sighting report of VFR traffic operating in the AIAA and that in the circumstances reported here, no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

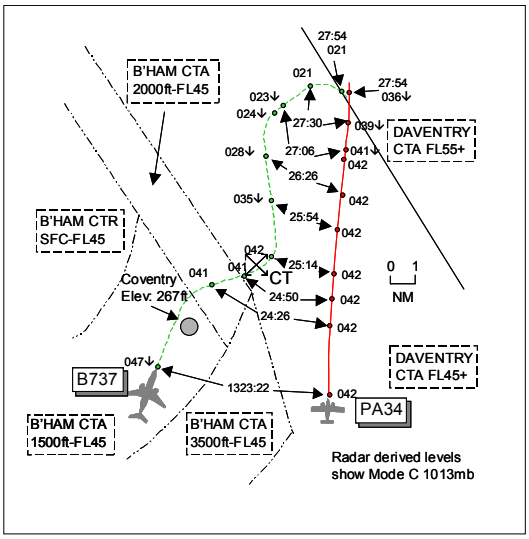
Cause: Sighting Report.

Degree of Risk: C.

AIRPROX REPORT No 161/05

AIRPROX REPORT NO 161/05

Date/Time:	6 Sep 1325	
Position:	5225N 00119W (7nm NE Coventry - elev 267ft)	
Airspace:	FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-500	PA34
Operator:	CAT	Civ Comm
Alt/FL:	4000ft↓ (QNH 1009mb)	4000ft (RPS 1005mb)
Weather	VMC CLOC	VMC CAVK
Visibility:	30km	NR
Reported Separation:	Nil V/2·5nm H	1000ft V/2nm H
Recorded Separation:	Nil V/2·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Coventry IFR and in receipt of a RAS from Coventry Radar on 119·25MHz squawking an assigned code with Mode C. The latter part of their descent was complicated by many radar contacts both with and without Mode C and a late handover by Birmingham Radar was given in the Coventry O/H descending to 4000ft and a heading of 090° at 200kt. When steady on this heading and still not identified by Coventry Approach, a TCAS contact was seen in their 1 o'clock indicating at the same level. The busy RT precluded any query over the status of this traffic as the TCAS contact aspect remained constant. Despite intensive lookout by both crew members, no visual contact was made. At 2·5nm TCAS range it was obvious that any lack of flight path change was going to result in an RA so the A/P was disconnected and a positive 40° turn away from the contact was made. At this point the FO visually acquired the other ac, the visibility was >30km, and confirmed that it was at their level and then Coventry Radar was able to coordinate the position of both ac and give a further turn away and a descent to 2000ft QNH. At a suitable point a turn back R onto a closing heading for the RW23 ILS was made. By now the other ac was in their vicinity and had also commenced a descent, passing over the top of their ac by 1500ft showing a descent on TCAS and the Capt also saw the ac and identified it as a low wing twin piston engined type. The other ac's pilot then contacted Coventry and identified himself reporting his descent which the controller urgently stopped. The other pilot said that he had been working Brize Radar and had then been advised to contact East Midlands, his destination.

THE PA34 PILOT reports routeing from the OX NDB inbound to East Midlands VFR heading 360° at 150kt and 4000ft RPS 1005mb in receipt of a RIS from Brize Norton squawking 3713 with Mode C. He was told to contact East Midlands on 134·17MHz – he was unsure whether it was a handover or freecall – and the controller asked if he had spoken to Coventry which he was about to do on Box 2; by now he was squawking the newly assigned East Midlands code 4550, he thought. He called Coventry and was told to standby - by now he was 6nm NE of Coventry – and, in the CAVOK conditions, he saw a B737 about 2nm away in his 10 o'clock about 1000ft above. It was seen to turn L onto 360° and he could hear the corresponding instructions from Coventry ATC; the B737 remained 2nm clear. As East Midlands (in their brief RT exchange) had advised him to remain clear of their CAS, he commenced a cruise descent, advising Coventry accordingly, in order to avoid infringing East Midlands CTA ahead. Coventry then requested him to stop his descent at 3500ft in order to avoid conflict with other/possibly the same traffic on approach to Coventry. He assessed the risk as low.

THE COVENTRY APP/APR reports that he was unclear where the alleged confliction occurred. The B737 had been coordinated by Birmingham Approach to be handed over 'leaving the gate at 4000ft through the Coventry overhead'. Upon first contact, he gave the B737 flight a heading (possibly 070°) followed by a further L turn onto 360° for vectoring to the ILS to RW23. As the flight left CAS the type of service was not changed owing to high RT workload. A number of ac were receiving a FIS – mainly transit ac – none of which conflicted 'position wise' (level or geographic) with the B737. He had planned to vector the B737 for a RH pattern which he had passed to

the crew. At some stage after this, an XYZ (company c/s prefix) called on frequency when the RT workload was excessive. A telephone call was received from East Midlands ATC to ask if the XYZ311 had called - he confirmed that an XYZ c/s had made a call but was unsure if it was 311 suffix. The B737 descended to altitude 2000ft and TI was given with reference to XYZ311 which was believed to be at FL042 and identified by East Midlands.

ATSI reports that the controller described his workload as high at the time of the Airprox. He had been in position as the combined APP/APR for about 30min. He added that a relatively inexperienced assistant had been in the Approach Control Room at the time. Although the assistant had been carrying out administrative duties he had enlisted this person's help to write out the fpss. The APR was operating with Primary Radar equipment only, as Coventry ATC is not equipped with SSR.

The 1320 Coventry weather observation was: surface wind 210°/4kt; visibility in excess of 10km; cloud, few at 2000ft and scattered at 7000ft.

In accordance with the agreement reached between the Birmingham and Coventry APRs, the B737 flight established communication with Coventry Approach at 1323, when it was SW of the airport, reporting descending to 4000ft on a radar heading 030°. The flight had been identified to Coventry but because of its routeing through the radar overhead, it would need to be re-identified E of the airport. The pilot was informed accordingly and instructed to turn R heading 080°, with the intention of positioning it LH downwind for RW23. The radar recording, timed at 1323:22, shows the B737, within the Birmingham CTA (Class D airspace), approximately 2·5nm SW of Coventry Airport, passing FL47. Also seen is an ac squawking 4554 (East Midlands) at FL42, heading N, 7nm to the E of the B737, outside CAS. This was, subsequently, established as the PA34. The controller commented that he had not seen the primary return of this ac tracking N at the time. The radar recording shows that it is possible that this ac would not have shown clearly on the Coventry radar display because of other radar returns in the area. The R turn issued to the B737 resulted in it tracking towards the PA34, therefore, without the controller realising the potential confliction.

At 1324 the PA34 flight made what turned out to be the first of several attempts to contact Coventry Approach. On this occasion the APR was telephoning the ADC to warn him that the B737 was in the overhead at 4000ft and he did not register the PA34's transmission. By 1324:30, the pilot of the B737 had reported steady heading 080°. At the time the B737 was still within the CTA with the PA34, 100ft above, in its 1 o'clock position at a range of 5nm. Although the PA34 was by now tracking clear of the other radar returns, the Coventry APR said that he was still unaware of its presence. The APR admitted that he had not positively re-identified the B737, as it routed out of the overhead, in accordance with MATS Part 1 procedures (Section 1, Chapter 5, Page 5). He explained that by correlating the radar display to the confirmation that the B737 was established heading 080°, he made the assumption that it was the correct ac, thereby, he reasoned, saving the need to turn it for identification as is normally required.

The APR said that he received a telephone call from Birmingham Approach (1324:30) asking him if he could see traffic (the PA34) that was N'bound, about 3nm SE of the Coventry (CT) NDB. He replied that he could and was warned that it was at FL42 on an East Midlands squawk. During this telephone call the PA34 flight made its second transmission on the Coventry Approach frequency, again unheard by the controller. Acting on the telephone call from Birmingham, the Coventry APR transmitted to the B737 *"just had traffic pointed out to me by Birmingham across in your R…in fact due east of you now by two point seven miles indicating Flight Level four two working East Midlands. Do you have any contact?"* By this time, the B737 was just about to cross the CTA boundary, at FL41, into Class G airspace. The pilot replied that he was visual and was turning L heading 030°. The flight, now outside CAS, was instructed to turn L heading 360°, for positioning RH downwind for RW23. It was as the B737 was in the L turn that the minimum separation occurred (1325:14), when both ac were at the same level 2·6nm apart. The pilot was not informed that he was leaving CAS or advised of the type of ATC service being provided. (MATS Part 1, Chapter 5, Page 2 refers). The controller stated that as far as he was concerned he was providing a RAS to the B737 but added that, because of the lack of SSR, he would not have known exactly when the flight left CAS unless he had obtained a level report passing FL45 (the base of the Daventry CTA). The pilot was instructed to descend to 2000ft when established on the heading. It was at this point that the PA34 made its third attempt to establish communication. On this occasion the pilot was unsuccessful because his transmission crossed with that of another ac. Finally, at 1325:50, following a further transmission, the pilot of the PA34 was told to standby and instructed to remain well clear of Coventry due to traffic. The controller reported that he did not correlate this ac to the unknown ac, although the D/F would have shown the bearing of the flight.

At 1326:30, the B737 was instructed to turn R heading 050°, 14nm from touchdown. The radar reveals that the subject ac were now 3·4nm apart, with the B737 showing at FL28 whilst the PA34 is to its SE, still maintaining FL42. Shortly afterwards the Coventry APR received a telephone call from East Midlands asking if he was working the PA34. The former said that he wasn't and requested if it was the one he could see on the radar display 8nm N of Coventry Airport. With reference to the East Midlands SSR display, the controller informed the Coventry APR that the PA34 was at FL42 and the B737 was showing at 2300ft. The pilot of the B737 stated he was ready to turn in anytime and was instructed to turn R heading 150°. Using the information supplied by East Midlands, the pilot was informed that the *"previously reported traffic is overflying, he's level Flight Level four two"*. The pilot responded *"thank you we have it"*. The B737 flight was then instructed to continue R heading 180°. By now, 1327:30, the subject ac were on conflicting tracks 2·1nm apart. The PA34 had commenced descent and was passing FL39, the B737 was 1800ft below.

The Coventry APR said that he recollected that the PA34 had called and been told to standby, although he could not remember its c/s. Consequently, he tried to contact the ac by just using the company prefix. The PA34 pilot responded, adding that he was descending and also talking to East Midlands on the other box. The pilot reported at 3500ft and was instructed not to descend, as there was a Boeing 737 below him at 2000ft. As the B737 continued its R turn as instructed, the two flights passed 0·3nm apart at 1327:54, separated vertically by 1500ft.

In accordance with the procedures stated in MATS Part 1, Section 1, Chapter 5, Paragraph 1.4, when providing a RAS *'Controllers shall pass avoiding action instructions to resolve a confliction with non-participating traffic and, wherever possible, shall seek to achieve separation which is not less than 5nm or 3000 feet'*. No avoiding action was issued during this incident.

The PA34 pilot made several attempts to establish communication with Coventry Approach. On 3 occasions the controller concerned was on the telephone. The controller commented that he had experienced problems with his headset recently and the telephone/RT reception levels. He could not say whether this precluded him from hearing both the RT and the telephone during this occurrence.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was unfortunate that the PA34 pilot had not called Coventry earlier after working Brize Radar. Although Brize had transferred the PA34 pilot directly to East Midlands, his destination, this had delayed his initial call on the Coventry frequency when subsequently prompted by the East Midlands controller. It was as the PA34 pilot was trying to establish contact with Coventry that the APR's workload had increased with the B737's arrival on frequency and the subsequent telephone calls.

It was clear to Members that the Coventry APR's options were limited for vectoring the B737 owing to airspace constraints. He could have tried to coordinate with the Birmingham controller to keep the B737 within CAS for a longer period but eventually the ac would have to leave CAS and enter Class G airspace during vectoring for the RW23 ILS. The Birmingham release placed the B737 in a position that would be clear of Birmingham traffic but would also allow the Coventry APR freedom to vector the ac for the ILS clear of other traffic. This release placed the B737 on 030° towards the Coventry radar overhead which required the APR to re-identify the ac after it had passed through. This was not carried out: the APR had given the B737 crew a R turn onto heading 080° as the ac passed overhead Coventry but had assumed the B737's identity after it reappeared to the NE. The B737 crew were then in an invidious position, whilst not identified and having been given a turn and, whilst still within CAS at that time, shortly to cross into Class G airspace. The B737 crew should have been told when they had left CAS but, without the benefit of SSR, the APR would not know this unless he obtained a pilot reported level. This was not done so a 'contract' between ATC and the B737 crew had not been formalised to change the type of service from a RCS to a RAS. However, the 080° heading given by APR had been for positioning the B737 into a LH pattern for RW23 but he had not noticed the PA34 tracking N'bound to the E of Coventry. This heading had vectored the B737 into conflict with the PA34 which had caused the Airprox.

Although during this busy period the Birmingham Approach controller had telephoned the Coventry APR to warn him of the PA34's presence, further adding to his workload, the APR had acted on the TI and informed the B737 crew. Fortunately the B737 crew had already received a heads-up on the potential confliction from TCAS. They

had monitored the PA34's converging course and, being unable to query the situation with ATC owing to the busy RT, had turned L to avoid it before the APR had given TI and a further L turn onto 360°. Members agreed that the use of TCAS for separation in the horizontal plane is unwise, owing to its known system deficiencies, but the crew had quickly visually acquired the PA34 to their R, during their L turn away, at the same level.

The PA34 pilot had tried on several occasions to contact Coventry and, during this period, he had seen the B737 to his L and watched it turn away, hearing the corresponding transmissions between ATC and the B737 crew. The APR had then descended the B737 and vectored it towards the PA34, assuming that the latter was still maintaining FL42 acting on the TI given by East Midlands APR. When the PA34 pilot did finally establish two-way communications with the Coventry APR, he had commenced a descent to avoid East Midlands CAS ahead of his track so the APR stopped his descent at 3500ft to remain above the B737. Even though no level of service had been agreed with the B737 crew, with both parties assuming a RAS was being applied, Members agreed with the ATSI findings that the APR should have seeked to achieve 5nm or 3000ft separation and not assume that separation existed between the subject ac when further turning the B737 towards the PA34. The B737 crew had continued to watch the PA34's progress on TCAS and seen it pass clear above. Although all of these elements were individually untidy, when combined they were enough to allow the Board to conclude that safety had been assured during the encounter.

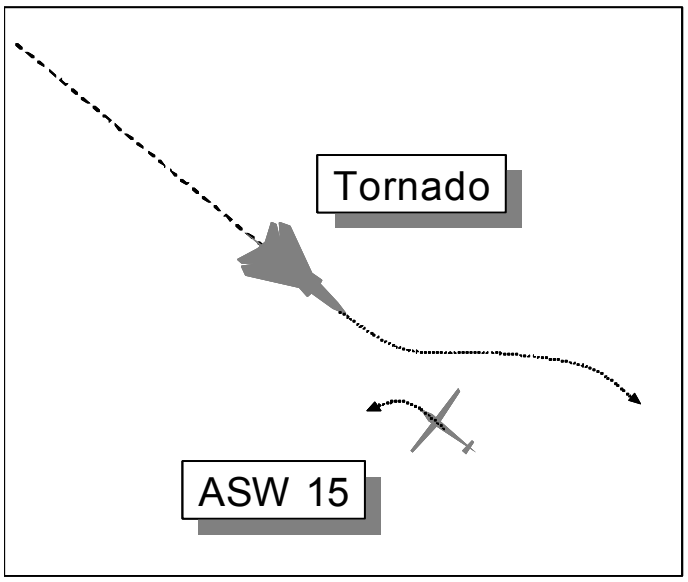
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Coventry APR vectored the B737 into conflict with the PA34.

Degree of Risk: C.

AIRPROX REPORT NO 162/05

Date/Time:	7 Sep 1302	
Position:	5534N 0202W (3nm SE Milfield GS - elev 150ft)	
Airspace:	LFIR	(Class: G)
	First Ac	*Second Ac*
Type:	Tornado	ASW 15
Operator:	HQ STC	Civ Pte
Alt/FL:	FL130	9826ft (QFE 1001mb)
Weather	VMC CLBL	VMC CLBL
Visibility:	Unltd	>50km
Reported Separation:	100ft V/500ft H	0ft V/300m H
Recorded Separation:	NK	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 134°, climbing at 350kt. The glider was seen in his 1 o'clock about 700ft away, 100ft below and on a reciprocal heading. He broke up and left at the same time as the glider broke down and left and they passed 100ft above and 500ft from the glider. It was last seen in his 5 o'clock 1000ft below, heading away and manoeuvring. He would not have collided with it but would have passed within 200ft of it without the avoiding action. His SSR was on STBY as No 2 of the formation and he was in 2nm radar trail on his element leader. At the time of the incident a RAS was just being established with GCI.

AIRPROX REPORT No 162/05

THE ASW 15 PILOT reports heading 320° at 46kt. While wave soaring from Milfield at 9800ft, 2 Tornado jets approached him from his 1 o'clock position. The first of the two passed safely on his right. The second, which he saw at 1 o'clock, 1·5km, passed about 4 seconds later - also on his right - while banking hard left, but this time about 300m away with little or no vertical separation. The risk of collision was moderate to high. He believed that the crew of the second Tornado took avoiding action as the ac turned hard left with 90° of bank. He also turned hard left and then flew into the Tornado's wake. On landing back at Milfield the incident was reported to the Scottish Civil ATC supervisor.

UKAB Note: The Tornado pilot believed the incident occurred at FL130. While there were other gliders airborne in the area, none was above 10,000ft since they were not O_2 equipped. The glider's GPS recorder showed 9,826ft above Milfield (9,880ft above the 1013mb pressure level) – the recorder has just been checked and its vertical accuracy certified to be within 30ft. The recorded level also agreed with the glider's altimeter at the time of the incident. Radar recordings show the Tornado element leader climbing at 5,000ft/min and unless the (non-squawking) No 2 was climbing at a much greater rate it is unlikely that his reported level would have resulted from delay in noting the level but his reported time was 1 minute after the time on the glider's GPS recording. The ATC radar recordings show an intermittent primary-only return in the reported Airprox position just before the Tornados pass but not at the time the No 2 passes. There is, therefore, no radar information on the Airprox and the discrepancy in reported levels has not been resolved.

ASACS SSU reports that the F3 was operating under a RAS from Boulmer RTB Leeming at FL140. No traffic was observed on radar in the vicinity of the Airprox. The F3 reported the Airprox on frequency at 1303:17.

HQ STC comments that this was a late spot by both but timely enough for some avoiding action to be taken. As the F3s were climbing between layers of cloud it is probable that the predominantly white glider would have been difficult to see against the upper cloud layer.

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 operating authorities.

Some Members considered that the cause of the Airprox was a late sighting of the conflicting traffic by both pilots. A majority, however, argued that the Tornado pilot probably saw the glider as early as possible against the prevailing background and that the glider pilot, with a limited ability to get out of the way of the Tornado, would not have been able to do much more had he seen the Tornados earlier. The Board concluded that the incident was a confliction of flightpaths in Class G airspace which was resolved by the actions of both pilots.

A GA Member raised the possibility of providing publicity for the location of suitable wave soaring conditions as a warning to other airspace users. The general view was that the information would be of limited use bearing in mind that gliders could be encountered almost anywhere and a lookout should always be kept for them.

In considering the risk, Members wondered if the glider's 'manoeuvring' as seen by the departing Tornado pilot was the result of the glider's encounter with the Tornado's wake. Although the Tornado pilot assessed that the ac would not actually have collided in any case, the Board considered that the closeness of passage and the sharp avoiding action carried out by both pilots indicated that the safety of the ac had not been assured.

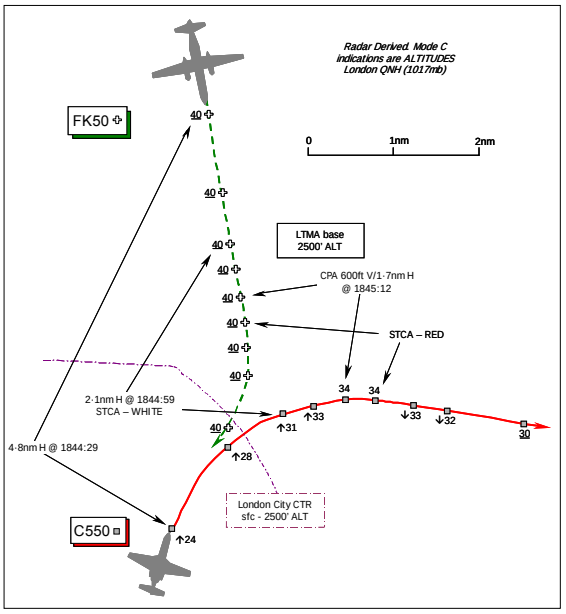
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G resolved by both pilots.

Degree of Risk: B.

AIRPROX REPORT NO 163/05

Date/Time:	4 Sep 1845 (Sunday)	
Position:	5134N 00011E (6nm NE London City Airport - elev 19ft)	
Airspace:	London TMA	(Class: A)
Reporter:	LTCC Thames Radar	
	First Ac	*Second Ac*
Type:	FK50	C550
Operator:	CAT	Civ Comm
Alt/FL:	4000ft amsl	3350ft (N/K)
Weather	IMC NR	NR NR
Visibility:	NR	>10km
Reported Separation:	LTCC: 600ft V/1·7nm H	
	NR	NK
Recorded Separation:	600ft V/1·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LTCC THAMES RADAR CONTROLLER reports that Heathrow SVFR was bandboxed onto the Thames RADAR Control position. The C550 was departing IFR from RW10 at London City with a FK50 inbound from Liverpool IFR, level at 4000ft QNH. As the C550 pilot reported airborne passing 2000ft, climbing to an altitude of 3000ft London QNH (1017mb), he asked the C550 pilot to squawk 'ident' and instructed him to maintain 3000ft followed by an instruction to fly a heading of 110°. A short time later he observed the C550's Mode C indicating an altitude of 3400ft and so he again instructed the pilot to maintain 3000ft. The C550 pilot replied that he was now descending and he then issued an avoiding action R turn onto 270° to the FK50 pilot, who was some 5nm NE of London City. Vertical separation was eroded between the C550 and FK50 down to 600ft and the minimum horizontal separation 1·7nm. STCA was triggered but no TCAS advisories were reported. A short while later standard separation was restored and both flights continued normally.

THE FK50 PILOT provided a brief account reporting that he was inbound to London City flying level at 4000ft amsl at 220kt in IMC with the autopilot engaged and the landing lights selected 'on'. Approximately 5nm NE of London City Airport at 1844 UTC the TCAS RA "engaged". ATC was informed after the RA was enunciated he thought, and the controller issued an avoiding action R turn onto 270°. Neither the minimum separation nor the risk was assessed. The pilot did not state if the other ac was seen.

THE C550 PILOT reports that he was outbound for Zurich and executing his initial climb from London City Airport under a RCS from Thames RADAR on 132·7MHz, whilst squawking the assigned code with Mode C: TCAS is not fitted.

Turning onto 120° they were cleared to climb to the standard departure altitude of 3000ft. Flying a course of 035° on the SID, he was given a heading 120° by Thames RADAR and whilst turning the heading "bug" slowly to avoid a sharp bank angle he noticed the autopilot had not captured their cleared altitude of 3000ft. They were at 3350ft when he engaged the Touch Control Steering (TCS) and they descended back down to 3000ft. Neither he nor his co-pilot were sure if the ALT HOLD had not been armed on the ground or it had inadvertently tripped in-flight. He had "no idea where the other ac was" nor did he quantify the minimum separation or the risk.

ATSI reports that there are no ATC causal factors apparent within this Airprox. On first contact with Thames RADAR the C550 pilot reported climbing to 3000ft. He was then instructed to maintain 3000ft on reaching and read back the instruction correctly. Subsequently, at 1845:01, STCA activated between the C550 that was passing 3100ft and the FK50 that was 2nm to the N tracking S at 4000ft. The controller immediately instructed the C550

to maintain 3000ft. Following acknowledgement of this call, the FK50 crew was given an avoiding action R turn onto a heading of 270° and passed traffic information about the C550. It is considered that the Thames RADAR Controller took prompt and appropriate action to resolve the situation.

UKAB Note (1): The Debden radar recording illustrates this Airprox clearly. The C550 is shown departing from London City CTR climbing steadily into the London TMA through 3100ft London QNH (1017mb) and turning R in compliance with the vector issued. STCA was triggered with a white 'low severity' alert at 1844:59, against the southbound FK50 some 2·1nm distant indicating 4000ft QNH. The C550 ascends to a maximum of 3400ft QNH – an excursion of some 400ft above the cleared altitude of 3000ft QNH – at 1845:12, which is also the point of minimum horizontal separation of 1·7nm. A red high severity alert is then triggered on STCA and the avoiding action R turn issued to the FK50 crew by the Thames RADAR controller then becomes apparent, before the Mode C of the C550 indicates a descent to the assigned altitude which is achieved some 24sec later. There is no indication from the FK50's Mode C of any response to a 'CLIMB' TCAS RA as the ac maintains 4000ft QNH throughout the entire 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 controller involved and appropriate ATC authority.

It was clear to the Board from the C550 pilot's frank account that there had been an apparent equipment malfunction or selection error with the ac's altitude select function. This had resulted in the C550 crew allowing their ac to exceed their cleared altitude of 3000ft on climb-out, despite the controller clearly stating their cleared altitude on initial contact, causing an erosion of prescribed vertical separation down to 600ft against the FK50. In the opinion of the commercial pilot Members this should have been entirely avoidable given the two-pilot crew on the flight deck and there appeared to be some underlying CRM issues here. The Board agreed unanimously that this Airprox had resulted because the C550 crew had climbed above their cleared altitude into conflict with the FK50.

The radar recording illustrated this Airprox clearly. It was evident that the alert Thames RADAR controller – perhaps helped here by the STCA - had very rapidly detected the C550's climb of 400ft above its assigned altitude which allowed the controller to pass descent instructions straight away. Having been instructed to descend this was complied with promptly by the C550 crew, which then ensured that vertical separation was restored as soon as practicable. It seemed to the Board that the avoiding action instructions issued to the FK50 crew, whilst prudent, had little effect on the eventual outcome. This was in no way critical of the controller, but the C550 had already turned away through the 12 o'clock of the FK50 before the latter's turn is apparent on the radar recording. Although the FK50 pilot reported a TCAS RA, pilot Members postulated that any RA generated in the FK50 was probably passive in nature at these ranges; hence the lack of any detectable climb. Whilst it was fortunate that the Thames Radar controller took prompt and effective action when he did, it was also evident that the outbound vector applied to the C550 was turning the ac away from the FK50 anyway. This coupled with the recorded separation of 600ft vertically and 1·7nm horizontally, led the Board to conclude unanimously that there was no risk of a collision in these circumstances.

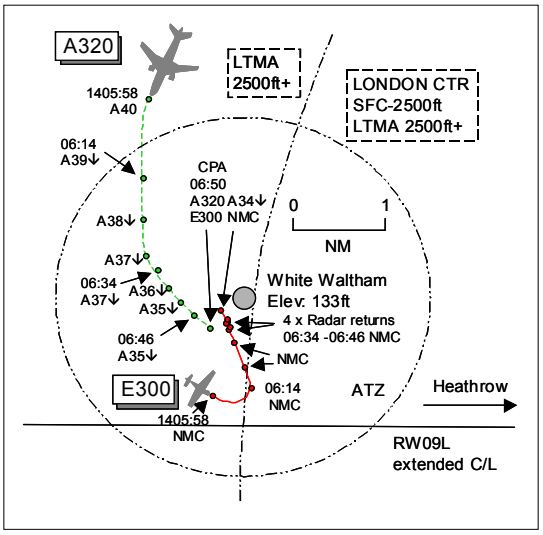
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C550 crew climbed above their cleared altitude into conflict with the FK50.

Degree of Risk: C.

AIRPROX REPORT NO 164/05

Date/Time:	6 Sep 1407	
Position:	5129N 00048W (0·3nm SW White Waltham - elev 133ft)	
Airspace:	LTMA/FIR/ATZ	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	A320	Extra 300
Operator:	CAT	Civ Pte
Alt/FL:	3400ft↓ (QNH)	Aeros ↑2400ft (QNH 1009mb)
Weather	VMC CLOC	VMC CLBC
Visibility:	>10km	'Lots'
Reported Separation:	700ft V/400m H	c1000ft V
Recorded Separation:	0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports inbound to Heathrow at 180kt and in communication with Heathrow Director on 120·4MHz squawking 5016 with Mode C. Descending through 3400ft for 3000ft, 2 TCAS TA alerts were received and a light ac was observed, a yellow/black coloured Extra, climbing towards them at the top of a loop. At the closest point the Extra was approximately 700ft [RT transcript shows pilot reporting 500ft] below their level and operating O/H White Waltham doing aerobatics, passing 400m clear to their L. At the time they were heading 120° on an intercept heading for an approach to RW09L from the N just under the G/S readout.

THE EXTRA 300 PILOT reports practicing aerobatics prior to a competition over the Western portion of White Waltham airfield below the LTMA base level 2500ft QNH squawking 7004; Mode C was not fitted. The ac was coloured yellow/green and the strobe lights were switched on. He ensured that his altitude did not exceed 2400ft QNH 1009mb at all times. There was a competent ground observer in place and they were using a safety radio frequency to ensure no risk of collision with other light ac as well as with Heathrow arrivals. During the period 1400-1415Z several ac were seen inbound to Heathrow passing O/H the airfield in a L turn to intercept the LLZ but he was unsure which ac had reported an Airprox. Usually these arriving ac are large and easily seen from below and are at approximately 3500ft, so his flight operations, not above 2400ft QNH, ensured 1000ft vertical and about 0·5nm lateral separation. He believed this to be adequate for safety but this can be easily misjudged on very clear days, especially when the higher ac is turning. He reiterated that there was no risk of collision with the Heathrow traffic.

THE HEATHROW FIN DIR reports she noticed an ac in the White Waltham cct squawking 7004, the aerobatic conspicuity code. As the A320 was turning onto the ILS from the N, the crew reported that an ac had just done aerobatic manoeuvres very close to him, within 500ft, as he was descending through 3300ft. The crew went on to describe the ac as a yellow Extra and that it had come 'interestingly close'.

ATSI comments that the A320 flight established contact with the Heathrow Director at 1404:00, when it was tracking downwind LH for RW09L and passing FL50. At the time, a 7004 (Conspicuity aerobatics and display) squawk could be seen in the vicinity of White Waltham aerodrome. At 1405:20, the controller instructed the crew to turn left heading 180° and reduce their speed to 180kt. At that time, the 7004 squawk was approximately 4nm S of the A320 but NMC was visible. Shortly afterwards, just before 1406:00, the controller instructed the A320 crew to descend to 3000ft. The base of the LTMA in this area is 2500ft and descent to a level 500ft above the base is compliant with the MATS Part 1 (Section 1, Chapter 6, page 4 para 9). The crew were then instructed, just after 1406:10, to turn L heading 120° and to establish on the LLZ. Approximately 40sec later the crew reported seeing an ac carrying out aerobatics above Wycombe Air Park (sic) and opined that it was operating above 2500ft, the base of CAS, as it came within 500ft of them whilst they were descending through 3300ft. The radar recording showed that the ac came within 0·2nm of each other but there is no way that the actual vertical separation can be

established. The Heathrow controller had followed all ATC procedures, in respect of the A320, and no errors were detected.

UKAB Note (1): Met Office archive data shows the Heathrow METAR as EGLL 1350Z 11004KT 360V170 9999 BKN020 BKN030 20/14 Q1009 NOSIG= and 1420Z EGLL 1420Z 12005KT 070V150 9999 FEW020 BKN040 21/15 Q1009 NOSIG=

UKAB Note (2): The Heathrow radar recording at 1405:58 shows the E300 1nm SSW of White Waltham tracking SE squawking 7004 NMC as the A320 is about to complete its turn onto a S'ly heading at altitude 4000ft 3·3nm to its NNW. The A320 commences descent at 1406:14 by which time the E300 has turned L and is rolling out onto a NW'ly converging/crossing track. Twenty seconds later the A320 is steady tracking 130° descending through altitude 3700ft by which time the E300 has crossed 1nm ahead of it. The next radar return from the E300 shows a track reversal followed by 2 further paints in very close proximity, about 0·3nm SW of White Waltham. The CPA occurs at 1406:50 with the subject ac passing 0·2nm abeam each other, on opposite direction tracks, the A320 descending through altitude 3400ft QNH, the E300 NMC.

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 understood the concerns of the A320 crew. During their descent towards final approach and without any ATC warning, they had received 2 TCAS TA alerts which had drawn their attention to an Extra ac climbing towards them at the top of a loop whilst carrying out aerobatics. The Extra was operating overhead White Waltham airfield and was seen to pass 400m clear to their L and 500-700ft below, as they descended through 3300ft QNH. Undoubtedly there was unease with the situation, in not knowing the conflicting ac's intentions and its apparent close proximity to their flight path. Although the Extra was squawking the aerobatic conspicuity code, without Mode C its manoeuvring in the vertical plane was not visible either to the TCAS equipment or on the radar display. Any estimate of vertical separation was by visual judgement which is known to be difficult to gauge accurately, particularly during the fluid situation that pertained at the time.

Given that the Extra 300 pilot was practising for an air display, a Member felt sure that all manoeuvres would have been flown within an 'aerobatic box'. Over the Western half of White Waltham airfield the base of the LTMA is 2500ft QNH which would provide a minimum of 500ft vertical separation from Heathrow traffic being vectored through the area descending to 3000ft. The Extra 300 pilot had carefully planned his sortie always to remain below the LTMA (maximum planned altitude 2400ft) and to the W of the CTR. He had utilised a ground safety observer to supplement his lookout for conflicting traffic during his manoeuvring. Although he was unsure which ac had filed the Airprox, the Extra pilot and ground observer had watched several airliners transit close to his area, including the subject A320, which were seen to pass about 0·5nm to the SW of his ac and 1000ft above. Given these circumstances Members understood the A320 crew's unease and reasoned that this had probably led to them filing this Airprox. However, despite the TCAS alerts, the investigation had revealed that both ac had been operating within their routine boundaries and that accepted separation limits were not breached. It was concluded therefore that this incident amounted to a 'sighting report'.

Turning to risk, TCAS had given the A320 crew a TA alert which allowed them visually to acquire the Extra which they had then watched pass always clear and always below and to their L. The Extra pilot had seen the A320 flying past whilst he had utilised a built-in vertical separation buffer to ensure always that an adequate safety distance existed. This led the Board to confirm there had been no risk of collision.

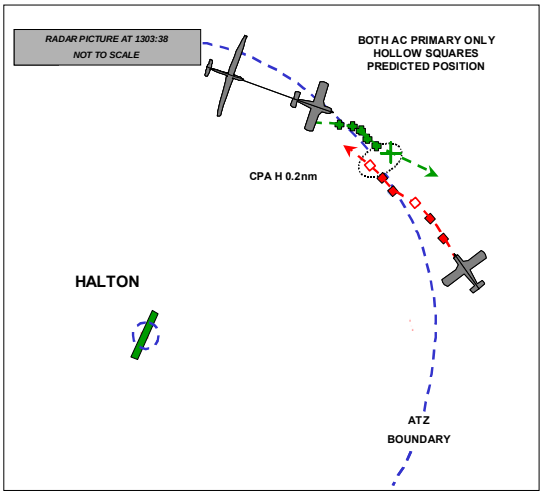
PART C: ASSESSMENT OF CAUSE AND RISK

Caus : Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 165/05

Date/Time:	12 Sep 1303	
Position:	5143N 00041W (Halton - elev 370ft)	
Airspace:	Halton ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA25	PA28
Operator:	HQ PTC	Civ Pte
Alt/FL:	1500ft	2000ft
	(QFE 1004 mb)	(QNH 1023 mb)
Weather	NK CLBC	NK CAVOK
Visibility:	>20km	30km
Reported Separation:		
	0 V/NR H	500m
Recorded Separation:		
	NR V/ ~0.2nm (~350m) H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA25 PILOT provided a brief report stating that he was towing a glider inside the Halton ATZ, listening out on the Halton A/G frequency, heading 175° at 65kt and was passing 1500ft Halton QFE when he saw a brown and white PA28-type ac 500m to his right at the same level and turned hard left to avoid it. He assessed the risk as being high.

UKAB Note (1): By the time of the incident the tug and glider had left the ATZ on a track of about 110°.

UKAB Note (2): The pilot reported that he was flying on a QFE of 1004. The nearest unit to promulgate METARS is Luton, 14nm distant, which at 1250Z reported:

EGGW 121250Z 03008KT 340V070 9999 SCT022 19/14 Q1023= [The QNH did not change during the following hour].

Since the Luton QNH was 1023mb and Halton has an elev of 370ft, ~ 12mb, the calculated QFE for Halton is ~1011mb. Since there is no Mode C information and the QFE reported by the PA25 cannot be reconciled with the calculated figure, it has not been possible to determine the altitude of the combination at the time of the incident. It was not possible to contact the PA25 pilot to resolve these anomalies, as he was on operational Military duties overseas.

THE PA28 PILOT also provided a brief report stating that he was flying a private flight from Denham to Turweston at 2000ft on the QNH in very good weather and listening out with Luton APR. He was heading Northerly when he saw a tug and glider combination 500m away in his 11 o'clock heading E. He turned left to avoid them by 500m and he did not consider the incident an Airprox as he kept his obligation to see and avoid the other ac.

UKAB Note (3): Halton ATZ is a circle of radius 2nm centred on the RW, extending vertically to 2000ft aal (2370ft amsl).

HQ PTC comments that the operator of the PA25, JSAT(G), although a Service-sponsored organisation, operates under the aegis of the CAA and the BGA from a military airfield which is within an ATZ. HQ PTC has a continuing concern over the number of Airprox that occur both within and adjacent to the Halton ATZ.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

AIRPROX REPORT No 166/05

The Board was informed that this was the third similar Airprox in just over 7 months, 010/05 and 018/05 being the other two. This was most likely because Halton is in a very busy area with VFR traffic being funnelled, both horizontally and vertically, into airspace which is a natural route between and round the London CTRs. Notwithstanding this however, both ac had been operating legitimately in Class G airspace and the radar recording showed the incident to take place just outside the Halton ATZ. Both pilots had seen and avoided the other ac as required in Class G airspace, albeit the PA25 combination pilot rather later than the PA28 pilot who was constrained from going further to the W by the ATZ which he already brushed as a result of his avoiding manoeuvre. Although the horizontal miss-distance of 350m was perhaps a little uncomfortable, the Board was unanimous in their view that there had not been a compromise to the safety of the ac concerned.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict on the boundary of the Halton ATZ resolved by both pilots.

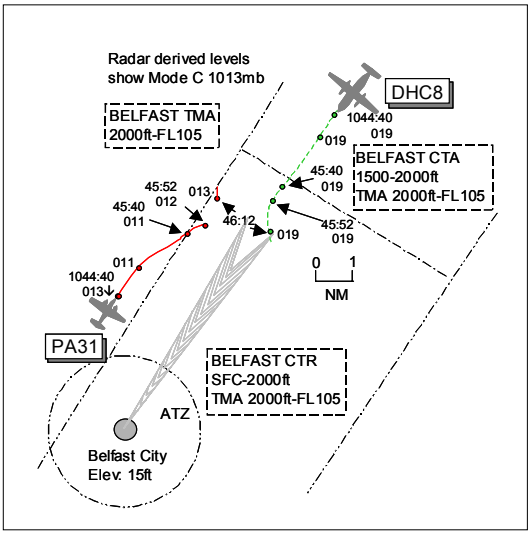
Degree of Risk: C.

AIRPROX REPORT NO 166/05

Date/Time:	13 Sep 1046	
Position:	5443N 00547W (6nm NNE Belfast City - elev 15ft)	
Airspace:	Belfast CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	DHC8	PA31
Operator:	CAT	Civ Comm
Alt/FL:	2000ft (QNH)	NR (QNH 1017mb)
Weather	IMC IICL	VMC CLBC
Visibility:	>10km	25km

Reported Separation:
300-600ft V/<2nm H NR

Recorded Separation:
c600ft V/1·6nm



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports heading 225° at 170kt inbound to Belfast City IFR and in receipt of an ATS from Belfast City Approach then Tower squawking an assigned code with Mode C. They were informed by ATC that traffic was extending visual downwind RH to position behind them; they were LLZ established RW22 and about 0·5nm from the G/P. Flying in and out of cloud, without visual contact with the traffic, TCAS showed traffic –800ft range 3nm converging then –600ft and very close in azimuth (<2nm), which they knew to be imprecise/unreliable, as they approached G/P intercept. The PF disconnected the A/P and initiated a 30° AOB level to climbing L turn through 30°. The other ac was not seen, he thought, but TCAS showed 300-600ft separation vertically. Very shortly after this, they became visual with the airfield and continued to an uneventful landing. He assessed the risk as low but opined that if the ILS descent had been commenced it would have been potentially high as the other ac was converging in elevation and azimuth.

THE PA31 PILOT reports inbound to Belfast City VFR and in receipt of an ATS from Tower squawking an assigned code with Mode C. He was flying below cloud with 25km visibility and was cleared to the overhead (O/H) at 2000ft QNH 1017mb to join downwind R for RW22 with an orbit, as there was a DHC8 on the ILS as he turned downwind. He saw ac No 1 and reported this to the Tower and he was cleared to continue downwind (not orbit). Late downwind heading 035° at 120kt he was asked if he could see No2 ac and as he said *"no"* he saw it visually, a

blue and white DHC8 on the ILS about 4nm away, and was asked to do a LH orbit. He completed the orbit L and was cleared to final No2 and landed safely.

THE BELFAST CITY ADC reports that the PA31 flight came on frequency approaching the airfield O/H from the SE and was told to expect to hold downwind for RW22, as there were 3 inbounds for the ILS in fairly close succession. At 1043 the PA31 flight was instructed to orbit downwind L RW22 but then it was observed to be continuing downwind (without orbiting) towards base-leg. The PA31 pilot reported visual with a DHC8 on final [not the subject ac but preceding traffic] and was told to continue downwind as there was another ac behind. At 1045 the subject DHC8 flight reported on frequency and was given TI on the PA31 which, at that stage, was approximately 6nm away. A minute later the PA31 was seen to be following the coastline of Belfast Lough, which converges towards the FAT, rather than a parallel downwind leg. He asked the PA31 pilot if he was visual with the DHC8 to which he replied *"no"* so the ADC then told the PA31 pilot to turn L. As the PA31 did not appear to be turning on the ATM, he told the pilot to *"turn left now"* as the subject ac were approximately 2nm apart. The DHC8 crew then reported visual with the PA31 and breaking-off the ILS. After asking the DHC8 crew if they were visual with the airfield, which they were, the flight was cleared for a visual approach, by which stage the PA31 was seen to have turned L and was well clear. Shortly thereafter the PA31 pilot reported visual with the DHC8 and was told to continue to final and was given the recommended vortex wake spacing. After landing, the DHC8 crew declared that they were filing an Airprox.

The Belfast City 1050 weather was surface wind 200/14kt 25km few 1200ft broken 4700ft temperature 17° dew point 13° QNH 1017mb.

ATSI reports that the PA31, inbound on a VFR flight, established communication with Belfast City Tower at 1041, on transfer from Approach. In accordance with local noise considerations, the pilot had been cleared, by Approach, for a RH cct to RW22. He reported 3 miles to the O/H (from the SE) at 2000ft and was instructed to continue towards the overhead, to maintain 2000ft and he was advised to expect to hold downwind for RW22 (because of IFR arrivals). The pilot acknowledged the cleared altitude.

At 1042, the ADC intended instructing the PA31 flight to orbit downwind but addressed the instruction to the wrong ac. Following a response from the pilot of this ac, who was on the RW at the time having just landed, the message was reissued to the PA31 flight *"orbit downwind left hand for runway two two"*. The pilot responded *"wilco"*. At the time there was a DHC8, not the subject ac, at about 5nm with the subject ac positioned behind it. The controller's intention was for the PA31 to approach number 3, behind the subject DHC8.

Subsequently, the controller observed that the PA31 was not orbiting as instructed. The pilot reported *"...visual with the Dash on short finals"* i.e. not the subject DHC8, which was about 6nm away. The pilot was instructed to continue downwind until advised (1044:40); he responded *"-ger c/s"*. The pilot of the subject DHC8 then made his initial call on the Tower frequency reporting at 9nm and was instructed to continue his approach. TI was issued about the PA31 *"traffic's a Navajo ac he's joining right hand for runway two two be number two to you. He's er believed to be in your er one o'clock a range of six miles"*. (The controller used the Aerodrome Traffic Monitor, primary only radar data, to provide this information.) Approximately 30sec later, concerned that the PA31 was still drifting towards final approach and the DHC8, the controller asked its pilot if he was visual with the traffic (1045:40). Receiving a negative response from the PA31 pilot, the controller instructed the pilot to *"turn left please you're getting a bit close too close to him"*. Receiving no acknowledgement and as the ac did not appear to be turning on the ATM, the instruction was repeated (1045:50) *"turn left now"*. This time the pilot responded *"do orbit this time"*. The controller estimated that the subject ac were approximately 2nm apart at this time. Immediately afterwards the pilot of the DHC8 reported visual with the PA31 and turning L to avoid. Some 30 sec later the pilot of the PA31 also reported visual with the traffic.

In accordance with MATS Part 1, Section 2, Chapter 1, Page 1 *"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: a) ac flying in, and in the vicinity of, the aerodrome traffic zone"*. Both ac, at 2000ft or below, were within Class D airspace of the CTR (surface-2000ft). MATS Part 1, Section 1, Chapter 2, Page 1, lists the minimum services to be provided by ATC Units within Class D airspace. Of relevance to this Airprox is to *'pass traffic information to IFR flights on VFR flights and give traffic avoidance if requested; pass traffic information to VFR flights on IFR flights'*. It is considered that the ADC passed sufficient information to the pilots of both ac to advise them of the traffic situation. The PA31 pilot confirmed, in his written report, that he was aware that he was No3 in traffic following two DHC8 ac on the ILS and was to continue downwind.

UKAB Note (1): The Belfast radar recording does not record the CPA as the PA31 fades from radar after 1045:52. The DHC8 showing FL019 (2020ft QNH 1017mb) is in the PA31's 12 o'clock range 1·8nm and 700ft above. The DHC8's L turn away is seen shortly thereafter before the PA31 reappears on radar at 1046:12 tracking N indicating FL013 (1420ft QNH) 1·6nm WNW of the DHC8 showing FL019.

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 PA31 pilot had been cleared to position overhead Belfast City airport to join downwind RH for RW22 and was told to expect to hold downwind owing to IFR arriving traffic. However, after being told to orbit downwind LH, the PA31 pilot had acknowledged *"wilco"* but had then continued downwind, appearing not to have assimilated this instruction. Shortly thereafter, when the ADC noticed the PA31 was not orbiting and its pilot reported visual with the preceding DHC8 on final ahead of the subject DHC8, he had then told the pilot to continue downwind which again was acknowledged and not read back. Both of the ATC instructions were therefore not read back which went unchallenged by the Belfast City ADC: Members felt this had contributed to the Airprox.

On its extended downwind leg, the PA31 had then flown on a track which converged with the FAT, not parallel to it. An orbit would have kept the PA31 in a position from where its pilot could more easily maintain station relative to the RW and traffic/cct pattern. By extending downwind it would have been difficult for the PA31 pilot to judge the required track, with the airfield and RW behind his ac at range. Members unanimously agreed that the PA31 pilot did not comply with the ATC instructions and flew into conflict with the DHC8 which had caused the Airprox.

The ADC had passed sufficient TI to both flights and had told the PA31 pilot to turn L after the pilot, when asked, reported not seeing the subject DHC8; he later reported seeing it almost straight away afterwards although the RT transcript reveals this occurred over 30sec later. The DHC8 crew had the benefit of 'seeing' the PA31 initially on TCAS and, on judging it to be in confliction, they had executed a L turn to avoid. Members discussed this aspect at length. Firstly, the wisdom of manoeuvring in azimuth from TCAS generated information which is unwise owing to the system's known deficiencies. Secondly, the turn was executed whilst flying within Class D airspace under 'positive control' by ATC where any manoeuvring could have caused a further confliction with other traffic being vectored downwind. Pilot Members agreed that although on this occasion there was no other traffic to affect the DHC8's manoeuvre, in general the best course of action was to execute a 'go-around' into a missed approach. The DHC8 crew had also visually acquired the PA31 and the radar recording had shown that vertical separation had not been less than 500ft throughout the encounter. The Board agreed that the actions taken by the DHC8 crew had been timely and had ensured that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

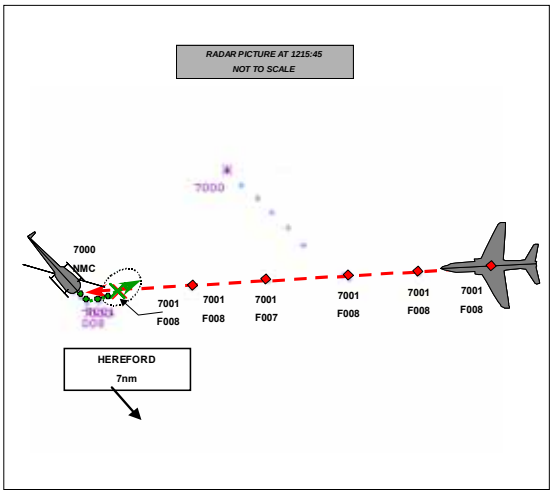
Cause: The PA31 pilot did not comply with ATC instructions and flew into conflict with the DHC8.

Degree of Risk: C.

Contributory Factor: The Belfast City ADC did not obtain read backs of the ATC instructions.

AIRPROX REPORT NO 167/05

Date/Time:	13 Sep 1216	
Position:	5209N 00250W (5nm NW Hereford)	
Airspace:	UKDLFS/Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk	Robinson R22
Operator:	HQ PTC	Civ Trg
Alt/FL:	1000ft	800ft
	(RPS 1016 mb)	(NR)
Weather	VMC CLBC	VMC CLBC
Visibility:	8km	25km
Reported Separation:		
	0ft V/100ft H	0 V/100m H
Recorded Separation:		
	NR V/Contacts Overlap (~100m H)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports flying a singleton GH sortie with a passenger in a black Hawk ac with HISLs and anti colls selected on, squawking 7001 but with no ACAS fitted. He climbed to 1000ft prior to exiting LFA 4 at the end of low level phase and was heading 260° at 420kt and had been looking right to clear the airspace ahead before a further climb. When he returned his lookout to straight ahead he saw a small red and white R22 helicopter pass 100ft down his LHS. Since he had passed the ac he took no avoiding action but a further climb was initiated and he reported the incident to London Military on contact with them. He assessed the risk as being high.

THE ROBINSON 22 PILOT reports flying a training sortie with a student pilot in a red and white ac with the HISL and anti-coll switched on, in receipt of an A/G service from Shobdon Radio and squawking 7000 but with no Mode C fitted. They had been practising basic autorotation and he had made a point of emphasising the importance of a good lookout before, during and after the exercise. On completing their first autorotation they commenced a recovery at approximately 700ft and as he instructed the student to look out he saw the landing light of an approaching blue and yellow Hawk jet. He immediately took control and turned hard right and climbed and within 3sec the jet had passed 100m down their LHS at the same height. Before they entered the autorotation the Hawk would have been too distant to make sighting it likely and during the autorotation it would have been below them and against the ground as a backdrop, again making the Hawk difficult to see. This would also have been exacerbated by the instructor's high workload during the exercise. He thought that he saw the Hawk at the earliest opportunity and took the correct avoiding action by turning right. The Hawk did not appear to take any avoiding action and apparently maintained its course and speed. He assessed the risk of collision as being high.

THE HAWK STATION comments that the Airprox occurred at 1100 on an overcast day with moderate visibility (8km). The ac was operating in accordance with Squadron SOPs and other pertinent orders. The nose light was on and both high intensity strobe lights were selected to white. The Hawk took no avoiding action as the conflicting ac was seen very late, the (Hawk) pilot considering that avoiding action would no longer be effective at that stage. The rotary ac was not seen to manoeuvre during the incident. Since ACAS systems were not fitted to the Hawk nor to the helicopter, this Airprox highlights again the need for constant effective lookout from all users of Class G airspace.

UKAB Note (1): The recording of the Clee Hill Radar shows contacts presumed to be the Hawk squawking 7001 with Mode C and the R22 squawking 7000 with no Mode C. At 1215:45 the contacts of the Hawk - tracking WNW - and the R22 - having turned on to an ENE track – are seen to overlap, as shown on the diagram above. Although it is difficult to make accurate measurements at such close ranges it appears that the contacts are about 100m apart. A right turn by the R22 can be seen on the recording but separation does not appear to be generated until after the ac had passed.

UKAB Note (2): The METAR for Staverton for 1150 was:

AIRPROX REPORT No 167/05

EGBJ 131150Z 23009KT 9999 FEW028 21/14 Q1024 and the Cotswold RPS was 1021mb.

HQ PTC comments that this was a very close encounter in class "G" which was resolved by good lookout by the Robinson instructor. If the Hawk had been fitted with an appropriate ACAS its pilot would have been aware of the presence of the helicopter and could have manoeuvred to increase the separation distance. The introduction of the Hawk 128, which will have an ACAS fitted, should help to reduce the number of incidents of this type.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings and reports from the Hawk operating authority.

The Board noted that this incident had occurred in the Class G airspace of the FIR/LFS and that both ac had equal right to operate there. That being the case, the responsibility for collision avoidance was equally shared by both pilots and relied on them both seeing other conflicting ac.

Specialist Members commended the helicopter pilot on his professional approach to the conduct of practise autorotations and his stressing of the importance of lookout during the manoeuvre. This increased awareness and his prompt and correct reaction, despite his high workload at the time, had most likely prevented closer encounter. The Board observed that the Hawk nose light had been a major factor in the R22 pilot acquiring the Hawk, allowing him to take avoiding action earlier than he otherwise would. Members noted that both a nose light and ACAS would be fitted to the Hawk 128. In this Airprox it was likely that this (relatively) early acquisition might have been a factor in the effectiveness of the avoiding action, taken only by the R22 pilot since the Hawk pilot did not acquire the Robinson until a few seconds later.

Members considered that there were several factors that had combined to prevent the Hawk pilot from seeing the R22 earlier: it is very small, it was almost head on, it was dark in colour against a similar background in overcast conditions and it was below the horizon. These, the Board concluded, had combined to thwart an earlier sighting by the Hawk pilot. In following this line of reasoning they considered that both pilots had seen the opposing ac almost as early as physically possible and that the sightings had not been 'late'; that being the case the incident had been a conflict in the FIR. The separation was small (~100m) and Members were unable to determine positively whether the R22 pilot's avoiding action had been conducted in time to have any effect (this would have resolved the conflict). Following that reasoning again the Board considered that safety had not been assured.

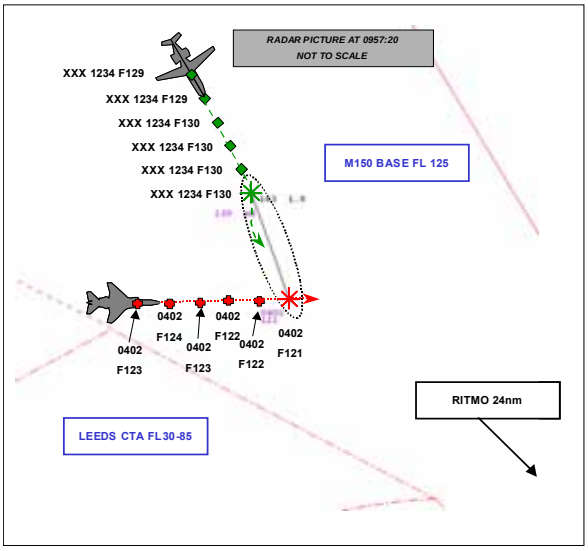
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR.

Degree of Risk: B.

AIRPROX REPORT NO 168/05

Date/Time:	12 Sep 0958	
Position:	5405N 00148W (15nm NNW Leeds)	
Airspace:	M150/London FIR	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	FK70	Jaguar
Operator:	CAT	HQ STC
Alt/FL:	FL120ft	FL120 (1013mb)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10km	80km
Reported Separation:	300ft V/0.5nm H	1000ft V/1nm H
Recorded Separation:	900ft V/1.7nm H (at the time of the incident)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FK70 PILOT reports flying a scheduled passenger flight from Durham Tees Valley to Amsterdam. They were heading 156° at 310kt on airway M150, climbing inbound RIMTO, when they got a TCAS TA and ATC reported unidentified military traffic. The traffic came from R to L climbing towards them and immediately ATC gave them avoiding action *"Turn right now, heading 270°, avoiding action"*. They cleared the military jet by 300ft above and 0.5nm behind it, he thought [recorded separation 900ft and 1.7nm]. The FK70 pilot requested the data of the military ac but none was provided before they were handed over to Amsterdam ATC. However, on landing he called Manchester Radar and details of the other ac were given. He did not assess the degree of risk.

THE JAGUAR PILOT reports flying a grey ac with HISLs switched on in receipt of a RIS from Leeming Zone. On completion of a low level recce task, the ac was climbed to FL120 under control [RIS] from Leeming Zone initially heading 080° at 360kt. Although he remained in the Class G airspace below Airway M150 as instructed, Leeming provided good TI on the airway traffic which enabled him to visually acquire the FK70 when it was 5nm away in the excellent VMC which prevailed. He remained visual with the traffic throughout thus ensuring that no collision risk existed as he passed well ahead of and below the airliner.

MANCHESTER ACC NORTH RADAR CONTROLLER reports that the FK70 called on frequency [at 0955] departing from Teesside climbing to FL130. It was cleared direct to RIMTO and to FL150. An ac squawking 0402 was seen at this stage passing FL121 climbing crossing the FK70's track from R to L. When it was seen passing FL123 and the FK70 was passing FL130, the latter was given an avoiding action turn to the R [at 0957] and full TI was passed until it was clear of the military traffic. While giving the avoiding action, the 0402 squawk was then observed to descend back to FL121 remaining beneath the airway throughout. Once clear of the traffic the FK70 pilot resumed his own navigation to RIMTO and continued with his flight.

MIL ATC OPS reports that the Jaguar had been in receipt of a RIS from Leeming and that TI had been passed iaw JSP552. On their radar recording the maximum height reached by the Jaguar was FL123.

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

HQ STC comments that the actions taken by all concerned ensured safe separation between the two ac in Class G Airspace.

AIRPROX REPORT No 168/05

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 noted that the FK70 had been joining CAS from below and the Jaguar had also been operating legitimately in the Class G airspace below the Airway. At the precise time of the incident the FK70 was level at FL130 in the Airway (base FL125) and the Jaguar was 900ft below, descending slightly to level at FL120. Both ac had been in receipt of a radar service, the Jaguar a RIS from Leeming and the FK70 an unspecified type of service from Manchester ACC. At the time of the initial call to Manchester, the FK70 was at about FL110 (but not specified by the pilot as a passing level in his RT message) in Class G airspace, joining the Airway very slowly from below. Although they were correctly cleared to join CAS and climb initially to FL150 then FL180, the type of service or the change of service as the ac entered CAS was not passed by the Manchester Controller. This, the Board considered, might have led the FK70 pilot to believe that he was under a Radar Control service, that the pertinent separation applied and that the military ac should not have been as close as it was.

Although there were some untidy aspects to this incident, in the opinion of the Board the salient factors were that both ac had a right to be operating where they were and both were given timely and correct information and instructions by the respective ATC units which alerted the pilots to the presence and position of other ac. As a result of this the minimum separation recorded at the time of the incident was 900ft and 1.8nm and therefore no TCAS RA had been generated. Furthermore, it was noted that even without the avoiding action given by Manchester, the flightpaths of the ac had never been in conflict. Considering the above factors the Board determined that no conflict had existed and that this incident had been a sighting report. Notwithstanding this, the Manchester Controller had been correct to give the FK70 avoiding action as he could not assume that the Jaguar was going to arrest its climb and therefore maintain separation. In sum all participants had acted in a correct manner given the circumstances at the time.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 169/05

Date/Time:	15 Sep 2341	
Position:	5305N 00119W (7nm NW Nottingham - elev ~400ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	EC 135	MD 902
Operator:	Civ Comm	Civ Comm
Alt/FL:	1300ft	700ft.
	(QNH 1020 mb)	(QNH 1019 mb)
Weather	VMC CLBC	VMC CAVOK
Visibility:	>20km	30km
Reported Separation:		
	200ft V/¼nm (450m)H	1-200ft V/ 5-600m H
Recorded Separation:		
	NR	

It has not been possible to create an accurate representation of the tracks of the two ac.

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC 135 PILOT reports heading 160° at 70kt, 2 minutes N of base returning from a task, when a call came over the police frequency that a pursuit was heading their way, down the M1 from the South Yorkshire police area, with a police helicopter involved. They overshot the approach at base and turned onto a heading of approximately 030°. He then called Nottingham East Midlands ATC, less than 1nm from base, while squawking 0056, to ask if the other police helicopter was on frequency and he was told that it was not. While en-route to the M1 (6nm away) they looked for the police vehicles that became visible very quickly (8 police cars with blue lights). They looked for the other helicopter but did not see any ac in the vicinity; he also had set the TCAS range at 20nm but his screen was blank. On arrival overhead the M1 with his TCAS still blank, he turned R on the E side of the motorway to keep the pursuit in his 2 o'clock. A short while later he saw pop-up 'TFC' on TCAS at 3nm in his 6 o'clock so he called East Midlands ATC to ascertain if they had it on radar and/or frequency; they replied that they had it on radar but not on frequency. Thereafter the other ac gave them 2 or 3 TA's and he had to partially break off the pursuit to gain visual contact. The other ac remained to his N and below him throughout and, as far as he could tell, in an orbit. At one point East Midlands ATC told him that they thought the other ac was following him.

On the ground, meanwhile, the offending vehicle was stopped and shots were fired. The workload in their cockpit had thus become extremely high. The other ac did not have its HISLs illuminated and it was very difficult to see with the ground and cultural lighting as a backdrop. Although he had used 'scene of search' and other similar frequencies many times before for planned and unplanned joint ops, in this case it did not occur to him to change to it and to try and establish contact with the other ac due entirely to the very high workload. Equally, he could not understand why the other ac had not been on the East Midlands frequency.

The other ac eventually cleared the area to the N. Upon leaving the scene he asked East Midlands ATC if they had had any voice contact with the other ac – they had not. ATC then asked him if he would be speaking to the other pilot and he said that he would. There had not at any time been any serious risk of collision: however the other ac's unnecessary presence, uncontactability and it flying with only limited lighting increased the EC 135 pilot's workload considerably.

On their TCAS with range set at 5nm, BRG info is extremely unreliable and misleading: not a technical fault but the limitations of the equipment.

THE MD 902 PILOT reports that they were flying with their nav lights, anti-colls and strobes selected on, squawking 0052 and were level manoeuvring before coming into a hover while videoing a serious incident. When they had 3nm to run to the incident area, a second ac approached the incident. Several calls were made on the deconfliction frequency 123·1MHz but there was no reply. Due to the seriousness of the incident on the ground,

videoing was continued while safe separation from the other ac was maintained by staying 1km to the W of the motorway. The other ac being to the E of the motorway: his action thus ensured that it was continuously in sight and the risk was nil.

UKAB Note: The MD902 pilot was in receipt of a FIS from Leeds ATCU.

EAST MIDLANDS APPROACH RADAR CONTROLLER reports that he had taken over as Approach Radar Controller and was providing the EC 135 with a FIS. The pilot of the EC 135 subsequently asked him if C/S XXX was on frequency but he replied that it was not.

Approximately 3min later the pilot reported that he had TCAS traffic 1½nm NW of his position at approximately 1200ft and asked if the Controller had anything. The Controller saw a contact in that position squawking 0052 indicating 1000ft Mode C and informed the pilot accordingly. The pilot said he was not visual with it. The SSR code allocation list available to the Controller showed this squawk to be allocated to the ZZZ Police and he asked the pilot if this traffic could be the other helicopter to which the EC135 pilot said that he did understand that the other helicopter was airborne hence his earlier question about it being on frequency. He continued to pass positional information on the other helicopter until the 2 ac began to diverge.

The pilot of the EC135 again asked the Controller to confirm that the other helicopter had not called him in the previous 30min and the Controller confirmed that this had been the case. They agreed that the EC135 pilot would take any action he considered appropriate and an entry was made in the Log.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a transcript of the relevant RT frequency and a report from the air traffic controller.

Unfortunately the Board Member who has extensive knowledge of police operations was unable to attend the Meeting. The Board determined that both ac had been operating legitimately in Class G airspace, VFR at night under their respective police air operator's certificates. That being the case, both pilots had a shared and equal responsibility to see and avoid other's ac regardless of how difficult that may be at night. Since the MD902 had been behind the EC135 for the majority of the period of the incident, the Board determined that the responsibility for collision avoidance was with the MD902 pilot and that he had done everything possible, commensurate with his task, to fulfil that responsibility and had maintained about 500m visual separation throughout. The Board considered that, although on-scene co-ordination is a matter for the police and their aviation authorities, common procedures would have helped to clarify this complex situation and may prevent further similar incidents. Members also accepted that there may be many RT frequencies that are important to police pilots and that probably, due to the high workload on the single pilot, not all can be monitored simultaneously.

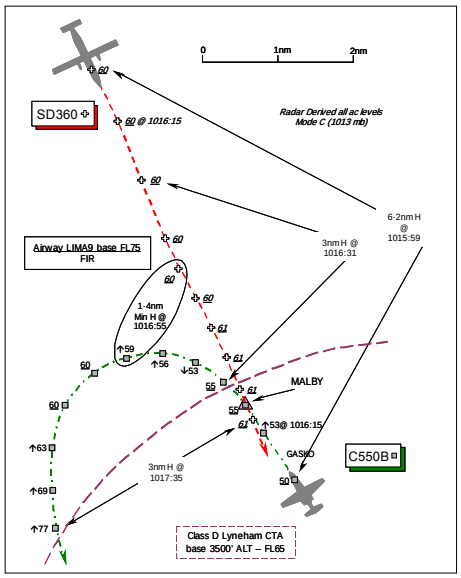
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 170/05

Date/Time:	20 Aug 1016 (Saturday)	
Position:	5136N 00205W (1¾nm NW of MALBY)	
Airspace:	CTA/FIR	(Class: D/G)
Reporter:	LACC Sector 23	
	First Ac	*Second Ac*
Type:	C550B	SD360-300
Operator:	Civ Comm	CAT
Alt/FL:	↑FL70	FL60
Weather	VMC NR	VMC NR
Visibility:	>25km	>10km
Reported Separation:		
	500ft V/<2nm H	not seen
Recorded Separation:		
	100ft V @ 1·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LACC SECTOR23 TACTICAL CONTROLLER (S23TAC) reports that the C550 departed Lyneham on a SIREN departure and first contacted S23 on a NW'ly track passing FL50 climbing to FL70 squawking A6357. A background track was seen indicating FL60 heading SE towards Lyneham below airway L9 and "almost head-on" to the C550 so an avoiding action L turn instruction was issued and traffic information given to the crew. Whereupon the C550 pilot reported traffic on his TCAS 600ft above his ac and stopped his climb at FL54. Although prescribed separation was lost he did not quantify that which pertained, but added that at the closest point both ac were outside the Lyneham CTR and below the base of LIMA9. After the conflict was resolved the C550 joined CAS without further incident.

THE LACC SECTOR23 PLANNER CONTROLLER (S23 PLAN) reports that the C550 was seen departing Lyneham on standard SIREN departure climbing to FL70. Opposite direction traffic was seen at FL60 on an A4520 squawk. The C550 crew called on 134·75MHz out of FL50 climbing to FL70 so the S23 TAC gave avoiding action and traffic information on the first call. He tried to open a conversation with Lyneham on the subject, but was unable to get a meaningful response and so called his Local Area Supervisor (LAS).

THE LACC LOCAL AREA SUPERVISOR WEST reports that the S23 PLAN called him over to his Sector to explain that an incident had occurred between a C550 working S23 and an ac squawking A4520 [the SD360] inside Lyneham's Class D CTA working Lyneham ZONE. After he telephoned Lyneham to find out what had occurred he was advised that Lyneham APPROACH had transferred the C550 to S23 TACTICAL (S23 TAC), passing FL50 on a SIREN departure. At the same time the SD360 had called Lyneham ZONE and requested a VFR transit clearance at FL60. The SD360 crew apparently reported visual with the outbound C550 and taking their own separation.

UKAB Note (1): The above reports were not filed with the UKAB until 1 month after the event, nor was notification of this Airprox reported on a CAA 1094A via AFTN.

THE C550B PILOT reports over one month after the Airprox had occurred that he was departing from Lyneham to join CAS bound for Marseille. The ac has a white/black/red livery and the taxy-lamp and HISL was on. TCAS is fitted and the assigned squawk of A6357 was selected with Mode C.

He departed from RW36 on a SIREN departure in VMC and was instructed to expedite the climb through 2000ft and report at FL50. Levelling at FL50 heading 340° at 170kt, he switched to London CONTROL on 134·75MHz where he was immediately told to turn L because of traffic. He disconnected the autopilot and initiated a L turn before he was cleared to climb to FL120, but as he had a TCAS TA at the same time with traffic some 600ft above

his ac, he said he could not climb due to the displayed traffic. No RA was enunciated but on a heading 190°, the TA disappeared and he resumed the climb to their cleared level of FL120. The other ac was not seen but the risk was assessed as *"medium"* with a minimum separation of <2nm horizontally, 500ft vertically at the closest point.

THE SD360-300 PILOT reports over one month after the Airprox had occurred, that he had departed from Gloucestershire Airport bound for Jersey on an IFR FPL in VMC in a level cruise at FL60 on a heading of 180° at 190kt. They were in receipt of a FIS, he thought, from Lyneham ZONE on 123·4MHz, squawking the assigned code with Mode C. TCAS is fitted.

They did not see the other ac, he thought, neither was a TA nor an RA enunciated during this portion of the flight. As far as he was concerned this was a completely normal flight, which he flew every Saturday throughout the summer - he opined that he always received a joining clearance at MALBY with a clearance through the Lyneham CTR at FL60. He was not notified of any confliction and was not aware of the Airprox until informed by his company. After a long chat with his 1st Officer, neither could recall anything unusual about the flight. If there had been anything different about the flight or unusual circumstances, he would have noted it at the time and filed the necessary report, if deemed necessary, whilst the facts were still fresh in his mind.

ATSI reports with RT transcript that although the RTF transmissions from S23 were obtained it was not possible to obtain a copy of the desk-side landline recording, which due to technical difficulties was unreadable.

The C550 was outbound from Lyneham and had been given a standard clearance from S23 relayed via Lyneham ATC - to climb to FL70 via the SIREN hold. (ATSI Note: The SIREN hold is defined as CPT radial 285º, 25-29 DME. This equates to a position 6nm NE of Lyneham.

The LACC unit investigation revealed that the S23 TAC trainee controller had seen the SD360's squawk prior to the C550 calling on frequency and so was not expecting the latter to contact him until it was at FL70. STCA activated at 1015:52, which was before the C550 was in contact with S23 and so the first transmission given was avoiding action to resolve the confliction. No civil ATC errors were disclosed.

[UKAB Note (1): Analysis of the Clee Hill Radar recording, shows an ac squawking A4520 - the subject SD360 on a Lyneham allocated squawk - at 1013:53, 16·3nm to the NW of Lyneham indicating FL45, tracking SE, which continues towards Lyneham as the Mode C indicates a climb. At 1014:18, the first return from the C550 appears, having departed from RW36, and makes a L turn onto a NW'ly track. The C550 crew contacted S23 TAC at 1016:00, and reported *"..passing level 52 for 70…SIREN departure"*. The ac was 4·4nm NNW of Lyneham with the SD360 in its 1o'clock at a range of 6·2nm now maintaining FL60. The S23 TAC, who was a trainee screened by a qualified mentor, transmitted at 1016:10, "[C550 callsign] *avoiding action turn left immediately heading..190 degrees traffic was north of you by 4 miles indicating flight level 60 southbound*". The crew acknowledged this instruction *"left heading 190.."* and were then instructed to climb to FL120. The C550 crew then reported at 1016:30, just as their ac exited the Lyneham CTA into Class G airspace at FL55 Mode C, with the SD360 3nm away maintaining FL60 *" we have the traffic now 600 feet above us..we wait with the climb please"* thereby delaying the climb momentarily. At 1016:31, S23 TAC acknowledged the pilot's call adding just before 1016:50, *"…if able turn left head 180 traffic is 2 miles north of you"*, whereupon the C550 pilot responded *"yes we are approaching..240* [degrees] *for 190* [degrees] *now"*. The two ac converged until they were 2·2nm apart when the C550 in the L turn indicated a momentary descent to FL53. Horizontal separation reduced to a minimum at 1016:55, when the SD360 was in the C550 crew's 3 o'clock at a range of 1·4nm, some 100ft above the latter. The C550 maintained FL60 for two sweeps as the SD360 crossed 1·7nm astern at FL60/61, before a climb is once again evident by the former through FL63; the pilot reported *"heading 180 climbing 120"* at 1017:30.]

MIL ATC OPS reports that the SD360 crew called Lyneham ZONE about 12nm N of Lyneham requesting a RIS in the climb to FL60. ZONE allocated a squawk - A4520 - identified the SD360 and at 1014:29, applied a 'limited' RIS due to poor radar performance. ZONE then requested confirmation of whether the SD360 crew required a VFR or IFR transit of Lyneham's Class D CTA, to which the crew responded that an IFR crossing was required. At 1016:00, ZONE passed traffic information to the SD360 crew on "*traffic 12 o'clock, 6 miles, reciprocal heading, climbing FL50*". Seven sec later at 1016:07, the SD360 crew reported "[SD360 C/S] *copied we've got it on TCAS*" and somewhat later, at 1016:54 "[SD360 C/S] *we have the traffic visual and we are maintaining FL60".* ZONE confirmed at 1017:38, "[SD360 C/S] *your IFR transit of Lyneham CAS is approved at FL60, entering Lyneham CAS maintain FL60",* [after the SD360 had crossed the CTA boundary]. The SD360 crew left ZONE's frequency at 1022:40.

Meanwhile, the C550 was departing Lyneham's RW36 following a SIREN (Awy) SID profile, [UK Mil AIP AD 2-EGDL-1-17 - RW36 – Climb on RW Track - 358° - to 2000ft then direct MALBY, then right to join SIREN Hold] under the control of the Lyneham APPROACH controller (APR). The C550 crew contacted the APR at 1014:29, passing 2300ft on an IFR departure. The APR identified the ac and confirmed the climb to FL70 and asked the crew to report passing FL50. A RCS was applied but not stipulated [as per SOPs]. At 1015:38, the C550 crew reported passing FL50 and the APR transferred the C550 to London CONTROL.

The SD360 crew had called ZONE approximately 12nm N of Lyneham requesting a RIS. The ac was correctly identified by ZONE prior to the controller ascertaining whether the crew required an IFR or VFR transit of Lyneham's CAS, which was in accordance with Lyneham ATC Squadron Orders. Although operating under a reasonably high workload ZONE passed timely traffic information to the SD360 crew on the conflicting C550 allowing the crew to become visual at 1016:54 - moments before the CPA. However, the traffic information given incorrectly stipulated that the C550 was climbing to FL50, whereas it was climbing to FL70 [as cleared by the APR]. This may have been due to an erroneous assumption by ZONE that the APR would stop the departing C550's climb at FL50, which would have provided separation below his traffic. All ac departing Lyneham are subject to a release clearance, in this instance release was approved by the APR for the C550 before its departure. It is SOP for Lyneham SIREN departures to be asked to report passing FL50 in order that Mode C can be verified prior to releasing the ac to London CONTROL. As the ac passes FL50, subject to the Mode A being validated, Mode C verified and the ac being free of confliction, the flight is released to London CONTROL. Here, the C550 was transferred by the APR to London CONTROL whilst still in confliction with the SD360. As well as approach control duties the APR is also the Lyneham CTR/CTA Airspace Manager and must approve any ac transiting the CTR/CTA. Despite there being no mention of a CTA crossing clearance by either ZONE or the APR in their respective reports or evident from the tape transcript, ZONE remembers requesting an IFR crossing clearance at FL60, for the SD360, which was approved by the APR 'face-to-face' and was therefore not included on the recording. It is SOP for all Lyneham CTR/CTA requests to be conducted on the landline, but it is acceptable for them to be agreed verbally on occasion. The APR has no recollection of a CTA crossing request from ZONE for the SD360, but equally has no reason to believe that he did not receive a request, which he subsequently approved. The APR did not detect the potential confliction because his attention was diverted by taking an external unrelated landline call just prior to releasing the C550 to London CONTROL. It is possible that ZONE requested the IFR CTA crossing clearance for the SD360 late (although prior to the SD360 reaching Lyneham CTA). Nevertheless, the onus was on the APR to ensure that the C550 was clear of confliction before releasing it to London CONTROL.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The radar recording had revealed that this Airprox occurred just in Class G airspace as the SD360 flew towards CAS and just after the C550B had exited the Class D Lyneham CTA. The Board commended the alert LACC S23TAC trainee controller who had promptly detected the confliction before the C550B crew had checked in on the frequency: thus he was able to initiate an avoiding action turn and pass traffic information about the conflicting ac as soon as the C550B crew called. Conversely, it was clear that the Lyneham APR had not detected the confliction between ZONE's SD360 and the departing C550B before he instructed the latter's crew to climb to FL70 and switched them to LACC. The Mil ATC Ops report had asserted that ZONE assumed that the departing C550 would be stopped-off below the transiting SD360, as evinced by the traffic information provided to the SD360 crew and suggesting that co-ordination had taken place to effect the CTA crossing clearance with 1000ft vertical separation between these two ac in the vicinity of the Lyneham CTA boundary. Whilst unfortunately the Mil ATC Ops report had not been able to provide a definitive answer to the question, it was evident that if any co-ordination had taken place between ZONE and the APR it was either incorrectly interpreted by ZONE or the APR had not taken account of the presence of the SD360 when he climbed the C550B above FL50. As the Lyneham "Airspace Manager", the Mil ATC Ops report had shown that it was the APR who was ultimately responsible for ensuring separation with crossing traffic. Moreover, it was clear that the APR had instructed the C550B crew to climb through the level of the SD360 - that should have been clearly displayed to him - but was apparently unaware of the impending conflict when he did so. The Board concluded unanimously that the cause of this Airprox was that the Lyneham APR had permitted the C550B to climb into conflict with the SD360.

Given the very late filing of this report initially by LACC, it was not surprising that the SD360 pilot had not remembered what might have seemed to him at the time to be a fairly benign encounter just outside Class D

airspace. However, the RT transcript of ZONE's frequency had revealed that the C550B had been displayed to the SD360 crew on TCAS. Moreover, the SD360 pilot had later spotted the C550B visually - just at the point of minimum horizontal separation - as the latter turned away whilst continuing to climb toward the SD360's levelthe SD360's level. Although he had not acquired the SD360 visually, the C550B pilot had also detected the presence of the other ac on TCAS and had wisely delayed the climb to ensure safe separation despite the absence of an RA. This Airprox also illustrated the value of the LACC STCA which the ATSI report had shown had provided an appropriate warning about the SD360. But it was clear that the prompt avoiding action issued by the S23 trainee controller had effectively annulled the Lyneham APR's lapse and undoubtedly stopped the situation from deteriorating still further. Consequently, as the C550B had already turned away through the SD360's nose at a range of 3nm, coupled with the minimum horizontal separation of 1·4nm, with both crews being aware of each other's ac from TCAS and the C550B in sight from the SD360's flightdeck, the Board concluded unanimously that no risk of a collision had existed in the circumstances reported here.

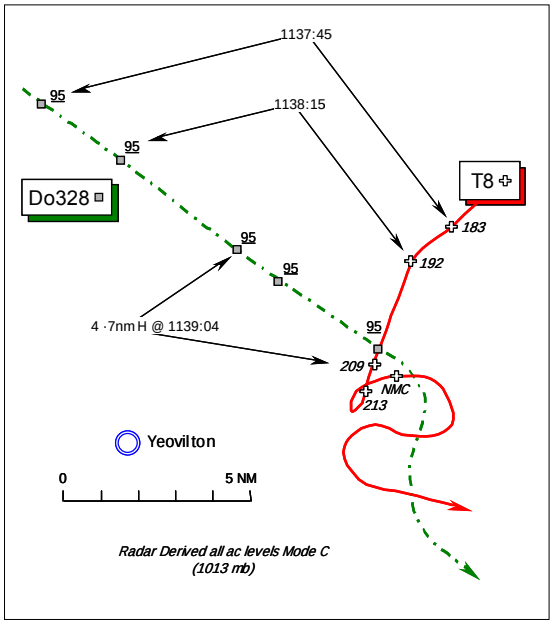
PART C: ASSESSMENT OF CAUSE AND RISK

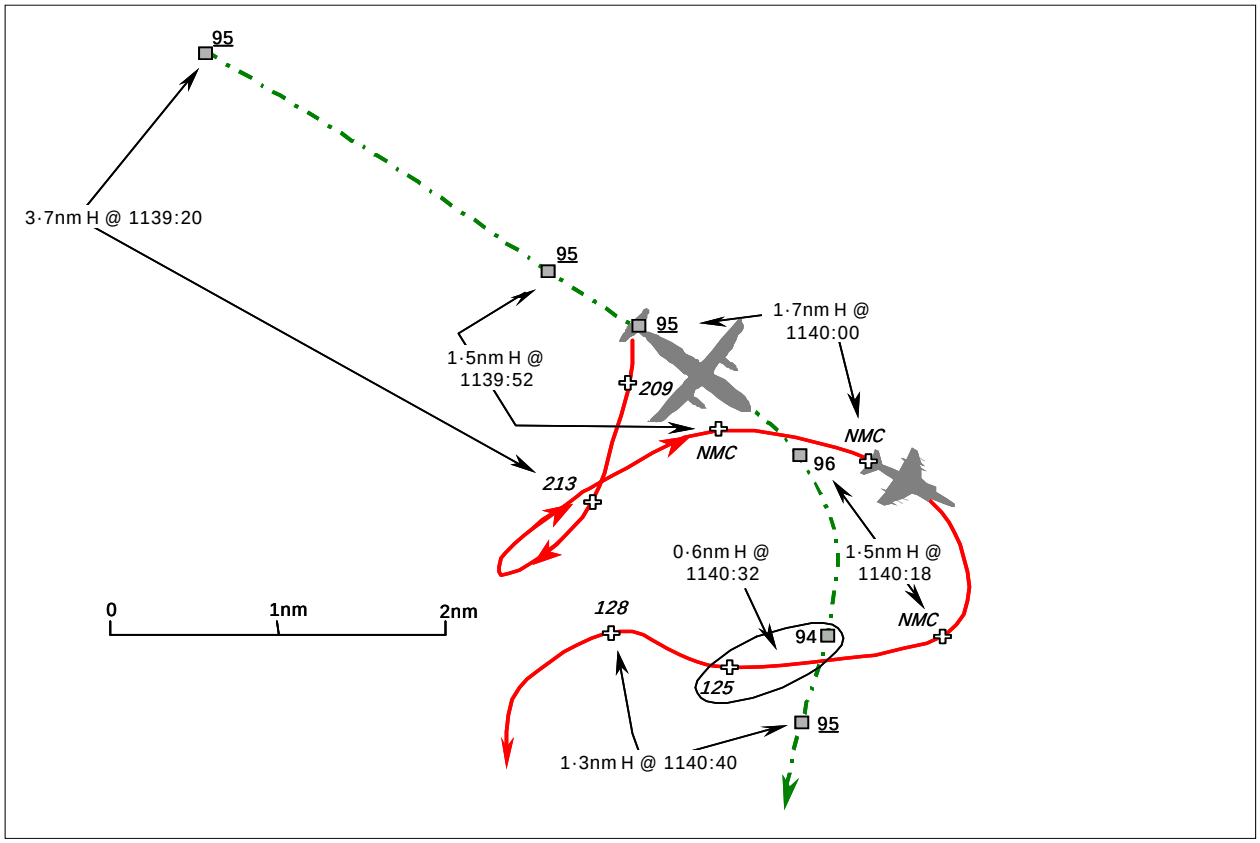
Cause: The Lyneham APR permitted the C550B to climb into conflict with the SD360.

Degree of Risk: C.

AIRPROX REPORT NO 172/05

Date/Time:	21 Sep 1140	
Position:	5103N 00228W (7nm ENE of Yeovilton)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Do328-300	Harrier T8
Operator:	Civ Trg	MOD DPA
Alt/FL:	FL95	FL105↓
Weather	VMC CLOC	VMC CLAC
Visibility:	>10km	40km+
Reported Separation:	1000ft V/1nm H	2nm H
Recorded Separation:	Not recorded	





AIRPROX REPORT No 172/05

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DORNIER 328-300 PILOT reports he was inbound to Southampton, IFR, under an ATS from Yeovil RADAR [situated at RNAS Yeovilton] flying in a level cruise at FL95 in VMC. The assigned squawk was selected with Mode C and TCAS is fitted.

Heading 130° at 250kt, RADAR called traffic information on co-ordinated traffic at 12 o'clock above them. A grey Harrier jet was then spotted at 10 o'clock-low, over 1nm away and pulling up into a loop, crossing from L - R. To avoid the Harrier he turned R at 30° AoB as the controller also called an avoiding action turn to the R, but he then lost sight of the Harrier which the RHS pilot then saw on their starboard side descending through their level. The other ac passed a minimum of 1nm away some 1000ft below his ac but no TCAS alerts were enunciated at any stage. He assessed the risk as *"medium/low"* but added that although the visibility from the Dornier's flightdeck is good, because RADAR had called the traffic "high" they were searching for the other ac in the wrong direction.

THE HARRIER T8 CAPTAIN, a test pilot [PNF] with another test pilot [PF] as crew, reports his ac has a black colour-scheme and the HISLs were on whilst flying part of a continuation sortie for the handling pilot. He was in receipt of a RIS from Boscombe RADAR on 276·85MHz whilst squawking the assigned code of A2612 with Mode C. TCAS is not fitted.

Flying in VMC some 5500ft clear below cloud with an in-flight visibility of 40km+, radar requested that they operate not below FL105 - raising the base operating level that they had been using up from FL70 - for co-ordination against conflicting traffic [the Do328] which was accepted. Their Harrier jet was climbed to between FL150 and FL210 for some low-speed scissors manoeuvring and on completion of the exercise the handling pilot overbanked and commenced a R turn to set up for a practice diversion to Boscombe Down. He as the Captain of the ac – PNF - was cognisant of the FL105 base level and gave the handling pilot a warning with 8000ft to go. Unfortunately and unbeknownst to the PNF at the time, the PF was working to an incorrect mental model of their original FL70 base level so with the relatively high RoD the '8000ft to go' call was close enough to the base level such that the PF did not adjust his mental model subsequent to the informative 'check-call'. Without a traffic information call from Boscombe RADAR neither he nor the PF was aware of the proximity of the conflicting Do328 at that stage. As he saw that the PF was rolling and pulling following his own 8000ft call [the PNF's], he believed at that stage that the PF was manoeuvring to comply with the FL105 base level. As the ac descended through FL100 on a heading of 120° at 380kt, the PNF reminded the handling pilot of the deconfliction base level and so their jet was recovered to a level above FL105. He estimated that his ac was below FL105 for no more than 15sec. The position of the co-ordinated traffic was requested from ATC and the right turn continued until it was spotted some 2nm away. Although the co-ordinated traffic [the Do328] was not seen during their initial manoeuvre the ac was being manoeuvred relatively gently and both pilots were clearing the ac's flight path visually so he considered that there was no risk of collision.

THE YEOVILTON LARS CONTROLLER reports that the Do328 was handed-over on a weather diversion to Southampton after a MAP at Cardiff. The ac climbed to FL95 routeing via Bournemouth for an ILS at Southampton, under a RAS throughout. Yeovilton LARS phoned Boscombe RADAR and requested co-ordination against the Do328 maintaining FL95 against Boscombe RADAR's manoeuvring traffic. After discussion Boscombe RADAR agreed that their ac would not fly below FL105, thereby maintaining vertical separation above his Do328. Traffic information was passed to the Do328 crew when the T8 was 12 o'clock - 7nm as "co-ordinated above" with the T8's Mode C indicating FL165. Traffic information was passed again when the T8 was 12 o'clock - 2nm with no SSR showing. The Do328 pilot responded with "visual with that ac passing below". The SSR contact of the T8 returned with Mode C indicating FL93 and climbing in the Do328's 12 o'clock at ½nm. Avoiding action was passed and the Do328 crew reported visual with the T8.

THE BOSCOMBE DOWN RADAR CONTROLLER reports that he was providing a RIS to the T8 crew, whilst general handling from FL60 – FL240. After about 5min Yeovilton LARS phoned through for co-ordination. Their traffic – the Do328 - was maintaining FL95 and they wanted the T8 to operate 1000ft above their traffic. After asking twice, the T8 crew confirmed they would not be below FL105 for co-ordination, which was agreed with Yeovilton. The T8's Mode C remained in the region of FL170-190 until he was about 1·5nm SE of the traffic, when his next Mode C update indicated FL87. He confirmed with the T8 crew that they were not operating below FL105 for co-ordination who requested the position of the Do328. After this the T8's Mode C remained above FL105 until they called for recovery to Boscombe. He did not pass traffic information on the co-ordinated Do328 as the T8 was well above it until they suddenly descended, which was only apparent when it was too late.

UKAB Note (1): The Boscombe Down ATC Supervisor also provided an account within which it was also reported that the T8 was shown indicating FL87 on the Boscombe Down Watchman SRE display.

THE HARRIER T8 PILOTS' STATION COMMENTS that this Airprox occurred when the Harrier crew did not conform to an agreed and acknowledged co-ordination measure requested by ATC. The PNF (aircraft captain) was well aware of the FL105 restriction throughout the incident, and considered that he had reminded the handling PF of the need to recover before that level. However, this warning was not understood as such by the PF. Two immediate lessons arise: Firstly, pilots must obviously adhere to previously agreed co-ordination measures until these have been revoked. Whilst there was no deliberate intent to ignore the level restriction, in this case, the PF had allowed this key fact to slip his mind. Secondly, whilst recognising that this was a highly dynamic situation, the Station shall investigate whether the captain had an opportunity to take more positive action in time to avert the incident.

MIL ATC OPS reports that the Do328, on a weather diversion from Cardiff to Southampton, was receiving a RAS from the Yeovilton LARS Controller (VLN LARS) at FL95. Simultaneously, the Harrier T8 was carrying out general handling in the block from FL60-240 under a RIS from Boscombe RADAR. At 1136:37, VLN LARS contacted Boscombe RADAR to initiate co-ordination with "*my traffic* [the Do328] *Wells Mast south west 7 miles tracking south east squawking 0230"* which VLN LARS reported as *"Maintaining FL95"* against *"your traffic south west of Wells 15* [nm] *manoeuvring 2612?".* Boscombe RADAR advised VLN LARS that it was a *"T8 between FL60 and FL240".* VLN LARS enquired "*Ah, do you think he could take a thousand feet above or below on* [Mode] *Charlie*?" Boscombe RADAR asked the T8 crew if they could "*fly not below FL105 for co-ordination*". After some negotiation, the T8 crew agreed to accept the limitation of the revised lower base operating level of FL105. The landline co-ordination discussion between Boscombe RADAR and VLN LARS finished at 1137:42. VLN LARS passed traffic information to the Do328 crew at 1138:12 "[Do328 C/S] *traffic left 11 o'clock 10 miles manoeuvring; it's a T8 co-ordinated above*" which the Do328 crew acknowledged. VLN LARS passed further traffic information at 1139:47 "[Do328 C/S] *previously reported traffic 12 o'clock 1 mile manoeuvring co-ordinated above*". However, the Do328 crew immediately responded "*Ah roger, seen below us, pulling up* [Do328 C/S]". VLN LARS reiterated that the T8 was co-ordinated against them but at 1140:02 transmitted, "[Do328 C/S] *avoiding action right 200 previously reported traffic now south east 2 miles now indicating co-alt*". The Do328 crew acknowledged the turn and then reported "*good victor mike with the traffic in our 12 o'clock this time passing overhead"*. At 1140:46, the Do328 crew resumed their own navigation. Concurrently, at 1140:00, Boscombe RADAR requested a confirmation from the T8 crew that they were not flying below FL105. The T8 crew confirmed this and asked for an update on the traffic that the T8 was co-ordinated against, whereupon Boscombe RADAR reported the Do328 as being "northwest *2 miles tracking SE indicating FL95"*. The T8 crew responded that they were visual.

[UKAB Note (2): The Burrington Radar recording shows the Do328 squawking A0230 at 1137:45, (just as the landline co-ordination was completed between the controllers) NNW of Yeovilton tracking 130°, level at FL95 Mode C, with the T8, squawking A2612, manoeuvring on a SW'ly course and climbing through FL183. The T8 crossed ahead of the Do328 from L – R climbing well above the airliner until 1139:20, when the T8 is shown at FL213 Mode C some 3·7nm away from the Do328 - this is the last Mode C indication from the T8 until after the Airprox has occurred. The jet turns R back towards the Do328, just as VLN LARS passed traffic information on the T8, and crossed 1·5nm ahead from R – L in a continuous R turn just before VLN LARS issued avoiding action at 1140:02 and reported the T8 as "… *south east 2 miles now indicating co-alt*" but at this point the T8 is displayed only as a primary contact. The T8 turns R through 100°, which was when the T8 pilot reported the level bust occurred, in the Do328's 12 o'clock turning obliquely from L – R once again at a range of 1·5nm at 1140:18, still with NMC displayed – this was probably just after the T8 went through the level of the Do328 in contravention of the base operating level agreed by the T8 pilots and the subject of the co-ordination. Meanwhile, the Do328 has climbed slightly to FL96 and is shown initiating a R turn southerly in conformity with the R turn onto 200° but unfortunately keeping the T8 ahead of the airliner's 12 o'clock. Radar contact on the T8 is lost on the next sweep – consequently the T8 is not shown as it crosses ahead at the predicted point of minimum horizontal separation – the jet is shown next indicating FL125 Mode C after it has crossed from L - R into the Do328's R 2 o'clock at 0·6nm. The Do328 meanwhile has descended slightly to FL94 as the T8 opens to the West before turning back toward Boscombe having climbed some 3000ft above the Do328, which resumes its original course maintaining FL95.]

VLN LARS observed that an ac being controlled by Boscombe RADAR was manoeuvring in the intended track of the Do328 that was under a RAS at FL95 and so contacted Boscombe RADAR for co-ordination. An agreement between VLN LARS and Boscombe RADAR was reached that the Do328 would maintain FL95 and the conflicting T8, under the control of Boscombe RADAR, would fly not below FL105. The T8 crew agreed this level restriction but it would

appear that the T8 crew did not adhere to this agreement and flew below FL105 into conflict with the Do328. Boscombe RADAR reported the T8's SSR readout as FL87 and climbing. Although the T8 crew had agreed to the restriction on their minimum level, traffic information was not passed by Boscombe RADAR about the co-ordinated Do328, which would have acted as a reminder for the T8 crew.

MOD DPA comments that irrespective of any measures to improve the situation in the Boscombe Area, which is of concern, pilots must adhere to previously agreed level restrictions. Whilst accepting the tremendously high workload pilots in the area face, there is little point in having a safety service if the conditions applied by that service are either ignored or forgotten.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident from the comprehensive Mil ATC Ops report that the Do328 crew was provided with a sound radar service from the Yeovilton LARS controller who, in the Board's view, had done all that he could reasonably be expected to do to facilitate the Do328's IFR transit through this busy portion of airspace. Clearly, LARS had initiated the co-ordination agreement with Boscombe Down who had ensured that the T8 crew were able to accede to this request. Controller Members considered whether it would have been beneficial if Boscombe RADAR had provided traffic information to the T8 crew about the Do328. Here a military controller Member postulated why RADAR had not done so: the controller Member explained that if the other traffic – in this case the Do328 – was not within 3-5000ft of the T8's observed Mode C level then the controller might not have considered the airliner to be relevant to the crew and thus unlikely to have transmitted traffic information, perhaps believing that it was superfluous RT and possibly troubling the crew unnecessarily. Whilst this might be generally accepted practice, other controller Members contended that as this had been the traffic which had been the subject of the co-ordination, the Do328 should have been pointed out to the T8 crew, regardless of the T8's operating level at the time, as the crew were free to descend at any moment down to their co-ordinated level of FL105. Noting that the recorded radar evidence was from a source not available to Boscombe Down ATC, the Burrington Radar recording had detected no Mode C from the T8 at all for about a minute before the Airprox occurred. This might have been because the Harrier was being manoeuvred so robustly that the ac's air data computer was unable to provide satisfactory inputs to the altitude reporting Mode C transponder, or that the ac had descended at such a high rate that the ground SSR interrogator was unable to keep up with the ac's transponder. The Board was aware of such concerns from earlier Airprox reports where not only the ground radar source but also TCAS was rendered ineffective by the seemingly inadequate data from a fast climbing or descending Harrier jet. Following its assessment of Airprox 156/03, the Board made a UKAB Safety Recommendation jointly to the MOD & CAA which was still open and being staffed. Whilst noting the potential for excessive RT - a criticism sometimes levelled at military controllers – on balance Members thought that a traffic information call might have prompted the PF in the T8 to remember the revised base level that had been agreed and that which the controllers and also the Captain of the T8 – the PNF – expected him to take into account. As it was, the PNF was cognisant of the revised base level that would have afforded the requisite separation above the Do328 co-ordinated level and had provided, in good time, a 'check-call' to the PF. However, controller Members were surprised that the interaction within the T8 cockpit between the two crew members had not amplified the revised base level of FL105. Perhaps this would be a good teaching point for CRM because it was clear from the T8 pilot's laudably frank account that the PF had interpreted his check call incorrectly and descended below the mutually agreed base level. Accepting that RADAR was not bound to provide an update if he perceived the T8 to be in the order of 10,000ft above the Do328 - which the last SSR update might have suggested – the T8 Captain's level check had proved to be ineffective here but fast-jet pilot Members contended that the PF should have been completely aware of the situation and taken care not to descend below the agreed level. Moreover, whilst operating VFR under a RIS, in the see and avoid environment of Class G airspace where the T8 crew was ultimately responsible for separation from other ac, the Do328 should have been spotted by the T8 crew beforehand. As it was, the radar recording had shown that the T8 crew had descended from some 12,000ft above the Do328 and turned in front of the airliner, unaware of its close proximity at the time. Therefore, the Board concluded, unanimously, that this Airprox had resulted because the Harrier T8 crew descended below their co-ordinated level into conflict with the Do328 which they did not see.

Turning to risk, Members recognised that the absence of Mode C data at the critical moment had resulted in several safety nets being breached. Firstly, the co-ordinated level agreed by all concerned, which should have

ensured that not less than 1000ft vertical separation was maintained between these two ac. Secondly, the rapid descent of the Harrier appears to have been masked from the controllers concerned until a very late stage in the encounter: LARS conscientiously updated traffic information at 1139:47 to the Do328 crew when the T8 was "…*12 o'clock 1 mile manoeuvring co-ordinated above*". However, Mode C does not appear to have been displayed to him on the Yeovilton SRE at that point as the Do328 crew immediately advised that it was seen below them. It was not until 15sec later at 1140:02 that LARS transmitted avoiding action when the T8 was "…*now indicating co-alt*" some 1·7nm away. This avoiding action R turn was unfortunately negated at these close quarters by the T8 crew's own subsequent R turn. Similarly, the Boscombe Down RADAR controller reports that the T8's Mode C remained in the region of FL170-190 until the ac was about 1·5nm SE of the traffic, when its next Mode C update indicated FL87, thereby preventing any earlier interjection. This apparently high RoD appears also to have confounded the Do328's TCAS, which its pilot reports did not enunciate any alerts at all. Assuming the device to be functioning normally, it appeared to Members that an RA should have been generated in the Do328 cockpit by the other ac's presence in these circumstances. Consequently, visual acquisition remained the only safety net and it was significant that the T8 crew remained unsighted on the Do328 whilst turning R 'belly-up' across the nose of the airliner as they descended through its level. Whilst the radar recording did not illustrate this clearly because of the dearth of Mode C data, there seemed to be no reason to doubt the veracity of either the T8 pilot's frank and honest account, that of the Do328 pilot or the controllers involved which all supported this view. This led some Members to conclude that safety had certainly been compromised as although the Do328 crew had spotted the nimble jet it would have been very difficult to avoid it themselves at close quarters. Fortunately, the minimum horizontal separation was approximately 1·5nm before the T8 crossed ahead of the airliner from R – L, whence it subsequently reduced to 0·6nm after crossing again from L - R, which led other Members to conclude that this was sufficient to remove any risk of a collision even if the T8 pilots were unsighted at this point. With the Board fairly evenly divided on this issue, the Chairman was minded to call for a vote. Finally, by the very narrowest of margins, it was concluded that whilst the separation here was sufficient to remove the actual risk of a collision, the safety of the ac involved had indeed been compromised.

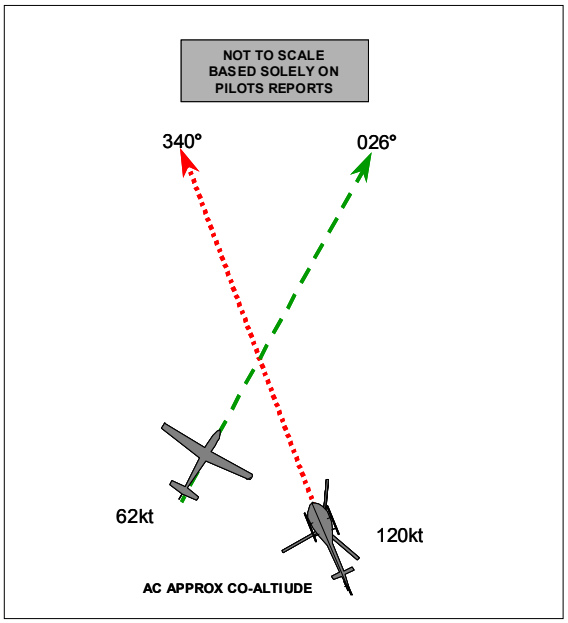
PART C: ASSESSMENT OF CAUSE AND RISK

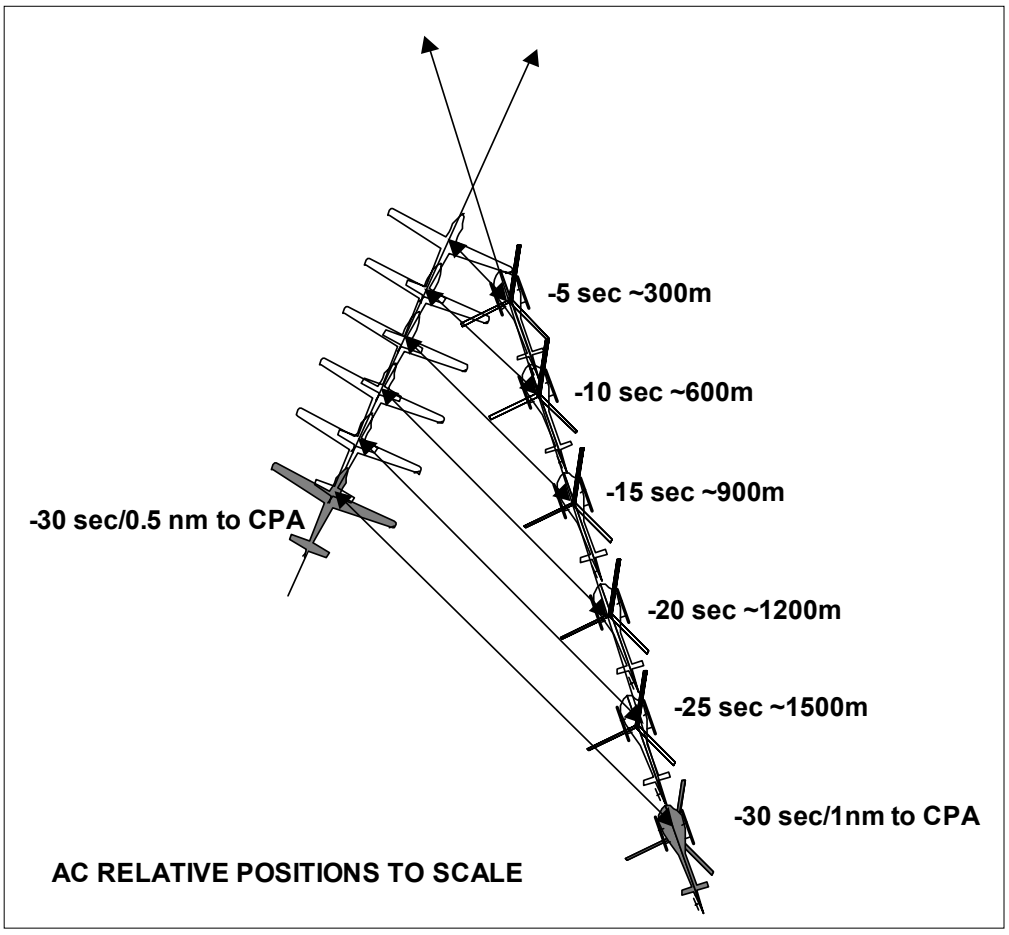
Cause: The Harrier T8 crew descended below their co-ordinated level into conflict with the Do328 which they did not see.

Degree of Risk: B.

AIRPROX REPORT NO 173/05

Date/Time:	21 Sep 1436	
Position:	5246N 00216W (3nm SSW Seighford, elev 321ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Ask 21 Glider	AS350
Operator:	Civ Club	Civ Pte
Alt/FL:	1250ft (1013 mb)	1400ft (N/K)
Weather	VMC CLBC	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:	20-30ft V/Nil H	50ft V
Recorded Separation:	NR	





PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 21 GLIDER PILOT reports flying a white and red glider returning to Seighford airfield heading 023° at 62kt following an unsuccessful attempt to find wave with the second pilot flying the glider from the front cockpit. They were in heavy sink at the time and unsure if they would make it to the airfield when the HP exclaimed *"Helicopter"* and started a moderate descent and 1-2sec later he saw the helicopter on his R about 100yd away and slightly above them, clearing them by 20–30ft vertically. He only saw the front view and underside so he could not determine the colour of the fuselage but its underside was blue, it was single rotor and had skids. The HP first saw the helicopter in their 3 o'clock position, 200yd away and assessed that only the avoiding action had prevented a collision; the helicopter did not alter course and showed no sign of having seen him.

They landed at 14.41 and called Shawbury ATC, later speaking to Manchester and Birmingham ATC, but none were able to help with identifying the ac, as it had not been in contact with them.

A map print from the datalogger file was provided and a data print at the time of the Airprox (within 20sec) together with a very detailed diagram of the helicopter.

THE AS350 EUROCOPTER PILOT provided a brief report stating that he was flying a blue and silver helicopter with all lights selected on from a site near Banbury to another near Chester, squawking 0240 with Mode C. While heading 340° at 120kt he saw a white glider cross from left to right about 50ft directly below him. He was flying into sun and suggested that that may have contributed to his not seeing the glider until he was almost overhead. He was unable to take any avoiding action and assessed the risk as being medium.

MIL ATC OPS reports that the AS350 pilot was in receipt of a FIS from Shawbury at the time of the incident. No report was made on the RT and no other ATC factors were evident.

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 noted that both ac had been operating legitimately in Class G airspace and therefore both pilots had a responsibility to see and avoid each other's ac in accordance with the provisions of the Rules of the Air, regardless of any extenuating circumstances. Members noted however that the helicopter was positioned just behind the glider's wing and although overtaking, it was maintaining a constant relative position. The helicopter pilot was flying from the RH seat and the glider was cross-cockpit and probably slightly low from his position: therefore it may have been obscured by the cockpit framework/floor. Furthermore gliders are slim from any angle which makes them very difficult to see from most perspectives.

The Board agreed that in this incident safety had not been assured due to the AS350 pilot not seeing the glider until too late to react and the late, although effective, action by the glider HP. Further, since the glider was having difficulty in maintaining sufficient altitude to return to the field, specialist opinion was that the avoidance might not have been as large as it would otherwise have been.

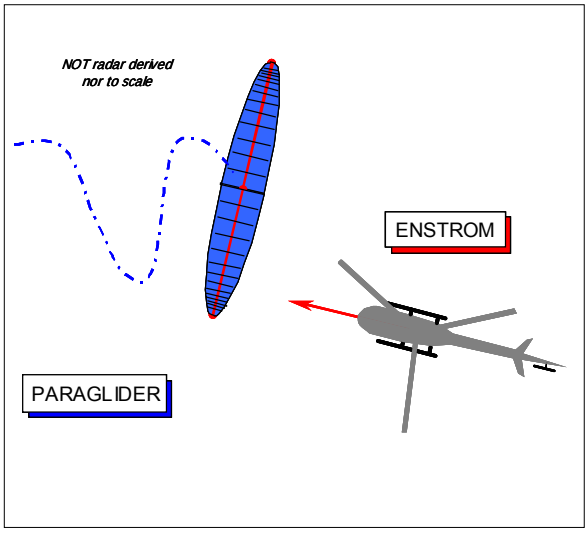
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sighting by the AS350 pilot and a late sighting by the glider pilot.

Degree of Risk: B.

AIRPROX REPORT NO 174/05

Date/Time:	19 Sep 1615	
Position:	5044N 00252W (1nm E of Charmouth)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Paraglider	Enstrom 280
Operator:	Civ Club	Civ Pte
Alt/FL:	NR	400ft (N/K)
Weather	NR	VMC CLOC
Visibility:	>10nm	>10km
Reported Separation:	100-150ft V/nil H	300ft V/200ft H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE OZONE ELECTRON (MEDIUM) PARAGLIDER PILOT reports his paraglider has a blue upper wing surface with a red longitudinal stripe and white underneath. He was soaring above the cliffs between Charmouth (Dorset) and Golden Cap near West Bay, either crabbing along the cliffs W to E - i.e. at 45° to the wind - or trying to gain a bit of height, when he first saw the black helicopter as it approached from over the top of the cliffs at Golden Cap about 2nm away to the E. At the point where he was soaring at the time the cliffs are not sheer, they actually slope and shelve back a couple of hundred yards or more, in a couple of steps to their highest point. The wind was giving him plenty of lift in this area between the front cliffs and the highest point to landward but he was not over the sea. As the helicopter approached, he turned directly toward it [E'ly] and made some 'S' turns both to avoid the helicopter and to try and make himself more conspicuous but the helicopter pilot made no alteration at all to his course. The helicopter passed 100-150ft directly overhead and as it did so the paraglider pilot recalled he was most definitely facing the helicopter's direction of approach and waving his arms frantically to show that he was concerned and even shouting - not that the helicopter pilot would have heard him! He assessed the risk of his wing collapsing as *"high".*

THE ENSTROM 280 HELICOPTER PILOT reports that he was in transit from Goodwood to a private HLS at Plymouth in his black helicopter. Whilst not in receipt of any ATS at the time of the Airprox he had selected a squawk of A7000 with Mode C. Heading W along the coast near Lyme Regis at 60kt, he was proceeding at low-level some 400ft above the cliff line whilst taking advantage of the up-draft due to high head wind and low ground speed. He saw the dark blue paraglider "in good time at least 500ft away", climbed gently to remain "well clear" and saw him wave. He did not know what the minimum separation was at the time of the Airprox but opined there was *"no risk, no danger".* The paraglider passed some 200ft horizontally to starboard and about 300ft below his helicopter, according to his diagram illustrating the encounter.

In his view, if the paraglider pilot was worried that he had not been seen then he should wear bright reflective colours, emphasising that the wing was coloured dark blue against a green cliff background. The Enstrom 280 pilot opined that he may have frightened the paraglider pilot but he saw him waving and was sure it was *"a happy wave".* He stressed that at no time was the paraglider in any danger from his Enstrom helicopter.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar.

THE BHPA comments that various aspects of the helicopter pilot's description are contradictory; flying along the lift giving cliff line into a high head wind. The wind must have been virtually perpendicular to the cliff line to give lift described by both pilots. Also the wind must have been about 10 knots for the paraglider to be flying as he was. If the helicopter pilot's minimum separation is as per the diagram then he passed some 360ft clear of the paraglider. Taking the stated sighting of "at least 500ft away" and the 60kt then the helicopter had some 2 seconds

between seeing the paraglider and passing it. It would appear that the miss distance may well have been less than the drawn 200ft horizontally and 300ft vertically. It is not clear whether it was a conscious decision of the helicopter pilot's to pass upwind of the paraglider, if so it is regrettable as it means that the risks to the paraglider pilot from the helicopter's wake were greatly increased. A wing collapse at that height could easily have resulted in a fatal crash.

Where the wind direction is known a helicopter should always pass downwind of a light weight aircraft such as a paraglider or hang glider so as to minimise the risks of wake turbulence. Helicopter pilots can get a rough assessment for their aircraft of what distance is too close by looking for the effects their passage has upon foliage, if leaves move then there is sufficient air movement to collapse a paraglider.

UKAB Note (2): The Meteorological Office estimate for the winds in the vicinity of Charmouth for the period of the Airprox is: surface: 210/8 -10kt; 500ft: 240/13kt; 1000ft: 260/15kt.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac.

A commercial helicopter pilot Member commented that the Enstrom pilot was not flying his helicopter at a particularly high speed but it was most unwise to fly so close to the paraglider given the helicopter pilot's estimates of the separation that pertained here. If the helicopter pilot had believed that he saw the paraglider in good time then he should have given it a wider berth downwind. However a sighting range of 500ft suggested to some Members a very late spot indeed given the helicopter pilot's comment that the paraglider was not very conspicuous against the green background of the surrounding terrain. In the helicopter pilot Member's view the advice proffered by the BHPA was sound and helicopter pilots should be in no doubt that the effect of rotor downwash and wake vortex on fragile ac such as a paraglider can be potentially catastrophic. Other Members commented that pilots should always be wary of the presence of paragliders at coastal locations and should be prepared to alter course to give as wide a berth downwind as possible to ensure the safety of those concerned. Unfortunately Airprox involving paragliders/parachutists such as this are never captured on the recorded radar data available to the Board. Consequently the differing perceptions of the separation that pertained here could not be resolved with any certainty, but it seemed to the Board on balance that it was too close at this low altitude. In the Board's opinion this Airprox had resulted because the Enstrom 280 Helicopter pilot had flown sufficiently close to cause the paraglider pilot concern for his safety and that the safety of the ac involved had not been assured by any means.

PART C: ASSESSMENT OF CAUSE AND RISK

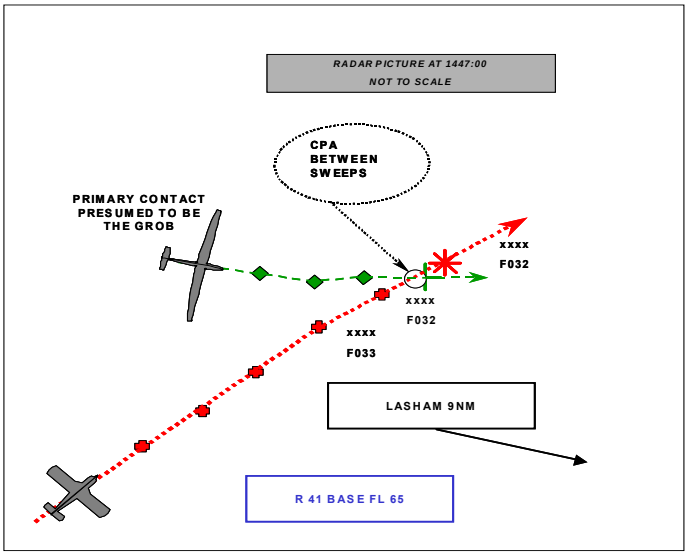
Cause: The Enstrom 280 helicopter pilot flew sufficiently close to cause the paraglider pilot concern for his safety.

Degree of Risk: B.

AIRPROX REPORT No 175/05

AIRPROX REPORT NO 175/05

Date/Time:	24 Sep 1447 (Saturday)	
Position:	5114N 00114W (1nm E of Overton)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Glider	PA28R
Operator:	Civ Pte	Civ Pte
Alt/FL:	3300ft (QNH NK)	3300ft (QNH)
Weather	NK CLBC	VMC IN HAZE
Visibility:	>50km	5-6km
Reported Separation:	20-40ft V/30-60ft H	~30m V/40m H
Recorded Separation:	Projected at 0H between sweeps	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB GLIDER PILOT reports flying a white glider, dual, on a cross-country flight returning to Lasham and listening out on a gliding frequency. While 9nm W of the field on a heading of 193° at 52.4kt, the HP in the rear seat first saw an ac come into view from under the starboard wing, approximately midway between root and tip. The ac - a low-wing, single engined, 4-seater - was white and blue or brown in colour and it was in level flight. From his perspective it seemed that the other ac yawed markedly to starboard as it passed underneath and slightly in front. The heading of the other ac was estimated to be approximately 025° +/- 005°. From a front seat (P2) perspective, the other ac appeared to pass in front of them and below. The entire fuselage could be seen but the glider nose obscured some of the port wing. As the ac was overtaking him from behind he did not take any avoiding action but considered the risk of collision as being severe. He provided a snapshot from the datalogger to verify the ac position, height and speed.

THE PA28R PILOT, in a commendably open and detailed manner, reports flying a silver and white ac with all lights selected 'on' on a VFR private flight from Henstridge to Blackbushe. Having left Henstridge he climbed above a stratus layer to about 3200ft to FL40 or FL45 and obtained a RIS from Bournemouth then a FIS from Farnborough. He was given TI regarding 2 ac inbound to Blackbushe from the S and at the same altitude but no warning of any gliders. At the time of the incident he was heading 045° at 130kt and saw only a flash of white near/behind his left wing. He was not certain of the minimum separation but thought it may have been about 30m and after passing he looked for the other ac but he could not see it. He did not report an Airprox as he was not sure what had actually happened. He had not seen any ac in his visual scan nor had any warning from ATC. He did not know whether it was an Airprox or whether the other ac pilot was visual and in control. He did not get enough of a glimpse to really judge distance, separation, heading etc as the other ac had disappeared so quickly; he saw the incident only as a peripheral movement in his left eye. By the time he had 'ducked', banked as a result (with no significant course change, just a spontaneous reaction) the glimpse of white had disappeared.

He thought in retrospect that his altitude/cloud separation of approximately 500ft from the stratus would have made a white glider very difficult to see in the hazy conditions. Scanning primarily from 9 o'clock to 3 o'clock as he was would not have put the glider in his main lookout area. The incident also occurred as he was changing from Bournemouth to Farnborough (just after) and he was looking for the reported traffic converging from the S into Blackbushe. He opined that it would probably help considerably if gliders were any other colour than white or had radios and transponders so that they could participate in ATC. He thought that a risk of collision had existed as he was unable to take any avoiding action.

UKAB Note (1): The PA28R shows on the recording of the Heathrow radar throughout. A primary contact following the track described by the Grob pilot at the corresponding time also shows. Although the CPA occurs between radar sweeps (4 sec ARP), just before 1447, it appears from geometric projection that the ac passed very close

indeed horizontally. The glider's data logger shows it to have been at 3202ft (QNH) at 1447. At that time the PA28R was at FL032 which equated to about 3300ft amsl.

UKAB Note (2): The Farnborough METAR for 1450Z was:

EGLF 241450Z 18004KT CAVOK 17/08 Q1016=

ATSI reports that at the time Farnborough ATC was very busy. The PA28R pilot contacted the Farnborough LARS frequency at 1446, reporting north of Popham at 3300ft and requesting a FIS. This was confirmed and the aircraft was identified 16nm W of Farnborough. Traffic information was passed about other traffic to the S, also inbound to Blackbushe. No information was issued about a glider and the P28R pilot made no comments. It is not known whether the subject glider was showing on the radar display but, in any case, under a FIS there was no obligation to pass traffic information.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board determined that in this incident the prime means of collision avoidance had been visual. The area round Lasham is very busy indeed, particularly in the summer and in good weather conditions. Although gliders may be launched from Lasham, the whole area can often be very congested, so much so that very often Farnborough LARS can at best only give pilots generic information on traffic density rather than TI specific to their position. Specialist Board Members considered it to be wise to avoid the Lasham area completely in such conditions. Even in good weather and light conditions, gliders are most difficult to acquire visually and in the reduced visibility that was reported by the PA28 pilot, reaction time is correspondingly reduced. Further, although it is difficult to be sure, it was possible that from the PA28 pilot's viewpoint the glider had been on a line of constant bearing such that the cockpit framework may have obscured it. Members considered it good practise to be aware of such problems and as a consequence to move one's head almost continuously to assist lookout by reducing, if not eliminating, blind spots.

Glider pilots have an equal responsibility to look out and to see and avoid conflicting traffic, even that coming from the rear hemisphere. Generally, other traffic is faster than gliders so there is a relatively high probability of them being overtaken. From a rear viewpoint gliders are very small targets indeed to acquire and the risk of not being seen by other, overtaking, pilots is very high; therefore some ac manoeuvring to assist lookout in the rear sector is very sensible, even to the detriment of gliding performance.

Despite the requirement for powered ac to give way to sailplanes - which can only be effective if the pilot of the powered ac sees the glider - the Board was of the view that both pilots had an equal and shared responsibility to see and avoid the other's ac in this and other similar events. In this case neither pilot had seen the opposing ac in time to take **any** avoiding action; effective avoiding action requires a few seconds more reaction time before the ac flight-vector changes. That being the case it had only been by good fortune that the ac flightpaths in this Airprox had not actually been in conflict which would have resulted in a collision.

It was the unanimous view of the Board that this incident provided another example of the urgent requirement for the development of electronic collision warning systems and their fitment to light ac and gliders.

PART C: ASSESSMENT OF CAUSE AND RISK

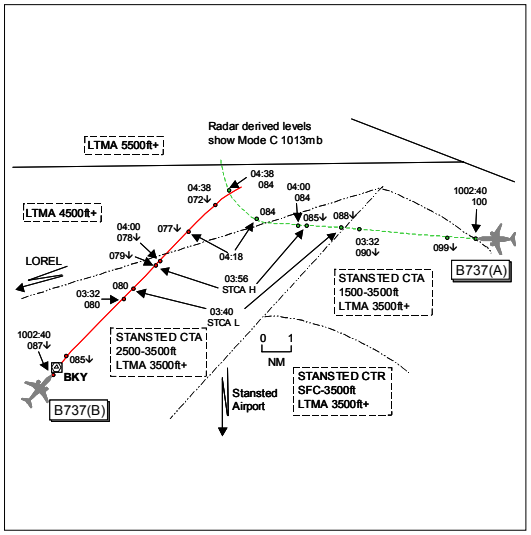
Cause: Effective non-sighting by both pilots.

Degree of Risk: A.

AIRPROX REPORT No 177/05

AIRPROX REPORT NO 177/05

Date/Time:	3 Oct 1005	
Position:	5205N 00013E (12nm N Stansted - elev 348ft)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737(A)-300	B737(B)-800
Operator:	CAT	CAT
Alt/FL:	FL87↓	NR
Weather	VMC CAVOK	NK
Visibility:	10km	
Reported Separation:		
	700ft V/2nm H	NR
Recorded Separation:		
	1200ft V/0·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737(A) PILOT reports inbound to Luton IFR heading 285° at 220kt and in receipt of an ATS from Essex Radar on 120·62MHz squawking 4106 with Mode C. Passing FL87 having been cleared for descent to FL80, the Capt observed a potential conflict and immediately reduced the ROD to 300fpm. A TA alert was received and almost immediately ATC gave an avoiding action instruction to *"maintain altitude, turn right heading 360°"*. The descent was arrested at FL83 and the other ac was seen in the CAVOK VMC, believed to an XYZ company B737, to pass 2nm away and 700ft below. He assessed the risk as high. The controller stated that their cleared level was FL90 but both crewmembers heard FL80 and read this level back without being challenged.

THE B737(B) PILOT reports that the crew were barely aware of an incident but recall something happening with an ABC company c/s on frequency. They received a TCAS TA alert and were given a heading change but no further comments were made by the controller.

THE LTCC STANSTED INTERMEDIATE (ESSEX RADAR) CONTROLLER reports that the B737(A) flight was placed on radar heading 285° from ABBOT for RW08 at Luton and cleared to FL90. The B737(B) flight was on radar heading 045° near BKY to be vectored RH downwind for RW05 at Stansted. The B737(A) was seen to 'level bust', he thought, and was subsequently given an avoiding action R turn onto 360°and told to stop the descent, stopping at FL85. The B737(B) flight was turned L to heading 360° but the B737(A) crew took this call. By the time he managed to recall B737(B), the L turn was not necessary and the ac was turned R below B737(A) and into the Stansted pattern.

ATSI reports that at the time of the Airprox, both ac were in communication with the TC Stansted INT controller. He described both the workload and traffic loading as 'medium'. Stansted INT is responsible for controlling ac inbound to both Stansted and Luton. To prevent potential confusion arising regarding inbounds to Luton being transferred to 'Stansted Approach', the RT c/s of Stansted INT is "Essex Radar". At the time of the Airprox, Stansted FIN was operating as a separate but adjacent position.

The B737(A) flight established contact with the INT controller at 0958:40, and reported descending to FL120 inbound to ABBOT. The crew were instructed to turn R onto a heading of 275°. He then continued vectoring other traffic before instructing the crew of B737(A) to descend to FL110. At this time, B737(A) was approximately 25nm NE of Stansted, passing FL121, whilst B737(B) was 15nm SW of Stansted passing FL117. At 1000:30, the INT controller instructed the crew of the B737(A) to turn R onto 280° and descend to FL100. Shortly afterwards, at 1001:20, the B737(B) flight reported on the frequency descending to FL90 heading for BKY. The crew were instructed to continue on their heading and reduce speed to 220kt. Having correctly acknowledged this, the controller advised them that they were number 6 in the landing sequence at Stansted.

At 1002:05, the controller instructed the B737(B) flight to descend to FL80. At that time, B737(B) was 8nm NW of Stansted at FL90 tracking 025° whilst B737(A) was 15nm NE of Stansted level at FL100 heading 280°. The controller instructed the B737(B) to turn R heading 045° followed, almost immediately, by an instruction to the crew of the B737(A) to descend to FL80 and turn R heading 285°. The effect of these instructions was to place the two ac on converging tracks, with B737(A) descending from FL100 to FL80 and B737(B) descending through FL87 for FL80. At the time descent was issued (1002:40) to the crew of the B737(A) the B737(B) was in its 11 o'clock at a range of 15nm.

The crew of the B737(A) read back the descent clearance clearly and no other transmissions took place to interfere with the instruction. At 1003:30, the controller instructed the B737(B) flight to descend to 6000ft, in preparation for handing the flight over to the Stansted FIN controller. At that time, B737(B) was at FL80 and B737(A) was passing FL90 in its 2 o'clock at a range of 8·2nm. As the crew of B737(B) read back their clearance (1003:40) STCA activated on 'low severity'. The controller then contacted another ac before he transmitted *"B737(B) company prefix B737(A) c/s turn right immediately heading zero three six zero degrees avoiding action"*.

The controller repeated the instruction, correctly addressing the flight, adding that the crew must stop their descent. STCA changed from low to high severity. At this time (1003:54), B737(A) was at FL85 and B737(B) was in its 11 o'clock at a range of 5·2nm, passing FL79 and crossing from L to R. The controller then instructed the B737(B) flight to expedite their descent, which the pilot acknowledged and confirmed his heading as 045°. STCA reduced from high back to low severity (1004:00) before minimum separation of 2·4nm and 700ft occurred at 1004:18. The controller then transmitted *"B737(A) c/s turn left heading three six zero degrees avoiding action*" and the crew immediately queried this by saying "*Ah confirm left, we're in a right turn on to three six zero B737(A) c/s".* The response from the controller was "*And that was B737(B) c/s in fact B737(B) c/s now you're clear of the traffic you can right heading two two five*".

[UKAB Note (1): The CPA occurs at 1004:38, B737(B) descending through FL72 as B737(A) crosses 0·6nm ahead and 1200ft above at FL84.]

The INT controller explained that it was a routine traffic situation. There were a number of ac inbound to both Luton and Stansted, with the latter using RW05. These inbounds were being vectored onto a NE'ly track by the Stansted INT controller before being turned R to position downwind LH for the RW and transferred to the Stansted DIR. B737(A), being inbound to Luton, was being positioned past the LOREL hold and descended to 5000ft via the 'Luton Gate' (*Note: This is a line drawn due N from LOREL extending a distance of some 5nm*).

When the B737(A) flight reported on frequency, B737(B) was already below it and so the INT controller's plan was to descend B737(A) on top of B737(B) and retain vertical separation until they had passed. His fpss were correctly organised and both were under the LOREL designator indicating that the ac were potential conflictions to ac holding at LOREL. The controller advised that he was vectoring another B737, inbound to Stansted from the E, and it was his intention to position B737(B) behind this ac. He was absolutely convinced that he had instructed the crew of B737(A) to descend to FL90 and marked his strip to this effect. When the incident took place he believed it was a level bust by the crew and it was not until several hours later, when he listened to a replay of the RT recording, that he became aware of his error.

When the instruction for the B737(B) flight to descend to 6000ft was issued, he noted that B737(A) was at FL90 and, so he believed, would maintain this level. He answered the telephone and accepted some releases as well as checking his strips when the FIN controller shouted a warning to him. STCA activated at low severity around the same time. Although he 'combined' the ac c/ss, it was his intention to turn B737(A) R onto 360°. However, when he later wanted to instruct the B737(B) flight to turn L heading 360° he had transposed the c/ss and the transmission made used the c/s of B737(A). His plan to resolve the confliction was to stop the descent of B737(A) and expedite that of B737(B) coupled with turning both ac onto 360°. As it transpired, the prompt turn by the crew of the B737(A) and the descent profile of the ac quickly resolved the confliction but not before separation was eroded.

In this situation he was clearly 'under pressure' and this may account for why he transposed the c/ss when issuing avoiding action. He added that following the avoiding action he re-checked his strips and confirmed that, according to his flight progress display, the B737(A) flight had only been cleared to FL90 and the B737(B) was descending to 6000ft. This is why he asked the crew of the B737(A) to confirm their cleared level and when they replied *"… flight level eight zero"*, his reply was *"Ah negative B737(A) your cleared level should have been flight*

level niner zero". The controller opined that the forthcoming introduction of Mode S should result in a reduction in such occurrences.

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 familiar with LTCC operations could add little to the ATSI report. Luton and Stansted STARs to RWs 08 and 05 respectively are initially routed to share the same hold but vectoring ac on the routeings exhibited during this incident were routine. The LTCC Stansted INT had placed the subject ac on headings and thought he had descended both flights in accordance with his plan but he had unwittingly cleared the B737(A) to FL80, not FL90 as intended. The intended level for B737(A) had been written on the correct fps which had reinforced the INT's perception that there had been a 'level bust'. This unintentional slip had led to the subject ac being on conflicting flight paths. Members agreed the LTCC INT had vectored B737(A) into conflict with B737(B) which had caused the Airprox. The NATS Advisor informed Members that following this incident a Human Factors study on human error was conducted at LTCC resulting in a further investigation into Flight Strip usage.

Members applauded the teamwork shown when the adjacent FIN warned the INT of the deteriorating situation. Although there was some c/s confusion during the period when avoiding action instructions were being given, the B737(A) crew had correctly responded to the INT's transmissions and carried out the requested actions. Also, the B737(A) crew had exhibited good situational awareness, having noticed the potential confliction from their TCAS display, and had already reduced their ROD prior to turning R and stopping their descent. The INT had correctly told the B737(B) flight to expedite descent. The timely actions by both crews had quickly taken the heat out of the situation insofar as the 'avoiding action' turn instructions meant for B737(B) were no longer required after the correct c/s had been used during the RT exchange. These elements when combined with the geometry of the encounter were enough to persuade the Board that any risk of collision had been quickly and effectively removed.

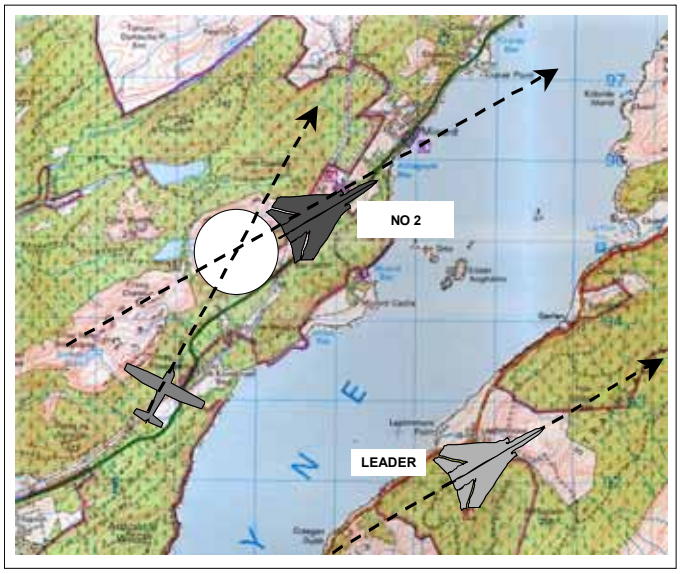
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC Stansted INT vectored B737(A) into conflict with B737(B).

Degree of Risk: C.

AIRPROX REPORT NO 180/05

Date/Time:	6 Oct 1502	
Position:	5606N 00517W (20nm S Oban)	
Airspace:	UKDLFS LFA 14 (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Tornado	Untraced
Operator:	HQ STC	NR
Alt/FL:	700ft	NR
	(Rad Alt)	(NR)
Weather	VMC HAZE	NR
Visibility:	40km	NR
	(reduced in haze)	
Reported Separation:		
	300ft V/100m H	NR
Recorded Separation:		
	300 ft V /100m H [HUD Tape]	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports flying a grey ac with HISLs and nav lights switched on as part of a 3-ship evasion sortie on a return from RAF Leuchars to RAF Lossiemouth. Just prior to the incident, his ac was steady at 1180ft, regional QNH, 700ft RAD ALT, 504 KIAS and heading 060° (all confirmed from the HUD tape). At 1502·25 his leader, who was flying 4km battle formation to the S [his right], called '*pull up climb climb'* on the intra-formation frequency. He immediately responded by climbing and as he did so saw the light civil ac (high wing, white, possibly a Cessna 152/172) pass just L of and directly beneath him at 1502·27.

After landing, a review of the HUD/FLIR video showed the light ac to be co-altitude with the Tornado prior to the avoiding action, resulting in a pass height of approximately 300ft. It was also judged that the light ac was offset slightly to the left/north of the Tornado's track by approximately 100m.

Weather conditions of the day were generally fine apart from patches of haze which, when combined with a low sun, produced areas of reduced visibility. The light ac appeared to be heading approximately 030° and the location of the Airprox was verified as 5606.50N/00517.80W.

UKAB Note (1): Despite extensive tracing action including contacting all airfields, clubs, landing strips and known sea-plane operators in the area within 200nm of the incident, the light ac could not be traced.

HQ STC comments that an excellent call by the formation leader prevented a very close pass on this untraced ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted only of a report from the reporting pilot and a HUD tape.

The Board had some difficulty in assessing this incident. While accepting the HQ STC specialist comment above and the evidence of the HUD recording, some Members considered that there had been a degree of risk in this incident. Since there was no report from the light ac pilot, evidence to substantiate this impression was less than compelling. Notwithstanding this, the Board fully accepted that the No 2 Tornado pilot, by reacting correctly and promptly to a good call by his leader, had removed any risk that the ac would have collided; however, a number of Members felt that safety had not been assured.

AIRPROX REPORT No 182/05

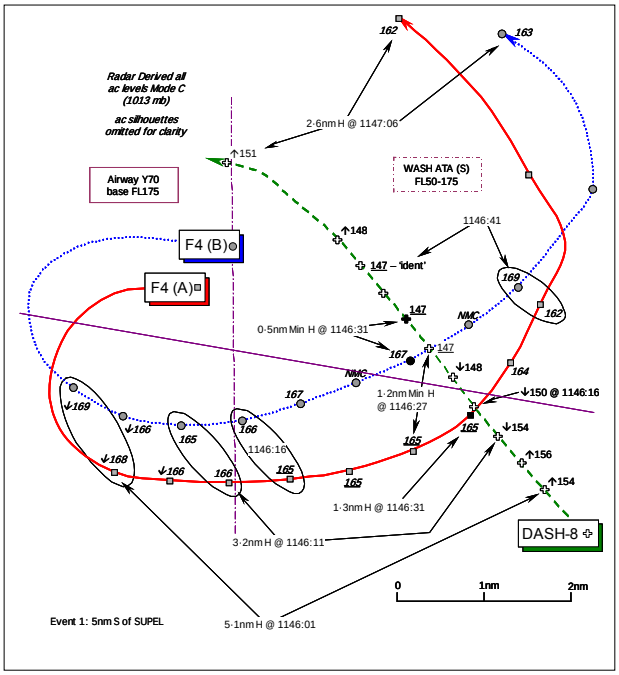
PART C: ASSESSMENT OF CAUSE AND RISK

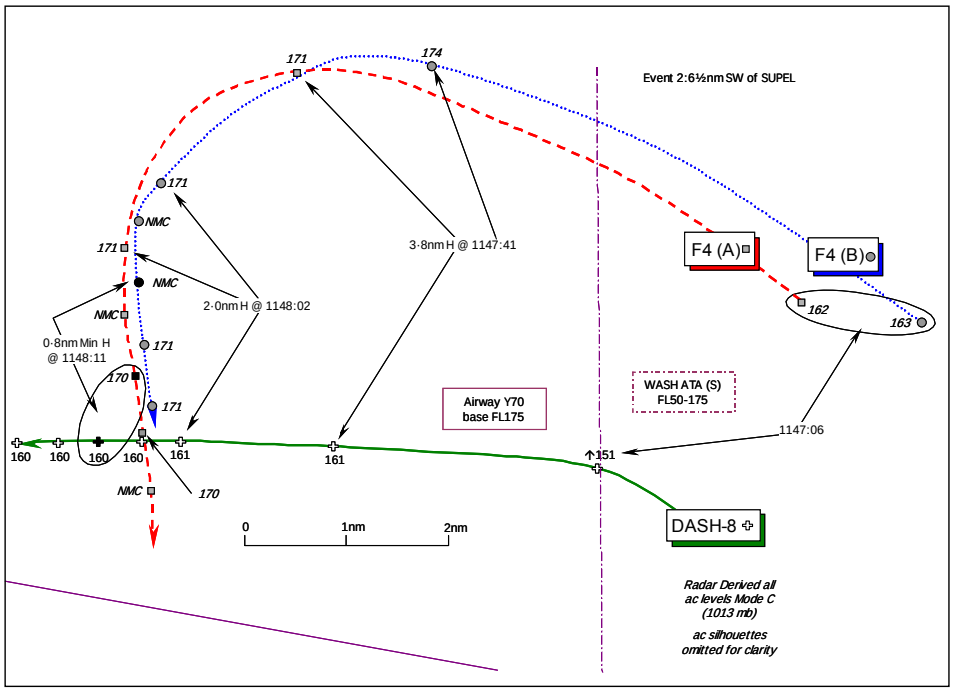
Cause: Conflict with an untraced light ac in the UKDLFS resolved by the Tornado crews.

Degree of Risk: B.

AIRPROX REPORT NO 182/05

Date/Time:	11 Oct 1146-1148	
Position:	5309N 00035E (5nm S of SUPEL)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DHC-8 400	F4F pair
Operator:	CAT	Foreign Mil
Alt/FL:	↑FL170	17000ft (QNH)
Weather	VMC CLAC	VMC NR
Visibility:	NR	>10km
Reported Separation:	100ft V/1nm H	1000ft V/2nm H
Recorded Separation:		
Event 1	DHC-8 V F4 (A) 1800ft/1·2nm	
	DHC-8 V F4 (B) 2000ft/0·5nm	
Event 2	DHC-8 V F4 (A) 1000ft/0·8nm:	
	DHC-8 V F4 (B) 1000ft/1·4nm	





PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 SERIES 400 PILOT reports that he was in transit from Norwich to Edinburgh on an IFR FPL but flying in VMC some 3000ft above cloud. TCAS is fitted. Climbing to FL170 they had departed from Norwich and had been in receipt of an ATS from Norwich ATC who handed them over to LONDON MILITARY. It was during this frequency change that the Airprox occurred. Heading he thought 360°, at 210kt they were first alerted to the presence of other ac by a TCAS TA on traffic at 11 o'clock about 4nm away. TCAS indicated that the other ac were 500ft above them with the vertical separation reducing, whereupon the TA rapidly changed to an DESCEND RA at about 2000ft/min, which was followed with a level excursion of about 2000ft. They were just calling LONDON MILITARY on handover from Norwich ATC but had not established contact with the controller until after the TCAS RA, when one of the two ac - he identified them as F4 fighters - passed behind them in a descending L turn. This first ac seemed to be joined by his wingman and they appeared to turn towards his DHC-8 causing a second TCAS TA - but no RA was enunciated this time. After contact had been established with LONDON MILITARY, who passed avoiding action in both heading and level with a L turn of 60-90° as the F4's closed from starboard, the controller said they were European fighters on an exercise and not talking to anyone. Minimum separation was about 1nm horizontally, 100ft vertically. Once he had spotted the ac the risk was "low" - because he could see that visual separation was going to be maintained, but with no TCAS warning "medium – high". He added that during this leg the 1st Officer was the PF who remained "eyes inside following the TCAS RA" whilst he looked for the ac and called the separation.

THE McDONNELL DOUGLAS F4F PILOT reports he was flying as one of a pair of camouflaged F4 ac on a Tactical Leadership Programme (TLP) exercise from Florennes. They were operating in VMC and in receipt of a RIS from an AEW ac whilst squawking A1634 with Mode C. Flying at 17000ft QNH they were turning L to intercept another pair of exercise ac when another ac was detected on AI radar some 8nm away. The white twin turboprop was acquired visually about 5nm away and to avoid the airliner they eased out of the turn to pass astern and then down the starboard side as they turned about. Minimum separation was 2nm horizontally, 1000ft vertically and the risk was assessed as *"low*". The airliner was "called out" to all other exercise participants by the other F4 pilot.

UKAB Note (1): UK NOTAM H3710/05, promulgated a warning of TLP missions between 1030-1330 from 500ft amsl – FL240 for stipulated dates in October. The narrative included a warning that "*up to 32 fast jet ac will conduct high-energy manoeuvres within* specified co-ordinates. *Ac will remain clear of regulated airspace but may be unable to comply with rules of air*." A foreign contact telephone number was also specified for TLP at Florennes.

THE NORWICH APPROACH RADAR CONTROLLER (APR) provided a laudably frank account reporting that the DHC-8 had been pre-noted to London MILITARY Console 14 (CON 14) in accordance with the current LOA and had departed Norwich at 1137 on a direct track to OTR climbing to FL170. At approx 22nm NW of Norwich the DHC-8 was clear of conflictions and in full compliance with the terms of the LOA for a [silent] transfer to CON 14 so the crew was requested to select the CON 14 squawk of A6141. At that moment another flight inbound from Amsterdam called near BODSO followed by another from the BKY direction, both requiring an IFR service. Also on frequency was an IFR flight en route to Glasgow via OTBED that was unable to be transferred to London MILITARY as they were working to capacity, together with a helicopter conducting training at Norwich. Additionally there were a number of VFR flights on frequency and calling so he assessed his workload at the time as "very high".

The TLP programme for the day was in full swing and the number of ac operating South of Y70 and over East Anglia was as high as he had ever seen in 26 years of operating in and around East Anglia. The Amsterdam inbound required numerous heading adjustments to remain clear of conflictions and for sequencing. At this point he assumed he had transferred the DHC-8 to CON 14. A short while later whilst checking his log sheets he realised that the DHC-8 was still "potentially active" having not been crossed out [FPSs are not used due to the unique operating constraints placed on the Norwich Radar controller situated at Coltishall]. He checked the ac which appeared clean and was just approaching the edge of his displayed radar picture (30nm range selected) and called the ac. After a short delay the DHC-8 crew answered and instinctively he transferred the flight immediately to CON 14 on 135·62MHz, but without checking the flight was still fully compliant with the LoA pre-conditions. Immediately afterwards he received a phone call from CON 14 who inquired about the DHC-8. He told CON 14 that he had just transferred the DHC-8 then the controller requested the type of ATS, which was a RAS. CON 14 informed him that there was traffic close to the DHC-8. After resetting the displayed radar range to 40nm he observed a number of ac about 8nm NW of the DHC-8 displaying TLP SSR codes. A short while later the LATCC (Mil) SUPERVISOR advised him that the DHC-8 had received a TCAS RA whilst under the control of

CON 14. He opined frankly that he had not complied fully with the LoA and placed CON 14 in an "untenable" position from which he had little chance to achieve standard separation.

Whilst recognising fully that this is Class G airspace he added that with such a large number of high energy military ac manoeuvring S of airway Y70 and N of the LTMA, which since the North Sea and TMA reorganisation has become a very confined piece of airspace, it is basically beyond co-ordination and almost certain to result in an incident. The best radar service available was severely limited because of the high traffic density and during that period standard separation with his other traffic was extremely difficult to maintain with any consistency. In his view, these large military TLP's with ac from numerous nations taking part should operate within the huge danger areas to the N of Y70 – as the creation of these Danger Areas was one of the major reasons why the realignment of the N Sea CAS was undertaken.

THE LATCC (MIL) CONTROLLER 14 (CON 14) reports that the DHC-8 was pre-noted by Norwich ATC to join CAS at Newcastle at FL240 and subject to the LoA silent handover procedure. The DHC-8 was observed departing Norwich on an A6141 squawk. However, he became concerned when the ac was observed heading towards a particularly congested portion of airspace and the crew had still not established RT communication. He spoke to the Norwich controller - the ac had been on a LATCC (Mil) squawk for about 15nm at this point - to determine the type of ATS required and was advised that the ac was under RAS, so he highlighted the conflicting traffic to the Norwich controller: his response was "sorry". The flight reported on his frequency almost immediately afterwards but his first transmission did not go out as he had a discrete frequency selected for other traffic working on the console. Literally seconds later he established communication with the DHC-8 crew who reported a TCAS RA immediately against military traffic passing behind. He instructed the pilot to squawk 'ident' and once identified, started to offer avoiding action but stopped when he realised that he could be manoeuvring in response to the TCAS RA - but he did instruct the pilot to maintain heading. Once relatively clear of the conflicting ac he issued a vector to transit clear from the bulk of the TLP tracks and later instructed the pilot to resume his own navigation when clear.

TACTICAL LEADERSHIP PROGRAMME comments that daily they receive calls from civil operators who ask for details of the TLP sorties and try to deconflict as much as possible. In return, the TLP try and deconflict their missions from the civil operators' intended flight path. The TLP is fully aware of the classification of this airspace and that they cannot prevent others using it but they will continue to highlight their activities and presence by way of NOTAM. The TLP makes a point of thanking those civil pilots who take the time to call them and check details of the NOTAM before getting airborne.

ATSI reports that the Norwich APR was operating in a busy traffic scenario. Commercial helicopter training was taking place at the airfield and there were a number of ac both inbound and outbound. The DHC-8 had been pre-noted to LONDON MILITARY by the APR at 1134:00, and a Console 14 squawk and frequency passed.

An LoA exists between Norwich and LATCC (Mil) in respect of silent [transfers] handovers for traffic outbound from Norwich. The relevant part of this agreement states:

"The aircraft must be clear of controlled airspace, clear of conflictions, clear of active danger areas, and must not be subject to any co-ordination".

The DHC-8 departed at 1137 and the crew established communications with the APR at 1138:50, climbing to FL170 and turning on track for OTTRINGHAM. The APR identified the flight and placed it under a RAS. A military exercise was taking place and the radar recording indicates that airspace to the N of Norwich was very busy. At 1141:30, when the DHC-8 was 13nm NW of Norwich, the APR instructed the crew to change their squawk to A6141 - that allocated by LONDON MILITARY. At that time the flight was clear of any conflictions. The APR reported that he was busy vectoring other traffic and believed that he had transferred the DHC-8 to LONDON MILITARY; however, this was not the case. A few minutes later, whilst checking through his log sheets (*ATSI Note: Flight progress strips are not used due to limitations of space*), he discovered that the flight was still on his frequency.

At 1145:15, he instructed the crew to contact LONDON MILITARY. However, before they could reply another ac called on frequency so it was not until 1145:40 that the DHC-8 crew acknowledged the frequency change. The APR reported that, at the time, he had a 30nm range selected on his radar display and the DHC-8 appeared clear of conflictions although it was approaching the edge of his displayed coverage. The telephone rang and it was

CON 14 asking whether the APR was still working the DHC-8 as there was now traffic in its vicinity. The LATCC (Mil) controller also asked what service the APR had been providing to the DHC-8 and was advised it was a RAS. The APR changed his selected range to 40nm and could see traffic in the 10 o'clock of the DHC-8, which had crossed from R - L at a range of 6·3nm, the Mode C of the other ac indicating FL173. The F4s then turned L and converged on the DHC-8. LONDON MILITARY then telephoned again and advised that the DHC-8 crew had reported receiving a 'TCAS Advisory'. The APR apologised for the late transfer.

The APR fully admitted that he had forgotten to transfer the flight when he initially intended at a time that it was clear of conflictions. When he found the DHC-8 was still with him he transferred it almost immediately: however, due to another RTF call the reply from the crew was delayed. By the time that two-way communication was established between the DHC-8 crew and LONDON MILITARY, the ac was in confliction with other traffic and did not permit the LONDON MILITARY controller to establish separation.

MIL ATC OPS reports that LATCC (Mil) Support Controller 14 took a pre-note from Norwich ATC at 1130 regarding the DHC-8 departing Norwich to the N climbing to FL170. A squawk of A6141 was allocated and a frequency passed iaw LATCC (Mil)/Norwich silent handover procedures contained in the LATCC (Mil) Unit Order Book Section 3 Order 13. The airspace to the N of Norwich was becoming busy with military exercise traffic routing E to W from the BODSO area towards SUPEL and then moving on to the SW; the exercise traffic was working an overseas AWACS, but although the jets were working under the auspices of the TLP no reports were forthcoming from the AWACS crew. At 1145:30, CON 14 observed a track squawking A6141 departing from Norwich tracking towards the exercise area. He called Norwich to ascertain whether the Norwich controller had seen the conflicting traffic and to determine the type of radar service the DHC-8 was under. He was advised that the DHC-8 crew were under a RAS and the Norwich controller apologised but the ac had been transferred to CON 14's frequency already. At 1145:58, the DHC-8 crew called on CON 14's frequency stating, "*we have a TCAS correction*". CON 14 responded, "[DHC-8 C/S] *London Mil identified er avoiding action turn er b.. er* "[DHC-8 C/S] *avoiding action maintain*…". However, the DHC-8 crew did not respond to CON 14's first transmission and called again, CON 14 asking the DHC-8 crew to squawk 'ident'. The DHC-8 crew advised "*Er, roger, we have just had a TCAS avoidance er with a military aircraft er just passed behind us*" and then added "*Ident you have, we're 147 re-clearing now to FL170".* CON14 replied at 1146:37, "[DHC-8 C/S] *roger identified avoiding action turn left heading 270, traffic was east of you by 3 miles manoeuvring indicating FL169 further traffic north 3 miles crossing right to left FL160"* [another ac and not the F4s].

[UKAB Note (2): CON 14 added at 1147:08, *" the best avoiding action is to get you out of the way and then hopefully get you enroute shortly"*. After a comment about reporting action CON 14 instructed the DHC-8 crew at 1147:32, *"…to maintain some kind of vertical separation stop climb FL160",* whereupon the DHC-8 crew advised they had already exceeded that level by 100ft but *" just going back down".* Simultaneous transmissions made the originator difficult to identify from the transcript but at 1147:57, LATCC (Mil) confirms that the DHC-8 crew advised about the F4 pair - *"..exercise traffic coming in from the right now just under a thousand feet above"*. CON 14 then advised at 1148:05, *"…I can't give you a turn south because of the Wash danger areas".* However, at 1148:22 the controller issued avoiding action of a R turn onto N, but with no response from the crew CON 14 repeated the transmission 9sec later, which was then read back by the DHC-8 crew who added *"...and there's two F fours"*.]

Norwich transferred the DHC-8 crew to CON 14's frequency whilst in confliction, contrary to the silent handover agreement between the 2 ATSUs.. Although slightly confused by the DHC-8 crew's initial call of "*TCAS correction*" CON 14 identified and passed avoiding action to the DHC-8 crew as quickly as possible. The DHC-8 crew were assigned a westerly heading which would have taken them clear of the exercise traffic but at 1147:52 the exercise traffic initiated a left turn back towards the DHC-8. The DHC-8 crew observed this manoeuvre on TCAS before it was evident to CON 14 on his radar. Due to the flight profiles of all the ac involved in the Airprox and the proximity of a Danger Area [EGD308] some 7nm to the SW of the DHC-8, CON 14 felt unable to pass an avoiding action turn. As soon as it became apparent that the exercise traffic was continuing the left turn to pass behind the DHC-8 then CON 14 passed an avoiding action turn onto north to increase the separation between the ac involved.

The DHC-8 crew were placed in an unsafe position initially by the transfer of the DHC-8 onto CON 14's frequency in confliction with the F4s. The westerly turn given by CON 14 should have taken the DHC-8 clear of confliction but the F4s turned back towards the DHC-8. The DHC-8 crew was aware that the F4s were turning back towards their ac from TCAS and informed CON 14 of this fact. CON 14 was restricted as to where he could position the DHC-8 and the fact that he was unaware of what heading the F4s would steady onto. However, he did have the

option to descend the DHC-8 crew at this stage to increase the 1000ft Mode C separation, which was already evident.

UKAB Note (3): The LATCC (Mil) Cromer radar recording illustrates this Airprox quite clearly as two separate encounters during a period of over 3min.

Event 1: At 1146:01, just after the DHC-8 pilot called CON 14 the closest of the pair - F4 (A) - was 5·1nm W of the DHC-8 in a L turn descending through FL 168, with F4 (B) in 1nm 'close battle' from the leader on the inside of the L turn. At this stage the DHC-8 is tracking 320° and indicating FL154 Mode C climbing. The next sweep at 1146:06, shows the horizontal separation reduced to 4·1nm with the F4 pair indicating FL166 whilst the DHC-8 indicates 1000ft below at FL156 Mode C – the point of minimum vertical separation. At 1146:11, the DHC-8 reverses into a descent through FL154 in conformity with the reported TCAS DESCEND RA, with F4 (A) as the closest of the pair is indicating level at FL166 some 3·2nm away and 1200ft above the airliner. The DHC-8 continues to descend and at 1146:16, the DHC-8 indicates FL150 descending with the F4s 2·3nm to the W indicating FL165/166. Minimum horizontal separation of 1·2nm occurred some 5nm S of SUPEL, with the lead F4 (A) at 1146:27, that was some 1800ft above the DHC-8 as the latter 'bottoms-out' at FL147 and crosses from R – L ahead of F4 (B) indicating NMC. The DHC-8 maintains FL147 as F4 (B) passes about 0·5nm to the S at the point of minimum horizontal separation whilst indicating 2000ft above the airliner as F4 (A) passes 1·3nm behind and 1800ft above the civilian ac. When the DHC-8 squawks 'ident' at 1146:31 – still indicating FL147 - the F4s have opened to the ESE of the DHC-8, indicating FL169/162 respectively and then turn NW'ly in a cross-over L turn to pass to starboard of the airliner as the latter turns W in conformity with CON14's avoiding action turn instruction issued at 1146:37.

Event 2: The DHC-8 climbs through FL151 at 1147:06, with the F4s indicating FL162/163 respectively. After this point the separation increases as the DHC-8 maintains a westbound course and levels at FL160/161, beneath airway Y70 – base FL175. Meanwhile, the F4 pair circle around L in a racetrack pattern to the N of the airliner and climb about 1000ft. F4 (A) with F4 (B) in trail turns L and steadies southbound at 1148:02, at a range of 2nm and 1000ft above the DHC-8. At a point about 6½nm SW of SUPEL F4 (A) closes to a minimum of 0·8nm range – still 1000ft above the airliner and passes 0·9nm astern, as does F4 (B) whilst some 1100ft above the DHC-8 with minimum horizontal separation of 1·4nm evident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

From the F4 pilot's perspective, his report had shown that the pair was operating VFR in Class G airspace and aware of the DHC-8 when it was detected first on their AI radar some 8nm away and then visually from a range of about 5nm. Whilst they had eased out of the L turn to pass astern and avoid the airliner visually they had passed somewhat closer than they had thought on the first event, before turning about around the airliner and passing astern again for a second time - albeit a little closer, the radar recording revealed - whilst continuing with their exercise. Whilst this was clearly of concern to the DHC-8 crew, flying under IFR and reasonably expecting to be afforded standard separation under a RAS from other traffic, it was evident that the F4 pilot considered this to be a relatively straightforward encounter in Class G airspace where they had detected and avoided non-exercise traffic.

The comprehensive reports provided by ATSI and Mil ATC Ops, coupled with the Norwich APR's report, revealed that not only was the Norwich APR operating under an intensive airfield traffic loading after the DHC-8 departed from Norwich but that the Class G airspace further afield was also very busy, in part because of the military TLP exercise. This all combined to produce a very busy traffic scenario - indeed the APR himself considered it was one of the busiest periods he had ever experienced. Members opined that such an intensity of military traffic was to be routinely expected within Class G airspace and should have been clearly evident from the NOTAM promulgated for the exercise. In an experienced civilian controller Member's view the DHC-8 flight should not have been routed through this airspace, which was advertised to be very busy with up to 32 fast jet ac conducting high-energy manoeuvres and which other airspace users were forewarned might have been unable to comply with 'The Rules of the Air'. Plainly the TLP planners had promulgated the intensive nature of their exercise and it should have come as no surprise to the DHC-8 crew that the military ac were operating where they were. Whilst recognising fully the limited options available to commercial operators who run schedules from regional airports

such as Norwich that are remote from the main airways structure, a controller Member contended that operators should consider routeing these scheduled flights around such major exercises if at all possible. Clearly when operating commercial flights outside CAS there is a potential for encounters such as these reported here, and in the controller Member's opinion operators should weigh the associated risks carefully when planning such flights through NOTAM'd exercises. However, Members agreed that on this occasion the exercise airspace promulgated was extensive, making it difficult to find an alternative route. In part, any risk should have been mitigated by the provision of a continuous RAS to the DHC-8 crew by the Norwich APR and then by LATCC (Mil). But the Norwich controller's own report had shown that other flights had not been able to obtain a service from LATCC (Mil). A point worth repeating here was that operators should be in no doubt that the provision of ATSs by LATCC (Mil) to civilian traffic in Class G middle airspace was certainly limited by the unit's own priorities of service and here the unit was allegedly operating at maximum capacity. This intensity of traffic had a direct bearing on this Airprox insofar as it occurred during a period of "very high" workload for the APR, which Members agreed was intrinsic to the cause.

The Board commended the Norwich APR for his laudably frank account and the ATSI report had shown that the controller had forgotten to transfer the flight at the time he initially intended when it was clear of any conflictions. However, the flight had continued onward, the APR apparently unaware that he had not transferred the flight to LATCC (Mil) until he checked its status on his log sheets. Thus the APR was not actively monitoring the flight as it approached the edge of his displayed radar coverage with the F4 pair apparently unseen outside the 30nm range selected, he said. Even then when he realised his omission and tried to switch the flight to CON14, another flight called thereby delaying still further the transfer. As it was, the DHC-8 crew were unaware that the APR had not been actively monitoring their progress to achieve the requisite separation. In his haste the APR had not scanned for conflictions in their vicinity just prior to eventually switching them to LATCC (Mil), which was just as the F4's turned eastbound once again toward the DHC-8. Thus unaware of the presence of the F4 pair manoeuvring ahead and descending, as the DHC-8 climbed up towards them, the APR had not fulfilled the intrinsic requirements of the LoA between these two ATSUs which in the Board's view was a significant contributory factor. Moreover, the APR had effectively ceased to provide the RAS he had 'contracted' to provide when the flight departed. Here then, in the Board's view, was the fundamental cause of this Airprox and Members agreed unanimously that during a period of high workload, the Norwich APR effectively ceased to provide a RAS to the DHC-8 crew before transferring the flight to LATCC (MIL) CON 14 in conflict with the F4 pair.

Thus it was not until 1145:40 that the DHC-8 crew actually acknowledged the frequency change with the APR and switched when, simultaneously, the F4s turned about. Eighteen seconds later, at 1145:58, the DHC-8 crew called on CON 14's frequency just as standard horizontal separation of 5nm was about to be eroded and just over 30sec before the point of minimum horizontal separation of 0·5nm occurred with F3 (B) – shown on the diagram for Event 1. It was clear from the Mil ATC report that with only this extremely short period available there was no time for CON14 to establish horizontal separation for it was not until after the F4 pair had flown astern of the DHC-8 that CON14 was able to identify the ac, place the flight under service and offer an avoiding action turn. However, by that stage TCAS had warned the DHC-8 crew of the presence of the F4's and contributed to the vertical separation that was achieved during the first encounter. The recorded radar data had clearly revealed the DHC-8 crew's prompt response but had shown that the DHC-8 pilot had underestimated the vertical separation significantly, the F4 pair remaining 1000ft vertically above the DHC-8 at a range of 4·1nm during the first event as the latter's crew reversed the climb and descended in accordance with the commanded RA. The effect was to achieve vertical separation of some 2000ft overall at the point of minimum horizontal separation. CON14's advisory avoiding action turn onto 270° never materially affected the outcome as it was applied too late to be effective. However, the DHC-8 pilot had reported that once the F4 pair had been spotted, he could see that visual separation was going to be maintained and it was evident that TCAS had proved its worth once again.

It was reported that the second event, as the F4's continued to turn about and approach this time from the airliner's starboard side, did not apparently trigger an RA. In this event it was clear from the radar data that the F4's had maintained more or less steady level flight 1000ft above the DHC-8 as they turned to pass astern. Therefore, without any conflicting vertical movement the 'safety net' of TCAS was not breached. Overall this was the closer of the two encounters with a CPA of 1000ft/0·8nm as the closest of the fighters – this time F4 (A) drew aft of the airliner's starboard beam to pass astern. Nevertheless, the Board noted that the DHC-8 crew observed this manoeuvre on TCAS before it was evident to CON 14 on his radar. Due to the flight profiles of all the ac involved and the proximity of EGD308 some 7nm to the SW of the DHC-8, the Mil ATC Ops report had revealed that the controller was unable to pass an avoiding action turn before the F4s cleared astern and CON14 was able to turn the DHC-8 back northbound. Taking account of both of these events, the pilots' own views and weighing all of the

factors carefully for relevance, the Board concluded unanimously that no risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

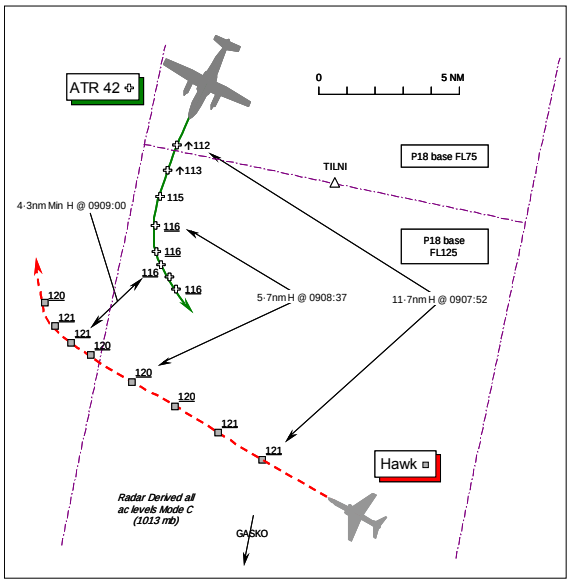
Cause: During a period of high workload, the Norwich APR effectively ceased to provide a RAS to the DHC-8 crew before transferring the flight to LATCC (MIL) CON 14 in conflict with the F4 pair.

Degree of Risk: C.

Contributory Factors: The silent handover of the DHC-8 was not in accordance with the Letter of agreement between Norwich ATC and LATCC (Mil).

AIRPROX REPORT NO 184/05

Date/Time:	14 Oct 0909	
Position:	5428N 00203W (9nm SW of TILNI)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ATR42-300	Hawk
Operator:	CAT	HQ STC
Alt/FL:	FL116↑	FL120
Weather	VMC CLBL	VMC CAVOK
Visibility:	20km	>10km
Reported Separation:		
	300ft V/3nm H	Not seen
Recorded Separation:		
	500ft V/4·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATR42 PILOT reports that he was enroute from Newcastle to Cardiff under IFR and had just switched to Manchester ACC on 125·95MHz. A squawk of A5414 was selected with Mode C; TCAS is fitted. About 10nm N of GASKO, heading 200° at 180kt climbing through FL116 in VMC, a dark coloured military jet – the Hawk - was spotted 3nm away. To avoid the Hawk he turned L onto 090° and stopped the climb as the jet crossed 3nm ahead from L – R with vertical separation of about 300ft as the Hawk climbed above them. He assessed the risk as *"low"*. He added that their departure from Newcastle was in "uncontrolled" Class G airspace. Furthermore Newcastle RADAR could not visually confirm that they had reached CAS because Newcastle's SSR was u/s and thus the controllers could not see his ATR42's indicated level on their radar display.

THE HAWK PILOT reports he was in transit from Leeming to Lossiemouth at 420kt in his black Hawk ac; the HISLs were on. A RIS was obtained from Leeming APPROACH on departure and then ScATCC (Mil) for the medium level transit at FL120, below the base of CAS, prior to a controlled climb with Scottish MILITARY to a higher cruising level. In the vicinity of the reported Airprox location he was heading 310° but he has no knowledge of the reported incident nor was the other ac seen. No traffic information he thought, nor avoiding action instructions were issued by either Leeming APPROACH or Scottish MILITARY, but at the reported time of the incident he was in the midst of a handover between these two ATSUs.

THE HAWK PILOT'S STATION comments that from their perspective the ac appears to have been handled correctly under a RIS provided by Leeming APPROACH whilst operating VFR in Class G airspace. The Leeming controller had noted the civilian traffic but considered that there was no threat to either ac and did not continue to call the traffic. By the time that the Hawk was being handled by ScATCC (Mil), both ac had separated and there was still no need to call the civilian ac as a threat. There does not appear to have been any erosion of safety.

THE NEWCASTLE RADAR 1 CONTROLLER (RADAR) reports that he was working outbounds from Newcastle and traffic in the FIR. The workload was high due to traffic levels and the Newcastle SSR was unserviceable. The ATR42 departed Newcastle at 0855 and was given vectors for the W side of P18 climbing to FL150. Once the ac had passed inbound traffic and at a point 3nm NW of TILNI, he transferred the ac to MACC. Because of a slow climb rate the ATR42 "dropped out" of the base of airway P18 when it steps up from FL75 to FL125 at TILNI. He was not aware of this at the time as he had no SSR Mode C readout and was later informed by MACC that the ATR42 had left CAS passing FL110 and flown into confliction with military traffic – the Hawk.

THE MACC NORTH UPPER SECTOR RADAR CONTROLLER (NORTH UPPER) reports that during "moderate traffic" the ATR42 was transferred on a heading from Newcastle passing FL110, climbing to FL150, SW of TILNI. The ac was outside CAS. As the crew called, his CO-ORDINATOR pointed out fast moving military traffic climbing through FL110 about 9nm SE of the ATR42 and climbing well. This unknown military ac – the Hawk - levelled off at FL120, placing the jet in conflict with the ATR42 whose crew was given an avoiding turn onto 090° and asked to maintain FL115 which in fact they had just reached. The ATR42 pilot informed him that he had observed the conflicting traffic displayed on his TCAS. As the Hawk passed 6nm SW of the ATR42, NORTH UPPER instructed the ATR42 crew to continue the climb and placed the ac back on a heading towards MONTY. He opined that Newcastle ATC should ensure that ac are transferred within CAS during periods of SSR outage.

MIL ATC OPS reports that the Hawk ac had departed Leeming routeing NW maintaining FL120 under a limited RIS, due to weather clutter and poor radar performance, from Leeming APPROACH (APR). At 0908:11, APR commenced a radar handover of the Hawk to ScATCC (Mil) Controller 4 (CON 4). During the handover the APR reported, erroneously, that "*traffic, north 5 southbound squawking 5414*" - the ATR42 - had been called to the Hawk and that the pilot was visual. CON 4 identified the Hawk and turned the ac R onto a heading of 350° but the turn does not take affect until the Hawk is well clear of the ATR42. No further mention was made regarding the conflicting traffic, which passed 4·3nm behind the Hawk.

The Hawk was operating in class G airspace below P18. Leeming APR had applied a RIS to the Hawk upon departure and had called the conflicting ATR42 on 2 occasions, the first at 15nm and later at 8nm. However, the Hawk pilot did not call visual contact with the ATR42, he only reported "[Hawk C/S] *looking not yet visual*". APR erroneously stated during the handover to ScATCC (Mil) CON 4 that the Hawk pilot was visual with the ATR42. However, given that the minimum horizontal separation between the 2 ac was recorded as 4·3nm, it is unlikely that the Hawk pilot would make any track adjustment against the ATR42.

ATSI reports that at the time of the Airprox the Newcastle SSR was unserviceable. The ATR42 was routeing from Newcastle to Cardiff via Airway P18. The classification of this airway is: Class A from Newcastle VOR to 8nm S of GASKO between FL125-FL225: Class D, FL75-125, from TILNI to 10nm N of TILNI and from this position to the boundary of Newcastle's CAS from FL55-125.

The ATR42 crew established communication with the Newcastle RADAR Controller at 0855, reporting passing 1900ft for 6000ft QNH (1030mb), routeing straight ahead to 3·5DME before turning R onto a heading of 190°. RADAR changed the heading after initiating the turn to 220° and issued a climb to FL150. About 4min later the RADAR controller asked the ATR42 pilot his passing level which was reported as FL80. The ATR42 was approximately 8nm S of Newcastle airport, within the Class D section of airway P18, where the base is FL55. No further checks of the ac's level were made before it was subsequently transferred to MACC. The only two transmissions made to the ATR42 pilot before transfer were revised headings to ensure he remained within the western area of the airway, in compliance with a local agreement between Newcastle and MACC.

The RADAR Controller was reported as busy with a high workload due to operating with primary radar only. The erroneous assumption was made, based on the ATR42's initial ROC, that the ac would remain within CAS. The radar recordings of the event show that as the ATR42 crossed the next Airway level-step boundary where the base rises to FL75, it was climbing through FL98. Subsequently, as the flight was transferred to MACC, approaching the next airspace boundary where the base is FL125, the ATR42 was passing FL110. Consequently, as the flight

contacted the MACC NORTH UPPER Sector, it was passing FL112 and was just leaving CAS into Class G airspace.

[At 0907:50, the ATR42 crew reported *"…climbing FL150 passing 110 radar heading 200°"*, Whereupon at 0908:00, the NORTH UPPER radar controller informed the ATR42 pilot *"…just continue on your present heading there's traffic climbing presently in your at 11 o'clock range of about 11 miles stop your climb at FL120 please".* The pilot read-back to level stop-off and reported the traffic was seen on TCAS.] However, realising that the unknown traffic – the Hawk - had stopped climb at FL120, the ATR42 crew was issued with an 'avoiding action' L turn [just after 0908:10] onto a heading of 090° and the traffic information updated as half past eleven, about 6nm. The flight was then instructed [at 0908:30] to maintain FL115. The closest the subject ac came to each other was 4·3nm horizontally and 500ft vertically by which time the conflict had been resolved.

At the time of the Airprox there were no specific procedures quoted in the Newcastle MATS Part 2 to be adopted by controllers when the local SSR source fails. However, since this Airprox, an Operational Memorandum has been published at Newcastle to address the problem. Of relevance to outbound traffic via Airway P18 is for controllers to 'issue a clearance that will ensure ac remain inside CAS. "Outbounds to cross 5nm west of TILNI FL130 or above" for example. As already stated in the MATS Part 2, if any ac is unable to achieve FL130 before or abeam TILNI then co-ordination must be agreed with MACC. Additionally, Newcastle and MACC are discussing the procedures to be introduced when Newcastle's SSR is out of service. Of further interest, the base of Airway P18 S of TILNI is to be lowered to FL105 (D) and Newcastle are negotiating for extra SSR coverage from NATS.

HQ STC had nothing further to add to the investigation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Clearly the Leeming APR was mistaken when he informed ScATCC (Mil) CON 4 that the Hawk pilot had reported visual with the ATR42 but he might have misheard the pilot's transmission as the transcript revealed that he actually advised "…*looking not yet visual*". From the Mil ATC Ops report and the Hawk pilot's own account it was evident that the Hawk was in transit VFR at a level chosen to stay below P18 and the Hawk pilot clearly had no intention of entering CAS. The Mil ATC Ops report also revealed that the Hawk pilot's recollection of the event was slightly mistaken insofar as he had actually been passed traffic information about the ATR42. With minimum horizontal separation of 4·3nm evident from the radar recording as the airliner drew aft, the Hawk pilot might well have perceived this to be a somewhat insignificant event from his perspective, discounting it whilst legitimately proceeding about his sortie below the airway in Class G airspace.

It was evident to Members that the catalyst to this Airprox was the ATR42 crew's apparently inadvertent excursion below the base of P18 outside CAS at the point the base level changed from FL75 to FL125, S of the TILNI reporting point. This excursion would not have been immediately apparent to the Newcastle RADAR controller (before he transferred the flight to the MACC NORTH UPPER SC) because he was denied the benefit of displayed Mode C data because the Newcastle SSR was unserviceable. At the time, no specific guidance was given to the Newcastle controllers on this topic and the ATSI report had shown that the investigation of this Airprox had prompted Newcastle ATC to address this issue. Whilst the Board agreed that the transmission of more specific clearances to aircrew would ensure ac remain inside CAS as mentioned in the ATSI report, the crux of the issue was whether it should have been apparent to the ATR42 crew that they were about to, or had, strayed outside CAS. The ATSI Advisor said that the ATR42's initial climb rate was satisfactory as it departed from Newcastle but clearly the ac should have maintained a climb gradient that would have kept it within Class A CAS. The radar recording had shown that as the airliner passed abeam TILNI it was only passing FL112 in the climb, below the lower limit of P18 S of TILNI. Consequently, the ATR42 exited CAS into Class G airspace, unbeknown to the Newcastle RADAR controller, into potential conflict with the Hawk. In the Board's view, the controller could reasonably have expected that the ATR42 crew would maintain an appropriate climb gradient to keep them safely inside CAS. CAT pilot Members believed that the crew should have anticipated the need to do this and taken action in good time either to remain within CAS or to alert Newcastle RADAR if unable to do so. The Board agreed, therefore, that this Airprox had resulted because the ATR42's climb gradient was not sufficient to stay within CAS and it flew into conflict with the Hawk beneath the airway.

Turning to risk, having exited the relative sanctuary of CAS, the prompt avoiding action turn instruction from MACC NORTH UPPER SC when he astutely detected the conflict and also stopped the ATR42's climb at FL115 – some 500ft below the Hawk – effectively prevented the situation from deteriorating any further. This coupled with the resultant horizontal separation of 4·3nm convinced the Board that no risk of a collision had existed in these circumstances.

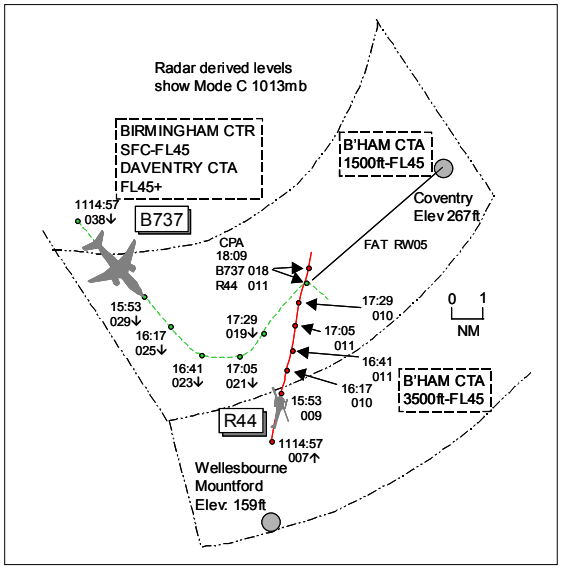
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ATR42's climb gradient was not sufficient to stay within CAS and it flew into conflict with the Hawk beneath the airway.

Degree of Risk: C.

AIRPROX REPORT NO 185/05

Date/Time:	13 Oct 1118	
Position:	5221N 00135W (5nm FIN APP RW05 Coventry - elev 267ft)	
Airspace:	CTA/FIR	(Class: D/G)
	Reporting Ac	*Reported Ac*
Type:	B737-500	R44
Operator:	CAT	Civ Pte
Alt/FL:	2000ft (QNH 1019mb)	<1400ft (QNH)
Weather	IMC IICL	VMC CLBC
Visibility:	18km	6-8km
Reported Separation:	700ft V/<0·5nm H	not seen
Recorded Separation:	700ft V/0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Coventry IFR and in communication with Coventry Approach on 119·25MHz squawking 1050 with Mode C. During radar vectors towards final approach, TCAS indicated proximate traffic ahead. On a LLZ intercept heading at 2000ft, flaps 5 at 170kt in IMC, the proximate traffic was still on final approach indicating 1300ft and at approximately 6nm from the threshold RW05. ATC informed them of the traffic, possibly an R22 helicopter, but they were unable to identify it visually as they were flying in and out of cloud at 2000ft. ATC then cleared them for descent to 1500ft. The offer was declined but they asked to turn L to avoid and maintain 2000ft. They were instructed to turn R onto 150°; a TA alert was then received with vertical separation showing 700ft. They believed they flew directly over the top of the other ac (TCAS showed <0·5nm separation) and once clear they asked for further vectors to RW05. The Approach controller informed them that he would be filing a report.

UKAB Note (1): The RT transcript reveals that the reported traffic was observed later by the Coventry ADC and identified as a Robinson helicopter, no model specified, which was subsequently traced by RAC Mil to be an R44.

THE R44 PILOT reports flying solo en route from Wellesbourne to a private site near Woodford, VFR and in receipt of a FIS from Wellesbourne on 124·02MHz squawking 7000 with Mode C. The visibility was 6-8km 400ft below cloud in VMC and the helicopter was coloured blue with the anti-collision light switched on. He was not aware of any Airprox until contacted by RAC Mil five days post incident when the geometry of the encounter was explained. At the time, he thought he was heading 330° at 100kt and was flying at <1400ft QNH – he had not seen the B737

whilst flying VFR clear of CAS. From the information given, he believed that the B737 flight should not have been given an IFR clearance to descend below 1500ft since Coventry has no CAS (i.e. no CTR). He went on to say that he did not think an Airprox occurred as the B737 Captain elected not to continue his descent with no alternative but to take that action. To have continued its descent might have resulted in the B737 descending through the base of the CTA and then flying IFR in IMC below 1500ft outside CAS.

THE COVENTRY APR did not submit a report. Although the APR stated on the RT that he would be completing paperwork, no formal report was filed. However, the APR was fully debriefed on the incident by local management.

UKAB Note (2): The Met Office database did not contain archive data for Coventry. The nearest airport METAR available was Birmingham which shows EGBB 1120Z 34012KT 9999 BKN018 13/10 Q1019=

ATSI comments that the B737 flight established communications with the Coventry APR at 1115:00, and reported passing 3800ft for 3000ft and heading 140°. The ac was 10·7nm W of Coventry, within the Birmingham CTA, having previously been vectored by Birmingham Approach. The Coventry APR informed the crew they were identified and would be vectored for an ILS to RW05. At 1115:50, the crew were instructed to descend to 2000ft, QNH 1019mb. At that time, a 7000 squawk was in the 12 o'clock position of the B737 at a range of 5nm showing an unverified Mode C readout of FL09 (approximately 1080ft amsl) which is beneath Birmingham's CAS. (*ATSI note: Coventry has no SSR information available and so the APR was using primary radar only and, accordingly, would not have had any height information*). The Coventry APR made a blind transmission to "*Traffic just south of Warwick Racecourse…*" but received no response. TI was passed to the crew of the B737 *"...twelve o'clock range of two miles er northbound you're still inside controlled airspace I presume that traffic is outside.."* and they were instructed to turn L heading 090°. At this point (1116:20) the B737 was passing FL25 (equivalent to 2680ft amsl) and within the Birmingham CTA where the base is 1500ft. The 7000 squawk was continuing on a track of approximately 015°, remaining below the base of CAS, and would cross the extended C/L of RW05 at a range of 5nm. The B737 crew reported (1116:40) that they had the traffic on TCAS, 1100ft below them, but they were not visual. At 1117 the APR transmitted "*B737 c/s that traffic is now on a six mile final very just very a short distance south of the centreline are you happy to continue or do you wish to go through*". The crew replied "*He's now a thousand feet below us and we're still in IMC at the moment so we're just becoming visual we'll keep a good look out*". The Clee Hill radar recording shows the B737 turning L and closing on the 7000 squawk from its 8 o'clock. The APR passed further TI (1117:20) *"okay it's now twelve o'clock one mile"* and 10sec later, at 1117:30, the B737 crew reported that they were breaking off to the L. The APR instructed them to turn R heading 150° and to descend to 1500ft. The crew responded that they would turn R but they wanted to maintain 2000ft. The B737 continued to catch up on the 7000 squawk and separation reduced to a minimum of 700ft and 0·4nm, at 1118:09, when the B737 began to track away to the SE. The B737 was subsequently re-positioned for another approach.

Throughout this encounter the B737 remained within CAS, and in accordance with MATS Part 1 (Section 1 Chapter 6 Page 4 para 9), 500ft above the base of the CTA and the 7000 squawk was at FL11 (approximately 1280ft) beneath the base of the CTA. The APR passed TI to the crew who initially decided to continue with the approach before choosing to break off. 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 and reports from the appropriate ATC and operating authorities.

Pilot Members wondered if the B737 crew had filed this Airprox because ATC cleared them for descent to 1500ft into confliction with the R44. Subsequently, the investigation had revealed a slightly different sequence of events to those recalled by the B737 crew. Both the B737 crew and ATC had good situational awareness during the encounter, the APR passing timely and accurate TI to the B737 flight whose crew continuously monitored the R44's progress on their TCAS display. The B737 crew had initially elected to continue their approach, maintaining 2000ft within CAS in IMC, until deciding to break-off to the L as they continued to close on the helicopter flying >500ft below them, beneath the CTA. ATC had then issued a R turn to the B737 flight and descent clearance to 1500ft. The B737 crew accepted the R turn, which ensured earlier track divergence from the R44, but declined the descent. In doing so the B737 crew had effectively resolved the situation and removed any risk of collision as the B737 turned 0·4nm behind the R44 and passed 700ft above it. At the end of the day, this had amounted to no more than a sighting report on TCAS where safety had been assured throughout the encounter.

The Board noted the R44 pilot's comments on the incident. However, pilot Members thought that the R44 pilot had shown poor airmanship when he elected to cross the FAT of RW05 obliquely at range 5nm, albeit VFR, without calling Coventry ATC for a service. Although the pilot was under no obligation to do so, his chosen flight path had placed the flight into potential confliction with any ac flying an instrument approach. An RT call to the controlling ATSU would have made both ATC and the B737 crew aware of the R44 pilot's intentions, enabling all parties to discharge their responsibilities for 'see and avoid' in Class G airspace in a timely and more co-ordinated manner.

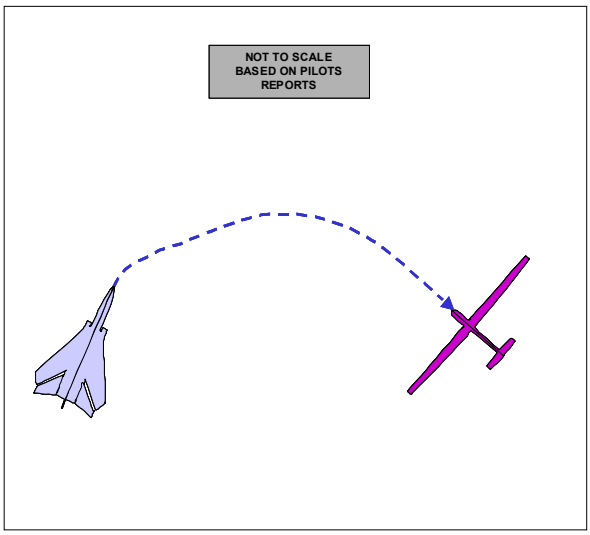
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 186/05

Date/Time:	6 Oct 1410	
Position:	5658N 00423W (Loch Laggan)	
Airspace:	Scottish FIR	(Class: G)
	First Ac	*Second Ac*
Type:	Duo Discus T	Tornado F3
Operator:	Civ Pte	HQ STC
Alt/FL:	9130ft	8500ft
	(1013)	(RPS 1003 mb)
Weather	VMC CLAC	VMC CAVOK
Visibility:	>50km	80km
Reported Separation:		
	50ft V/25m H	50ft V/30m H
Recorded Separation:		
	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DUO DISCUS T GLIDER PILOT reports that he was on a soaring flight from Aboyne in a white glider and at the time was flying at about 65kt in very good visibility some 3000ft above about 2/8 of cumulus cloud with tops to 6000ft. He had just spoken to Scottish Info and crossed W3D from E to W at Newtonmore and was climbing in lee-wave through FL91, flying NW-SE figure of eights, reversing direction about every 45sec. He was about 4nm N of the N end of Loch Laggan when he first saw a fast jet, which he thought to be a Tornado, flying at low-level SW down Loch Laggan away from him. The ac then began a climbing R turn and he had watched it for about a minute when it became clear that if it continued to climb and turn it would pass very close to him. His view of the other ac was never obscured by cloud or terrain and by then he was looking to the W, viewing the jet nose-on, and he found it very difficult to judge its track but he thought that if it continued to turn and climb it would pass in front of him (to the S) at a similar altitude. While on a SE track he banked to the R as sharply as he could without losing sight of the jet, hoping that the pilot would see his profile and that the ac would continue to turn and pass to his L but after he had turned to a W'ly heading (he was not checking the instruments at the time), the jet's rate of turn appeared to decrease and it was still on a collision course. At that point the jet was only a few sec away and still climbing. There was no point in trying to reverse his turn (his glider takes 4-5sec to reverse from 45° bank) and all he could do was to put the nose down steeply. The jet passed about 50ft above him and about 25m to his 1 o'clock; he would have been heading roughly NW at that point. He felt a terrific thump from the slipstream and could smell the kerosene fumes as the jet continued to climb across W3D in a gentle turn to the SE. He thought

that the other pilot had not seen him and he assessed the risk as being high. His flight was electronically recorded, which verified the details above.

THE TORNADO F3 PILOT reports leading a pair of F3s on a tactical sortie in the N of Scotland opposing a formation of 4 grey GR4s themselves defended by 4 other F3s. All were grey in colour and had HISLs switched on. They were in receipt of an ADIS from Boulmer. At the time of the incident he was initially heading 180° at 450kt and attempting to intercept the GR4 package below in a sharp descending left turn, then starting to roll out. They first saw the glider 200yd [1 sec] away on their nose and, before they had time to take any effective action, it passed down their right side at a similar level [50ft] and very close [10m]. Initially they were worried that the wake turbulence would damage the glider so they climbed and circled to keep it in view. When it was apparent that the glider was undamaged they then filed an Airprox while still airborne, through the GCI Controller, assessing the risk to have been high

UKAB Note (1): Although both pilots reported the incident to their respective ATC agencies, neither report was actioned/forwarded correctly. Both units involved have reminded their staffs of the correct procedures and emphasised the need for accurate and timely reporting.

UKAB Note (2): The 2 F3s and a primary-only contact, presumed to be the glider, can be seen on the recording of the Tiree radar. An analysis of the recording proved fruitless as the glider contact was intermittent, the Airprox probably occurred when it was not visible and the tracks could not be reconciled with the glider pilot's very detailed description. The recording shows the F3 operating continuously at about FL95 prior to the event. The F3's orbit after the incident can be seen being flown at a slightly higher level. Since there was a divergence between the report of the glider pilot and that of the F3 pilot, the F3 crew was contacted by the UKAB and they confirmed that they had not at any stage prior to the incident been flying at low level. Since there were up to 10 Tornados, all similarly coloured, it was concluded that the ac seen by the glider pilot climbing up from low level was not the one that was involved in the Airprox. Since he saw the ac that was involved passing him, it must be assumed that at some stage during the evolution he described his attention must have transferred from one Tornado to another, namely the one involved. It therefore follows that it was likely that his initial avoidance was not conducted against the F3 finally involved in the Airprox.

Although the Tiree recording shows 2 other participants, presumed to be F3s, operating at medium level slightly further to the E, it (understandably due to the distance of the event from the radar head and the terrain in the area) does not show any low level traffic, leaving 2 F3s and 4 GR4s unaccounted for.

MIL ATC OPS reports that they have addressed the incorrect reporting procedures by the ASACS unit to which the F3 pilot initially reported the incident.

The F3 formation was operating under an ADIS from Boulmer on the Portree RPS 1003mb. The Controller passed TI on "possible glider traffic" which had entered radar cover. The F3 leader acknowledged the call and immediately reported the Airprox. The controller only had intermittent contact on the conflicting traffic for a brief moment and assessed that there were at least 3 gliders in the vicinity all of which were operating close to the limits of radar cover. The pilot returned to the position of the Airprox to verify the status of the glider.

No RT recording was available due to the unserviceable equipment.

HQ STC comments that this was another close call against well camouflaged glider. The late spot gave the F3 crew no time to react before the two ac had passed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings, reports from the fighter controllers involved and reports from the appropriate ATC and operating authorities.

The Board was unanimous that this had been a most serious incident and noted its marked similarity to Airprox 162/05, 191/05 and to two incidents in 2003. Members were advised by a specialist gliding colleague that on good wave days there is a very large amount of activity throughout the week from the major launch sites; on the day in question the radar showed several contacts presumed to be gliders in the immediate area, albeit very

intermittently. Although warned of possible gliding activity by the Air Defence Radar unit, this warning had come too late to enable the F3 pilot to take any avoiding action.

The Board noted the very comprehensive report from the glider pilot but were not able fully to reconcile his detailed description of events with the report from the F3 pilot. From subsequent HUD evidence there was no doubt that the particular Tornado had been the one involved in the Airprox yet the radar recording shows that this F3 had been operating continuously at medium level in the period leading up to the incident. There was prolonged discussion in an attempt to resolve the apparent discrepancy, in particular as to whether there might have been another unseen Tornado in the immediate vicinity. The most likely explanation, the Board concluded, was that at some point during the one minute period leading up to the incident the glider pilot's attention had unwittingly transferred from one grey Tornado to another grey Tornado, namely the one involved. That being the case, it was likely that at least his initial avoidance had not been conducted against the Tornado that was finally involved in the incident which he had not seen until either a very late stage or even after it had passed.

Both the BGA and STC Members agreed that in principle it should be possible to share information on each other's activities. Good wave days and times are limited; equally intensive activity by STC units in the areas where good wave exists is also rare. Both Members considered that a degree of flexibility might be possible if an information flow system were put in place thereby reducing the likelihood of their ac coming into close proximity on these days. Although powerless to implement any formal or informal agreement, it was suggested that DASC might be an appropriate organisation to chair any discussion.

Although accepting that the nature of the material and composition of gliders necessitates a predominantly white finish, the Board considered that this had without doubt contributed to the Tornado crew's late sighting of the glider. Because it was probably not possible to increase substantially the visual conspicuity of such gliders, the Board considered that as much as possible must be done regarding electronic measures. The Board was briefed on the development in the UK of a lightweight low-power usage transponder that would operate successfully in gliders, a Member commenting that progress had been very slow. Members were unanimous and unequivocal that widespread use of such equipment would provide a significant advance in ac safety. Statistics show that almost 14% of Airprox assesed by the Board in the last 6 months had involved one ac in receipt of a radar service and another which was not transponding. Without a functioning transponder a conflicting ac can not only be invisible to a controller but also, and often more importantly, to another ac's ACAS. The Board considered that advances over the last few years in electronics and battery technology must now make a technical solution achievable. That being the case, it was again the unanimous view of the Board that the CAA should continue actively to encourage, as a matter of urgency, the production of a lightweight transponder which can operate in gliders throughout their flights and regardless of their altitude (OAT). When the equipment is available, the CAA should consider mandating its use.

This had been a very close encounter. The glider pilot found himself in an unenviable situation where, despite an apparent early sighting, he was not able to 'outmanoeuvre' the approaching Tornado and, in any case, it was likely that it was not the one that had only just missed him. Despite being assisted by ground and AI radar, the Tornado crew were denied all the visual and electronic clues that would have alerted them to the presence of the glider(s) so they were equally poorly placed to take any action to prevent a 'coming together'. In short neither crew could do anything to prevent the occurrence and it was only by good fortune that the ac did not collide.

In addition to publicising widely the details of this incident, the Board considered that the risk of repetition would be further mitigated by action on its two Safety Recommendations.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sighting by the Tornado crew of the glider which was unable to take effective avoiding action.

Degree of Risk: A.

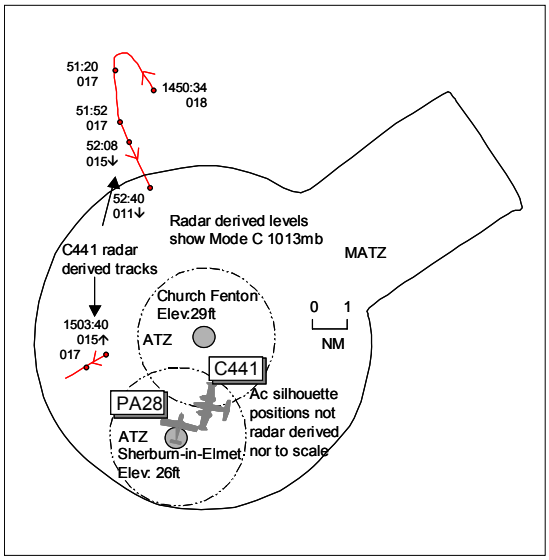
Recommendations:

186/05-01 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.

186/05-02 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.

AIRPROX REPORT NO 187/05

Date/Time:	19 Sep 1456	
Position:	5348N 00113W (c0·5nm Sherburn-in-Elmet - elev 26ft)	
Airspace:	ATZ/FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	C441
Operator:	Civ Trg	Civ Comm
Alt/FL:	1500ft (QFE)	á2000ft (QFE 1020mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	20km	>10km
Reported Separation:	200ft V/500m H	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports flying a dual training sortie from Sherburn-in-Elmet and in communication with Sherburn Radio on 122·6MHz, squawking standby. The visibility was 20km; he was flying 1000ft below cloud in VMC and the ac was coloured white with strobe lights on. Initially he was circling L O/H Sherburn-in-Elmet at 80kt on a standard O/H join at 1500ft Church Fenton QFE, explaining the significance of the signal square and the deadside descent to his student. He then began to track 020° to position the ac well to the deadside of RW29, the intention being to begin a descent to 1000ft. The student pointed out an ac in their 1-2 o'clock at a similar level which had hitherto been obscured by the windscreen pillar and which was on a constant relative bearing about 600-800m away and converging. It was a light twin-engine type with its gear retracted. He immediately dived the ac and turned L to avoid it. The next time he saw the twin it was on the same course as themselves, about 270°, about 200ft above and 500m clear on the R; he thought the other pilot had not seen his ac. After landing he contacted Church Fenton ATC who informed him that the twin was a 'calibrator' which had been instructed to turn L on going around but had turned R and consequently flown through the Sherburn-in-Elmet ATZ. He went on to say that he had become concerned about the situation at Sherburn. Flying 4-5 days a week, in the previous 9 months he had experienced 5 incidents involving other ac joining the cct inappropriately which had required prompt action to avoid collision. His experiences had also been shared by other instructors at the airfield.

THE C441 PILOT reports calibrating the Church Fenton PAR and in receipt of a RIS from Church Fenton on a UHF frequency, squawking 0024 (Radar Flight Evaluation/Calibration squawk) with Mode C. The visibility was >10km 1500ft below cloud in VMC and the ac was coloured blue/white with nav and strobe lights switched on. The flight was carried out in accordance with company standard procedures and involved up to 6 PAR approaches onto RWs 24, 06,16 and 34. The ac was self-positioned to a 7nm final for the appropriate RW under a RIS. During the calibration runs No2 VHF is on company duties whilst Nos1&2 UHF are on task frequencies. No1 VHF was used to monitor traffic at Sherburn and Full Sutton as appropriate. Earlier in the day, initial calls were made to establish their presence but because of busy RT, reliance was placed on ATC to liaise with Sherburn. A careful pre-flight

briefing was given to ATC and both the company radar assessor and controllers were very conscientious in warning of any conflictions. The geographical proximity of the 2 ATZs makes overflight of Sherburn, when calibrating Church Fenton, inevitable. Consequently on completion of each approach he climbed steeply to 2000ft QFE before turning, normally to the L, for repositioning downwind. By the nature of the task, a vigilant lookout is maintained by both pilots at all times. A number of light ac were seen and, where necessary, avoided but at no time was he aware of getting close to any ac. He did appreciate that the sudden appearance of any ac just 500ft above can give rise to concern. At no time did his ac enter the Sherburn ATZ although he did overfly the zone, but not the airfield, at or above 2000ft Church Fenton QFE.

THE CHURCH FENTON APP reports the C441 flight was calibrating the PAR for all RWs and was on its own navigation under a RIS and positioning for each serial run at 1500ft QFE. Whilst carrying out a run on RW16, the C441 pilot informed the APP of his intention to turn L outbound for a further serial. However following completion of the run the pilot advised that he would maintain RW track and reposition for RW06. He then observed the C441 turn unexpectedly towards the Sherburn-in-Elmet ATZ and he asked the pilot if he had spoken to Sherburn (for permission to transit). The pilot asked him for the frequency by which time the ac was inside the ATZ. The APP immediately informed the Linton-on-Ouse ATC Supervisor of the incident.

THE LINTON-ON-OUSE SUPERVISOR reports the APP had told him of the incident where the Calibrator had turned R unexpectedly after an approach onto RW16 and flown through the Sherburn area giving the APP no time to offer advice or avoiding action to the pilot. The APP had told the Calibrator pilot to contact Sherburn, as the ac was within their ATZ, which action was carried out after the pilot requested the frequency. Previously, the Supervisor had not seen any ac returns in the Sherburn area and as the C441 quickly cleared the area, this remained the case. The C441 pilot returned to the Church Fenton frequency without comment and the flight check continued.

UKAB Note (1): Met Office archive data shows the Church Fenton METAR as EGXG 191450Z 23012KT 9999 BKN042 BKN220 19/09 Q1021 BLU=

MIL ATC OPS reports that all timings in this report are UTC. The timings of the tape transcripts and the video recording cannot be correlated due to limited radar data.

A C441 was carrying out calibration of the PAR for all RWs at Church Fenton under a RIS. At 1445:57 Church Fenton Approach (APP) cleared the C441 *"...fly through, gear up, runway one six."* The pilot responded *"Request left turn out for a further one."* APP asked if the pilot intended to turn L immediately and the pilot responded *"Negative, on go around turn left out for a serial nine"* and APP acknowledged. TI was passed by APP on a pipeline inspection ac at 1448:21 and the C441 pilot reported *"contact it's well below."* At 1450:35 the C441 pilot reported *"...turning inbound, one minute to record"* and at 1452:25 APP transmitted *"...cleared to fly through, gear up runway one six, circuit clear"* the pilot acknowledged and continued *"...it will be ahead and then turn for zero six."* At 1455:54 APP, on noticing the C441 turning R instead of L on the climb out, asked *"...have you spoken with Sherburn"* and the C441 pilot asked for and was given the Sherburn frequency.

Analysis of the Great Dunn Fell radar recording shows the C441 positioning for approaches but the Airprox is not shown.

Following the discussion prior to the C441's approach it was reasonable for APP to expect the ac to turn L after overshooting RW16 and there was therefore no requirement for APP to arrange prior co-ordination with Sherburn-In-Elmet. When the ac was seen to turn R both APP and the Linton-On-Ouse Supervisor reported that they believed that the C441 had entered the Sherburn ATZ and APP carried out the correct action by advising the pilot to contact Sherburn.

Neither APP nor the Supervisor saw any conflicting ac in the area of the Sherburn ATZ and it was reported that the C441 returned to the APP frequency without any further comment on the incident.

UKAB Note (2): The UK AIP at AD 2-EGCJ-1-2 para 2.17 promulgates Sherburn-in-Elmet ATZ as a circle radius 2nm centred on the longest RW 11/29 534703N 0011303W from the surface to 2000ft aal, aerodrome elevation 26ft amsl. Flight Procedures 2.22 includes para c *"Circuit directions: Runways 06, 11 and 19 – RH; Runways 01, 24 and 29 – LH"* and para d which states *"Circuit heights 1000ft (on Church Fenton QFE) and circuits must be kept close to Sherburn in order to avoid conflict with Church Fenton traffic"*.

UKAB Note (3): The MIL AIP at AD 2-EGXG-1-8 para 2.17 promulgates Church Fenton ATZ as a circle radius 2nm centred on N53 50 03·86 W001 11 43·56 from the surface to 2000ft aal, aerodrome elevation 29ft amsl. Flight Procedures 2.22 cross-refers to TAP charts which advise *"Caution Light acft flying at Sherburn-in-Elmet (3nm SW of Church Fenton), circuit height 1000; not to be over-flown below 2000 QFE".*

UKAB Note (4): The Great Dun Fell radar recording at 1450:34 shows the C441 7·3nm NNW of Church Fenton, steady tracking 340° downwind LH for RW16 squawking 0024 at FL018 (2010ft QFE 1020mb). The ac commences a L turn towards final approach shortly thereafter, rolling out on a S'ly track at 1451:20 level at FL017 (1910ft QFE). Just over 30sec later the C441 has established on final approach RW16 and commences descent before fading from radar, when it is last seen at 1452:40 4·5nm NW of Church Fenton descending through FL011 (1310ft QFE). The C441 reappears 11min later at 1503:40 3nm W of Church Fenton tracking 240° climbing through FL015 (1710ft QFE). No other radar contacts are observed within the Sherburn ATZ during the C441's radar fade period.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members were aware of the high workload generated during calibration flights. Although 'serial' runs are planned to be flown to a programme for each RW, it was noted that the task does not always go according to plan which often necessitates changes to be carried out at short notice as the calibrations runs unfold. During this incident, the C441 crew had carried out one approach to RW16 with a L turn-out on the go-around and reposition for a further approach. During this 2nd approach, the C441 crew reported 'it will be ahead and then for zero six'. No direction of turn was stated by the C441 crew nor stipulated by the APP who would have been expecting a L turn out, cognisant of the close proximity of the Sherburn-in-Elmet ATZ to the SW and the C441's previous go-around actions. ATCO Members thought that perhaps the Church Fenton APP should have re-iterated the required direction to the visiting C441 crew as, if a R turn had been requested by the crew, ATC would have coordinated with Sherburn if necessary or told the crew to contact the Sherburn A/G operator prior to entry of the ATZ. However, the APP had cleared the C441 through the cct and had then seen the ac turn R towards the Sherburn ATZ. By this time it was too late for ATC to coordinate with Sherburn and the APP did not know if the C441 crew were already talking to Sherburn on another VHF radio. Contrary to his report, it appeared that the C441 crew were not monitoring the traffic situation at Sherburn as they requested the Sherburn frequency when the APP asked then if they had spoken to Sherburn. Consequently, following this unannounced R turn, the C441 crew entered the Sherburn ATZ without prior contact and flew into conflict with the PA28 which they apparently did not see. This had caused the Airprox.

Meanwhile, the PA28 was positioning to the N of Sherburn at 1500ft QFE on the deadside for a LH cct on RW29. The instructor had had the converging C441 pointed out to him by his student when it was 600-800m away at the same level and had quickly taking avoiding action by diving his ac and turning L. The C441 was seen to pass 500m away to their R on a parallel course and 200ft above. These robust actions taken by the PA28 instructor were enough to persuade the Board that any risk of collision had been quickly and effectively removed.

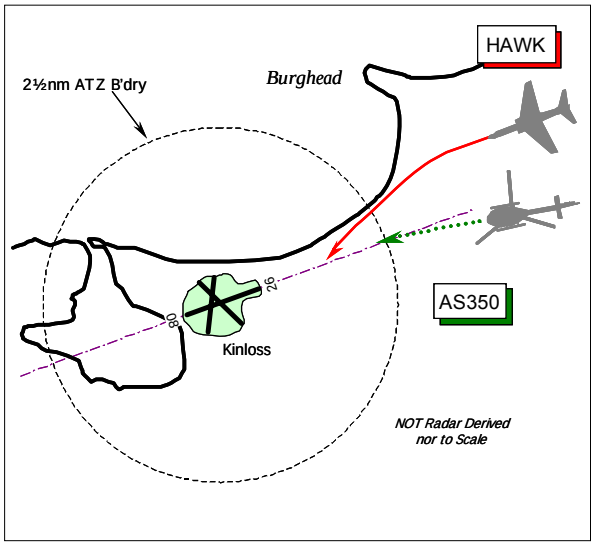
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following an unannounced R turn, the C441 crew entered the Sherburn ATZ without prior contact and flew into conflict with the PA28 which they apparently did not see.

Degree of Risk: C.

AIRPROX REPORT NO 188/05

Date/Time:	18 Oct 0841	
Position:	5740N 00330W (3nm ENE of Kinloss - elev 22ft)	
Airspace:	Kinloss CMATZ	(Class: G
	Reporting Ac	*Reported Ac*
Type:	AS350	Hawk
Operator:	Civ Comm	HQ PTC
Alt/FL:	1500ft	1000ft
	(QNH 1020mb)	(QFE 1019mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	>10km	20km
Reported Separation:		
	Nil V/200ft H	<200ft V/200ft H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS350 SINGLE SQUIRREL HELICOPTER PILOT reports his ac has a dark colour-scheme and the HISLs were on whilst in transit from E of Kinloss to Inverness. Flying some 1500ft clear below cloud with an in-flight visibility of >10km, he was in communication with KINLOSS TOWER on 122·1MHz whilst executing the MATZ penetration. A squawk of A0036 was selected with Mode C but neither TCAS nor any other form of CWS is fitted.

Kinloss TOWER had previously cleared him to fly to the N side of Kinloss aerodrome and he was flying in a level cruise at 1500ft QNH (1020mb). Heading 255°, approaching a position 075° Kinloss aerodrome 3nm at 105kt, a military fast-jet passed him – overtaking from behind and to starboard - whilst continuing to descend and crossing his flight path from R – L ahead. The dark coloured jet [the subject Hawk] was first seen some 200ft away on the starboard beam as it passed by at the same distance and level with his helicopter. No avoiding action could be taken because the Hawk was first seen when abeam his Squirrel and overtook at high-speed so he could not have spotted it any earlier. He reported to TOWER that the jet had flown very close to him. TOWER later advised him that the pilot of the jet had apologised and that he had joined on a wrong downwind leg before landing at Kinloss. He did not assess the risk but added that the Airprox was reported to Kinloss TOWER on RT.

THE HAWK T1A PILOT, a solo QFI, reports he was operating as a singleton Hawk, joining Kinloss from the direction of Lossiemouth in VMC some 1000ft clear below cloud with an in-flight visibility of 20km. His ac has a black colour-scheme and the HISLs were on.

After leaving Lossiemouth's APPROACH frequency, he switched to Kinloss TOWER on UHF 336·35MHz. Approaching Kinloss heading 260° at 300kt flying straight & level at 1000ft QFE, once he was visual with the aerodrome he spotted the dark-coloured helicopter about 1nm ahead heading the same way. TOWER informed him about a helicopter crossing the MATZ that was operating on a VHF frequency and asked whether he had seen the ac. He confirmed he was visual with the helicopter and then positioned his Hawk for a L 'break' across the traffic but approximately 1nm ahead of it. The rotary-wing traffic passed approximately 200ft below and 200ft to port of his jet as he flew past. To remain well clear of the helicopter he descended on the break to 500ft, estimating the helicopter to be flying at 800-1000ft. He assessed that there was *"no"* collision risk and the Squirrel helicopter did not manoeuvre at any time.

Two days later he was informed by the RAC at LATCC (Mil) that the helicopter pilot had filed an Airprox.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar as neither the AS350 nor the Hawk are shown at the time of the encounter. However, the Hawk is shown on the Aberdeen Radar recording tracking 020° and descending, midway between Kinloss and Lossiemouth. The Hawk appears to be positioning to join the Kinloss

aerodrome cct through the 'Initial point' (IP) for RW26 - instead of the notified RW08 - as it descends below radar cover at 0839:24, the penultimate return being some 4nm E of Kinloss indicating FL36 Mode C.

UKAB Note (2): The UK Military AIP at AD2 – EGQK-1-7 notifies the Kinloss ATZ as a radius of 2½nm centred on RW08/26, extending from the surface to 2000ft above the aerodrome elevation of 22ft amsl.

THE HAWK T1A PILOT'S STATION comments that ac's nose light was on and both high intensity strobe lights were selected to white. No avoiding action was taken by the Hawk pilot as the conflicting Squirrel helicopter was seen at 1nm and no avoiding action was deemed necessary. The helicopter was not seen to manoeuvre during the incident.

MIL ATC OPS reports that the AS350 helicopter was 'warned in' to the Kinloss TOWER by Lossiemouth GROUND, returning to Inverness from the Lossiemouth area after completing a pipeline inspection at 1500ft Lossiemouth/Kinloss clutch QFE (1019mb). After initial contact at 0837:50, the TOWER asked the AS350 crew to confirm if they were routeing along the coast, which the crew confirmed, asking whether they should route N or S of Kinloss airfield. TOWER responded "*Understand you're passing to the north, report passing abeam Burghead*" which the AS350 crew acknowledged. The Aerodrome Controller (ADC) then received a prenote from Lossiemouth DIRECTOR (DIR) stating "*Lossie DIRECTOR 'warning-in' Hawk* [C/S] *from the south for visual recovery*". The Hawk pilot called the TOWER at 0839:37, reporting "[Hawk C/S] *join*", whereupon the TOWER responded "[Hawk C/S] *Kinloss TOWER, join runway 08 clutch QFE 1019, circuit clear."* The Hawk pilot readback the QFE and requested confirmation that the circuit was right hand. However, the ADC countered that the circuit direction was in fact left hand and added *"there is a MATZ crosser* [the AS350] *helicopter routeing east to west at 1500ft".* Simultaneously, the AS350 pilot reported passing Burghead - a known feature 4nm NE of Kinloss - which is used to delineate Kinloss/Lossiemouth circuits. The Hawk pilot replied *"We've just passed him down the right hand side".* At 0840:20, the TOWER stated "[Hawk C/S] *roger, its runway 08 in use confirm?"* This transmission was repeated 5sec later as the ADC had transmitted on VHF rather than UHF. The Hawk pilot replied "*Roger, eh, I'll reposition downwind again, thank you very much*". At 0841:38, the AS350 pilot reported that the Hawk had been "*very, very close*". During a follow up telephone call, Lossiemouth DIRECTOR confirmed that the Hawk pilot had received the correct weather information, which recorded the RW in use as RW08 and a confirmation was received from the pilot.

At the time of the Airprox the AS350 and the Hawk were the only ac on the TOWER's frequencies - the AS350 was operating on VHF and the Hawk on UHF. The ADC had expected the Hawk pilot to join the visual cct from the S or W, as prenoted by Lossiemouth, and so was searching in that general direction in an attempt to gain visual contact with the Hawk and also to check for bird activity on FINALS to RW08. Kinloss Tower is not fitted with any Aerodrome Traffic Monitor (ATM) equipment. When the Hawk pilot called to join the cct the ADC passed RW08 and the clutch QFE, although the Hawk pilot readback the QFE he did not readback the runway in use. In addition the Hawk pilot requested confirmation of the cct direction which the ADC confirmed as LHD and it was at this point that traffic information was passed on the AS350 as a "*MATZ crosser, helicopter, routeing east to west at 1500ft*". The Hawk pilot should have joined through the IP for RW08, which is situated 3nm to the WSW of Kinloss, S of the centreline; if the Hawk pilot had positioned for RW08, as anticipated by the ADC, there would have been no immediate confliction with the AS350. The ADC was aware of this and intended to pass the Hawk and AS350 pilots detailed traffic information on each other's ac as the Hawk passed through initials, which is the normal position to pass circuit traffic information to ac joining the visual circuit in this manner. However, the Airprox had occurred before this point was reached. The Hawk pilot initially called TOWER at 0839:37, at this time the Hawk was approximately 3nm E of Kinloss and already in the vicinity to the helicopter.

There are several military ATC aspects involved in this Airprox. ADC was unaware that the Hawk had positioned for the incorrect RW as no monitoring equipment was available. The runway in use was passed as RW08 by both the TOWER and also by Lossiemouth DIR before the Hawk pilot switched to Kinloss TOWER, but upon joining the visual cct no readback was obtained from the Hawk pilot by the ADC pertaining to the runway in use. No traffic information was presented to either crew in sufficient time to prevent the conflict due to the ADC being unaware of the true 'air picture'. Both acs' pilots were communicating with TOWER on different frequencies and the Mini-Comms communications equipment fitted at Kinloss does not allow cross-coupling of VHF and UHF frequencies that would have enabled the pilots to hear each other's transmissions. The Hawk pilot called Kinloss TOWER later than would have been expected for an 'INITIALS' cct join resulting in traffic information on the helicopter being passed as the Airprox was occurring.

HQ PTC comments that it appears that the Hawk mistakenly joined through the Initial Point for RW26 which then put him in a position to conflict with the AS350. The element of surprise generated by the Hawk appearing from behind the helicopter at high speed was sufficient to cause the AS350 pilot concern, even though the Hawk pilot was visual throughout and assessed that there was no need to take avoiding action. This incident serves as a good reminder that the assessment of what is a suitable avoidance margin will vary from pilot to pilot, dependant on the relative geometry and speed of the encounter. It is always preferable to err on the side of caution where possible and manoeuvre to increase the separation margin, especially when you are flying the faster and more manoeuvrable ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Military controller Members noted the absence of an Aerodrome Traffic Monitor (ATM), within Kinloss Tower, which displays short-range radar data on a monitor in the VCR to assist the ADC with visual acquisition of inbound aerodrome cct traffic and its integration with instrument traffic on an approach. Here, having instructed the Hawk pilot to join for RW08 and been informed by LOS DIR beforehand that the jet was approaching "…*from the south for visual recovery*", the ADC was apparently looking for the Hawk in the direction of the IP for RW08. Unfortunately, it would appear that the solo QFI had incorrectly set up for a L break from the IP to RW26 at the same time as he reports he spotted the helicopter. If an ATM had been provisioned for Kinloss Tower it might well have assisted the ADC to 'bowl-out' such unexpected errors as described here. Controller Members stressed the advantages that an ATM can provide and the Board was dismayed that none was currently provided for Kinloss ATC. [See Post Meeting Note below]

The Hawk pilot had first called TOWER at 0839:37, somewhat late - only about 3nm E of the aerodrome according to the Mil ATC Ops report - after switching from Lossiemouth DIR. Given the location of the Airprox - reported as about 075° Kinloss 3nm – and the last known radar derived position of the Hawk some 4nm E of Kinloss at about 0839:24, this first call was being made just as the incident was occurring. In the Board's opinion, this short notice coupled with the ADC looking the wrong way gave little opportunity for the Kinloss controller to provide the Hawk pilot with an earlier warning of the presence of the helicopter. The ADC's response to the joining call – that the RW08 cct was clear – was correct insofar as the helicopter was transiting through the MATZ above the standard visual aerodrome cct height of 1000ft QFE. Whilst with hindsight the ADC might have added traffic information about the helicopter at that point, it was accepted that it is normal to give such information when the Hawk pilot reported at 'INITIALS', which he had not done at that stage, although the ADC provided a warning only moments afterwards. There should not have been a confliction with the helicopter if the jet had been at the correct height for the 'BREAK' and joining through the IP for RW08 as the Hawk would have been well clear below the helicopter before passing the threshold of RW08 into the 'BREAK'. Thus Members accepted that if the ADC was looking the wrong way before the Airprox and did not spot the Hawk approaching from the E behind the helicopter then it was with good reason. However, the Hawk pilot had not 'read-back' the RW in use and had seemed more concerned over clarifying the RW08 visual cct direction, which would have been clearly mentioned to a visitor with the cct joining instructions if it had been anything other than a standard LH cct. Some thought this query might have distracted the ADC at the critical moment, but as had been pointed out in the Mil ATC Ops report, the ADC had not obtained a readback of the RW in use from the Hawk pilot as is required. Whilst some thought this contributory to the cause the overwhelming majority disagreed, as this interchange was probably just as the Airprox occurred and the RT transcript revealed that the Hawk had already passed the AS350 when the ADC transmitted traffic information on the latter, with the end result that neither pilot had any prior warning about the other's ac beforehand. This brought the topic of cross-coupling of VHF & UHF frequencies to the fore: commercial helicopter pilot Members were concerned that such a facility was also lacking at this aerodrome – in common with almost all others that utilise the standard RAF communication fit. Some postulated that if the Hawk pilot's UHF transmissions had been re-broadcast on VHF, and vice versa, then at least the pilots might have been forewarned of each other's presence from these transmissions. From the AS350 helicopter pilot's perspective he might have gleaned that there was another ac in the vicinity, but unfortunately from the Hawk pilot's transmissions could still have expected the jet to be flying towards him for RW08 within his forward field of view and not from astern joining for RW26. As it was, unfortunately the helicopter pilot made no relevant transmissions that might have advertised his presence before the ADC advised the Hawk pilot about it. Consequently, a V/UHF cross-couple facility could not have materially influenced the situation here. Some Members wondered if the Hawk – fitted with VHF – could have

been switched to the same VHF frequency used by the ADC for communication with the AS350 crew, but as this is a 'common' VHF frequency used at all military aerodromes the Mil ATC Ops Advisor said this might in other circumstances have resulted in blocked transmissions or overloaded RT, so there was no ideal 'happy mean'.

However, the Command had commented that the Hawk pilot had joined from the E for RW26, which was the catalyst of this Airprox. Thus it was left to the final 'safety net' for the avoidance of aerial collision – that of 'see and avoid'. It was clear that with the Hawk overtaking rapidly from astern it would have been impossible for the AS350 pilot to detect the small Hawk jet any earlier than he did. Nevertheless, the Hawk pilot reports that he spotted the AS350 1nm away 'tail-on' and managed to position for a L 'BREAK', intending to execute the 'BREAK' 1nm ahead of the helicopter. Therefore, the Hawk pilot had seen the helicopter before he overtook it and thus he was entirely responsible for the eventual horizontal separation that pertained. The two pilots estimates of the horizontal separation were identical and the vertical separation the Hawk pilot reported was less than 200ft, which was sufficiently close to the AS350 to cause its pilot concern. This, by an overwhelming majority, the Board concluded was the cause of this Airprox. However, as the Hawk pilot had sighted the helicopter and was always in a position to give the AS350 a wider berth if need be in his nimble jet the Board agreed that no risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

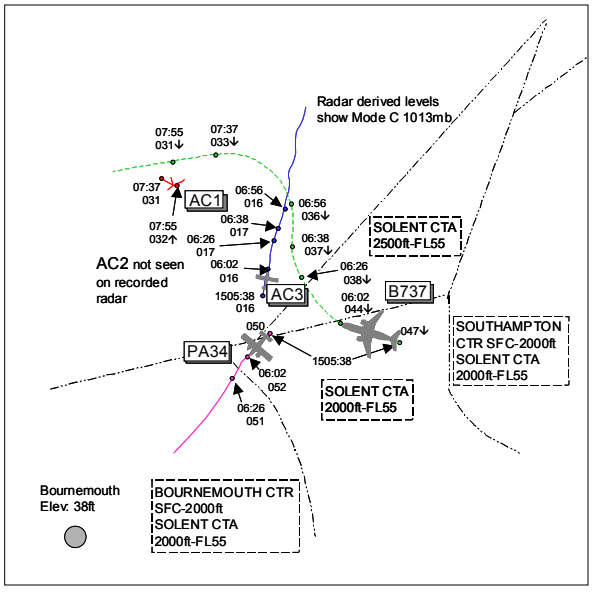
Cause: The Hawk pilot flew sufficiently close to the AS350 to cause its pilot concern.

Degree of Risk: C.

Post Meeting Note: Mil ATC Ops advises that the installation of Hi-Brite (ATM) equipment at Kinloss was financially outwith the remit of the Station's budget. However, it may be feasible to obtain the Hi-Brite equipment from an RAF airfield that is scheduled for closure shortly, for installation at Kinloss.

AIRPROX REPORT NO 189/05

Date/Time:	17 Oct 1508	
Position:	5059N 00145W (13nm NNE Bournemouth - elev 38ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-300	Untraced ac x2 AC1 and AC2
Operator:	CAT	N/K
Alt/FL:	3300ft↓ (QNH 1019mb)	
Weather	VMC CLOC	NK
Visibility:	10km	
Reported Separation:	AC1 NR AC2 500ft V/2nm H	
Recorded Separation:	AC1 200ft V/0·9nm H, AC2 NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Bournemouth IFR and in receipt of a RCS from Solent Radar on 120·22MHz squawking 5645 with Mode C. Descending to 3000ft with multiple TCAS returns seen, Radar gave an avoiding action turn onto 020°. When clear of traffic a radar heading of 260° was given. Two light ac contacts were seen

visually in the 12 o'clock position, about 5nm away R to L, one above and one below. Both crewmembers lost sight of the higher ac (AC1) but the Capt remained visual with the lower traffic (AC2). Speed was reduced towards 'clean' 210kt and the ROD was reduced to 300fpm to avoid the traffic. Descending through 3300ft QNH a TCAS TA 'traffic' was received and then an RA 'descend descend' was annunciated. The RA command was followed to avoid the higher traffic (AC1) and a turn initiated to avoid the lower 'non-transponding' traffic (AC2). By now the frequency was too busy to allow the crew to give a 'TCAS descend' call. At no time during the RA manoeuvre did the crew see the higher traffic (AC1), he thought, but AC2 was seen to be a PA28 type coloured white/blue passing 2nm clear and 500ft below, in straight and level flight. ATC had no radar returns from AC2.

RAC MIL reports that despite extensive tracing action, neither AC1's nor AC2's identity could be established. With Pease Pottage radar being out of service at the time, both ac's radar returns could not be traced from either a point of departure nor to a destination airfield. Procedural tracing action also proved fruitless.

THE SOLENT APR reports that during a fairly complex traffic situation she gave the B737 a R turn onto heading 020° to separate it from other traffic which resulted in the ac leaving CAS. She coordinated with the Bournemouth APR who requested the B737 on a W'ly heading at 3000ft. She turned the B737 onto heading 260° and passed TI on 2 primary contacts observed outside CAS. The B737 crew reported a TCAS RA descent on 1 ac and the flight was subsequently given a S'ly heading to re-enter CAS.

ATSI comments that at the time of the Airprox, Pease Pottage radar was out of service. The Solent APR was using primary radar supplied from Southampton and SSR data from the Heathrow 23cm radar. The B737 flight contacted the Solent APR at 1457:35, when 11nm SE of the Goodwood GWC VOR, and reported descending to FL70. The APR instructed the crew to maintain FL70 on reaching and to expect an ILS approach to RW08 at Bournemouth. As the B737 crossed overhead GWC, the crew asked whether there was "*…any speed*" for them to which the APR replied "*No ATC speed restriction*". The crew were instructed to continue their descent, first to FL60 and shortly afterwards to 4000ft. The GS of the B737 was steady at around 325kt. At 1502:30, the APR instructed the crew to turn L heading 260° which was correctly acknowledged. At this time, the B737 was 9nm ESE of Southampton, passing FL63. There was traffic inbound to Bournemouth W of Southampton southbound, a PA34, passing FL74 for FL50 and traffic inbound to Southampton, a DHC8, S of Southampton N'bound maintaining FL50. At 1504:55, the APR instructed the B737 crew to turn R heading 290° and descend to 3000ft. This was followed by a telephone call to Bournemouth and the Solent APR advised that she was "*..turning right all the way around*". The APR asked the B737 crew (1505:38) if they were happy to turn R heading 020° which the crew acknowledged and asked whether the APR wanted them to expedite their descent. The B737 was passing FL47 with a ground speed of 325kt and commencing its R turn which was, unsurprisingly, rather wide. The APR requested them to expedite descent to 3000ft. The crew advised (1506:00) that they had traffic in their 1 o'clock and what was the traffic in their 11 o'clock. The APR did not respond: however, analysis of the radar recording showed that this latter traffic was the PA34 inbound to Bournemouth maintaining FL50, at a range of 3·6nm from the B737. At 1506:26, the B737, whilst in its turn onto 020° left CAS: however, the crew were neither informed of this fact nor advised of any change of service by the APR. Following another telephone discussion with Bournemouth, the Bournemouth controller advised that he would accept the B737 heading 260°, and so at 1506:30, the Solent APR instructed the crew to turn L onto this heading. At 1506:40, the Solent APR transmitted "*(B737 c/s) unknown contact outside of controlled airspace one mile west of you no height information*" (a Boscombe Down ac, AC3, not the subject ac, see next para). The B737 was now 11nm W of Southampton and passing FL37 for 3000 feet. Shortly afterwards the APR requested that the crew "*…tighten up the turn*". Further TI was passed (1507:35) *"..contact er to the west of you by two miles southbound no height information"*. At 1508:05, the crew reported having received a TCAS descent. They added that they could see further traffic in their 9 o'clock at about the same altitude but the APR replied that there was nothing showing on her radar. The Bournemouth controller was advised about the TCAS RA and he added that there was traffic in the B737's 12 o'clock at 2200ft. It was agreed to turn the B737 L heading 180° to bring it back into CAS and this instruction was passed to the crew at 1508:45. At 1509:10, the B737 crew were instructed to contact Bournemouth.

AIC 53/2004 (Yellow 138) provides guidance on the relaxation of Airspace Speed Limits by ATC and advises that they may be relaxed when the tactical traffic situation dictates and when the aircraft will be remaining within a known traffic environment. The Solent APR's own report describes the traffic situation pertaining at the time was complex and so, with the benefit of hindsight, the relaxing of the airspace speed limit of 250kts below FL100, was unwise in this instance.

Analysis of the Jersey radar (which was not available to the Solent APR at the time) clearly shows traffic operating outside CAS. The first encounter the subject B737 had was with an ac, AC3, squawking the Boscombe Down Conspicuity code with a Mode C readout of FL17 but when the Solent APR passed TI at 1507:35, on traffic to the W of the B737, this was on a return (AC1) squawking 7000 and indicating FL31. The B737 passes behind it (1507:55) and can be seen in the 7000 squawk's 7 o'clock at a range of 0·9nm indicating FL32. Very shortly afterwards the B737 reports the TCAS descent.

UKAB Note (1): At no time during the B737's TCAS manoeuvre with AC1 is another ac seen on any of the recorded radars analysed. This other ac, AC2, is believed to be the 'lower' traffic reported by the B737 crew which was not squawking but was seen to be S'bound in the vicinity of AC1. After the B737 crew reported a TCAS descent, they had then reported visual with traffic at the same altitude which is believed to be AC1 but they had in their written report stated not seeing the higher ac, AC1, during the manoeuvre. This anomaly remains unresolved.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a reports from the B737 crew, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

As a result of the Airprox investigation the incident assessed was between the B737 and the 2 ac seen by its crew (AC1 and AC2) which were untraced, with AC2 not being displayed at all on any of the recorded radars available. Leading up to the encounter, the Solent APR had relaxed the Airspace Speed Limit, when requested by the B737 crew, as the ac was expected to be remaining within Class A then D CAS - a known traffic environment. Although this relaxation was good for the B737 crew, as it allowed flexibility for them to adjust their flight profile (losing height and then speed in relation to their track distance for a RW08 approach) into Bournemouth, there was a need to balance this with maintaining good manoeuvrability to discharge their responsibility in Class D airspace to 'see and avoid' VFR traffic with a minimum of TI from ATC. However, on the other side of the coin, the high-speed element became the Solent APR's undoing. The B737 had caught up the S'bound crossing PA34, which necessitated the controller giving a R turn onto 020° to pass behind it, which led to the B737 leaving CAS. After the Solent APR had previously agreed coordination with the Bournemouth APR to turn the B737 R all the way around, she had then changed her plan when she accepted the subsequent offer of turning the B737 onto a W'ly heading. This turn to the L further exacerbated the situation as it then required the B737 crew to execute a turn reversal thereby taking the ac further outside CAS. Consequently, after the Solent APR had vectored the B737 outside of CAS the L turn given to the B737 had led to it flying into conflict with the two untraced ac, one of which was not displayed on radar, which had caused the Airprox.

The NATS Advisor informed Members that there were Human Factor issues relating to this incident and that recommendations and actions had subsequently been made and taken. Solent ATC will be creating scenarios within the Unit Training Plan to gain practise in dealing with similar situations. Also, Operational Notices (OPNOTs) have been produced to: a) remind controllers of the necessity to advise ac crews when they are positioned outside CAS and b) highlight the need for careful consideration to be given of all options before changing a plan.

Turning to risk, the Solent APR had turned the B737 L onto 260° and had passed TI on traffic (AC1) to the crew; AC2 was not being displayed on radar. Fortunately, a TCAS TA had given the B737 crew a 'heads-up' to traffic ahead which had allowed the crew to visually acquire both ac. The ensuing RA guidance was followed and visual separation from the non-transponding ac was maintained. Although this had been an untidy situation, the actions taken by the B737 crew were enough to persuade the Board that safety had been assured during the encounter.

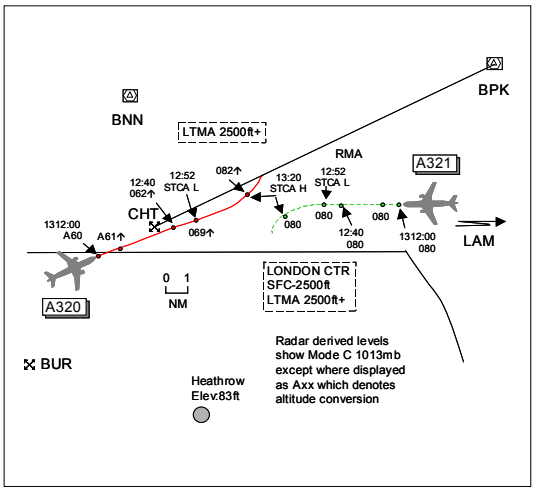
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Solent APR vectored the B737 outside CAS and into conflict with an untraced ac and subsequently with a further, undisplayed ac.

Degree of Risk: C.

AIRPROX REPORT NO 190/05

Date/Time:	3 Oct 1310	
Position:	5139N 00023W (11nm N Heathrow)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A321	A320
Operator:	CAT	CAT
Alt/FL:	FL80	↑FL110
Weather	VMC CLBC	VMC CLOC
Visibility:	10km	50km
Reported Separation:		
	nil V/2nm H	NR
Recorded Separation:		
	200ft V/1·9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports heading 275° at 210kt and FL80 inbound to Heathrow and in receipt of an ATS from London on 119·72MHz squawking 4401 with Mode C. During vectors from LAM for landing RW27R at Heathrow, ATC cleared them for a L turn onto heading 110°. Just before entering the turn TCAS alerted them with a TA on opposite direction traffic at the same level. The turn was started as ATC called opposite direction traffic at 20nm, he thought, then during the same transmission changed the instruction to *"avoiding action turn off immediately"*; during the turn they were cleared for descent. No RA warning was received, believing the turn negated the generation of an RA, but the other ac was seen about 2nm away in a L turn, possibly climbing. At the time of the Airprox the frequency was very busy.

THE A320 PILOT reports outbound from Heathrow at 300kt and in receipt of an ATS from London on 118·82MHz squawking 2227 with Mode C. Whilst following a BPK6G SID they were cleared 'direct BPK climb FL110' but when climbing through FL70 a TCAS TA alert was received. The Capt, PF, selected vertical speed 800fpm and when passing FL75 ATC told them to 'turn left immediately heading North, avoiding action'. He disconnected the A/P and made an immediate L turn whilst the Co-pilot tried to visually acquire the other ac. During the L turn a 'monitor vertical speed' RA was received followed, seconds later, by 'clear of conflict'. After the event ATC confirmed that a loss of separation had occurred and that it was not as a result of the crew's actions.

THE LTCC HEATHROW INTERMEDIATE NORTH DIRECTOR reports the A321 was vectored off LAM at FL80 in the RMA heading 275° when traffic was observed in its 12 o'clock climbing. He turned the A321 onto a radar heading and quickly changed this to 'avoiding action'. After giving TI, the A321 crew reported having the other traffic in sight; minimum separation was >2nm with both ac at the same level.

THE LTCC NE DEPARTURE CONTROLLER reports the A320 was on a BPK SID and after passing BUR NDB he instructed the flight to continue on its present heading, about 065-070°. As the BNN stack was empty he told the flight to climb and turned his attention to other tasks. The Coordinator pointed out that the A320 was in conflict with the subject A321, with the A320 climbing through FL72, so he immediately gave the A320 flight an avoiding action turn and TI. As the A320 was turning L he gave further TI – later the crew advised that they had received a TCAS RA warning after he had given the avoiding action.

ATSI reports that at the time of the Airprox, the A320 was in communication with the TC NE SC and the A321 was in communication with the Heathrow INT N Controller. The NE SC described both the workload and traffic loading as 'medium'. The NE SC works in a non-operational post but retains currency in one certificate of competence.

The A321 flight made contact with the Heathrow INT N at 1306:20 and reported passing FL98 for FL90, inbound to LAM and reducing speed to 210kt. At this time, the aircraft was 9·5nm E of LAM and the INT N instructed the crew to leave LAM heading 275° which they acknowledged. The A320 flight contacted the NE SC at 1309:45 and

reported passing 2100ft climbing to 6000ft on a BPK6G SID. Initially the pilot received no response and so he repeated the message. The SC instructed the crew to squawk ident, removed the speed restriction and to maintain 6000ft on reaching. At the same time, the INT controller instructed the crew of the A321 to descend to FL80. This ac was now 5nm W of LAM and being sequenced behind another ac for RW27R at Heathrow. Meanwhile, the A320 was in its 10 o'clock at a range of 24nm.

The NE SC instructed the crew of the A320 to continue on their heading and climb to FL110 which they acknowledged. At that time (1312:00), the A321 was 14nm W of LAM, level at FL80 and still heading 275° with the A320 in its 11 o'clock at a range of 14nm. The two ac continued to track towards each other until, at 1312:40, the INT N instructed the crew of the A321 to turn L heading 100°. As the crew read this back the INT N transmitted *"A321 c/s traffic information in your twelve o'clock at three miles traffic at seven zero climb avoiding action turn left immediately please heading one zero zero"*. At the same time, the NE SC transmitted *"A320 c/s avoiding action turn left immediately heading three six zero traffic twelve o'clock five miles reciprocal heading at flight level eight zero"*.

Both ac commenced their turns to the L and separation reduced to a minimum at 1313:20 when the A320 was passing FL82 with the A321 in its 3 o'clock at a range of 1·9nm level at FL80. Standard separation was soon restored as the A320 continued its climb and lateral separation increased.

The NE SC advised that his initial intention with the A320 was to handle it in the same manner as previous ac departing on BPK SIDs. He checked the radar and saw no traffic holding at BNN. He did not have strips on traffic routeing into BNN but the adjacent radar is set to a long range and so gives prior warning of such ac. He was aware that traffic was being routed westbound from LAM before being turned L to position downwind RH for Heathrow. This would be where he would be concentrating in order to identify conflictions.

Two ac had departed ahead of the A320 and were following the same SID. This requires ac to track the 301° QDM to BUR NDB and then turn R to track to CHT NDB on the 056° QDM thereafter follow the BPK 246° radial. Both of the preceding ac had tracked approximately 055° and climbed past BNN, as there was no traffic to affect, and clear of the track from LAM to the downwind position. However, whereas the NE SC had routinely specified the heading that he wanted the crew to fly, he did not do this with the A320. At 1311:50 the controller transmitted *"A320 c/s continue present heading*". Having received an acknowledgment from the crew he added *"A320 c/s climb flight level one one zero"*. The crew complied with the instruction but their track was slightly to the E of that followed by the preceding ac. This took the subject ac closer to the traffic routeing through LAM.

The Heathrow INT N was vectoring his traffic from LAM W into the Radar Manoeuvring Area (RMA) before descending it below the minimum stack level. The NW extremity of this RMA is marked by a line joining CHT with BPK. The unit's MATS Part 2, page NEA 3.2 para 3.2.4 states: '*TC Departure Control is responsible for maintaining standard separation between outbound aircraft, deviated from the Standard Instrument Departure route or climbed above the Transition Altitude, and inbound aircraft under the control of the Heathrow Directors*'. As the A320 was slightly E of the CHT – BPK track and climbing above the Transition Altitude, it was the responsibility of the NE Deps SC to ensure that separation was maintained between the A320 and any traffic inbound to Heathrow.

STCA activated at 'low severity' at 1312:52, when the two ac were 6·3nm apart with the A320 passing FL69 and the A321 maintaining FL80. The Coordinator warned the SC of the two ac converging and avoiding action was passed. Coincident with this, STCA changed to 'high severity' but avoiding action had already been passed by both controllers.

With the benefit of hindsight, the NE SC accepted that he should have specified a heading for the crew of the A320 to follow when the instruction to climb to FL110 was issued. This, he believed, would have ensured that the ac followed the same track as those ac ahead and thus been clear of the Heathrow RMA.

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 LTCC NE Deps SC had not specified a heading for the A320 crew to fly. At the time the A320 flight was told to *"...continue present heading"*, it was still turning R through a more E'ly heading to reach CHT prior to turning towards BPK to follow the SID track. This issued heading had taken the A320 off the SID routeing following which the SC had then issued climb clearance to FL110, above the standard outbound level of 6000ft. On this heading and on climbing above the Transition Altitude, the A320 had then entered the RMA for which the SC was responsible for providing separation from Heathrow inbounds. In carrying out these actions, the NE Deps SC had dispensed with vertical separation without ensuring that lateral separation existed between the subject ac which had caused the Airprox.

The Coordinator had warned the NE Deps SC of the confliction about the time that STCA activated. The SC had given an avoiding action L turn to the A320 crew and TI. The A320 crew had previously received a TA alert and had adjusted their ROC before executing the 'avoiding action' L turn. During this manoeuvre an RA warning occurred but was quickly superseded by 'clear of conflict'. Simultaneously, the Heathrow INT N, having already given the A321 flight a L turn onto 100° for sequencing, immediately gave TI on the A320 5nm away and upgraded the turn to 'avoiding action'. The A321 crew had already received a TA alert, just before commencing the turn, and had executed the turn whilst visually acquiring the other ac about 2nm away. All of these prompt actions when combined were enough to allow the Board to conclude that safety had been assured during the encounter.

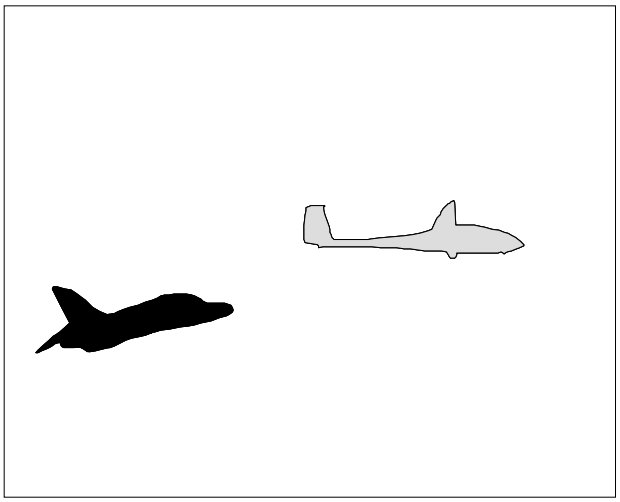
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC NE Deps SC dispensed with vertical separation without ensuring lateral separation.

Degree of Risk: C.

AIRPROX REPORT NO 191/05

Date/Time:	27 Oct 1045	
Position:	5537N 00155W (7nm ENE Milfield)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Hawk	Janus Glider
Operator:	HQ STC	Civ Pte
Alt/FL:	5500ft	4500-5000ft
	(QNH 983 mb)	(QFE Milfield)
Weather	VMC HAZE	VMC CAVOK
Visibility:	>8km	20-30km
Reported Separation:		
	50ft V/ >20 yards H	<200ft V
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports flying a black Hawk ac solo as part of a formation but operating independently at the time of the incident. He was squawking 7000 with Mode C but at that precise time not in contact with any unit. He had been mounting a CAP (Combat Air Patrol) at 4500ft overhead a position 10nm N of the Airprox position when the customer unit terminated the exercise. He then rolled out on a S heading and began a climb to medium level at 300kt, maintaining VMC, for his return to Leeming. He had just changed to the preset frequency for Newcastle APR which had involved a very brief glance slightly down to his left. Shortly afterwards, having resumed his lookout to the front, he was suddenly aware of a shadow passing very close over the top of his canopy in his high left 11 o'clock.

It was difficult to estimate initial sighting distance, as he was first aware of the presence of the glider when the shadow was seen to pass over his cockpit. He initially thought it may have been a flock of birds but as he turned L through 180°, he saw a glider level and heading S with its wings level. At about 1.5nm abeam he continued the L turn back on to his RTB heading and waggled his wings to acknowledge his presence.

On landing, he attempted to trace the glider pilot by contacting Milfield GS but they responded that there had been no report from any of their pilots. That surprised him, as the miss-distance involved was one of the closest that he had seen in many years of military flying. He then filed an Initial Contact Report to LATCC Mil. He had no doubt that the collision risk was extremely high and that this incident highlights the dangers of operating in an area of known high traffic density, albeit Class G airspace. He opined that white-painted gliders are notoriously difficult to see, especially when soaring at medium level.

THE JANUS GLIDER PILOT reports flying a white glider dual, listening out on the Milfield frequency. After leaving wave lift over Milfield at 6000ft, they flew E then S towards a line of developing cloud heading 180° at 70kt. The pilot heard the roar of a jet and asked P2 if he could see it. By then they felt the glider shudder as the black Hawk ac passed about 200ft beneath them from behind. Two more Hawk jets passed down the side of the hills 4-5nm away to their R. As the Hawk banked L [after the CPA] they were able to photograph it. The Hawk then levelled and rocked its wings. As the Hawk had come from behind, he did not take any avoiding action but assessed the risk as being high.

UKAB Note (1): The Janus does not show on the recording of the Great Dun Fell radar recording at any time. However, the Hawk can be seen heading about 170° through the incident area and climbing slowly to FL54 where it levels. The Hawk pilot's post incident manoeuvre can be seen on the radar.

HQ STC comments that this was very close indeed. It is difficult to assess if the Hawk pilot's quick glance into the cockpit affected his ability to see the white glider.

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 Hawk operating authority.

The Board discussed this incident in conjunction with Airprox 186/05 as many aspects were very similar. So that this Report can stand alone, pertinent sections of 186/05 (but not the Safety Recommendations) are repeated here.

One difference between this Airprox and 186/05 is that in this case the geometry of the incident was reasonably straightforward: the Hawk had climbed up from behind and below the glider thereby exonerating the glider pilot from avoidance responsibility. The Board noted the open and honest report provided by the Hawk pilot. Members determined that the military pilot's momentary distraction; the glider's white colour; the white cloudy backdrop and the tail-on aspect of the glider had all contributed directly to his not being able to acquire the ac visually until it was too late for him to take any action to avoid it; it was therefore only by good fortune rather than any action by either pilot that the ac had not collided.

The following extracts from the report into Airprox 186/05 also apply to this incident.

"The Board was unanimous that this had been a most serious incident and noted its marked similarity to Airprox 162/05 and 191/05 [186/05] and to two incidents in 2003. Members were advised by a specialist gliding colleague that on good wave days there is a very large amount of activity throughout the week from the major launch sites."

"Both the BGA and STC Members agreed that in principle it should be possible to share information on each other's activities. Good wave days and times are limited; equally intensive activity by STC units in the areas where good wave exists is also rare. Both Members considered that a degree of flexibility might be possible if an information flow system were put in place thereby reducing the likelihood of their ac coming into close proximity on these days. Although powerless to implement any formal or informal agreement, it was suggested that DASC might be an appropriate organisation to chair any discussion."

"Although accepting that the nature of the material and composition of gliders necessitates a predominantly white finish, the Board considered that this had without doubt contributed to the Tornado crew's late sighting of the glider. Because it was probably not possible to increase substantially the visual conspicuity of such gliders, the Board considered that as much as possible must be done regarding electronic measures. The Board was briefed on the development in the UK of a lightweight low-power usage transponder that would operate successfully in gliders, a Member commenting that progress had been very slow. Members were unanimous and unequivocal that widespread use of such equipment would provide a significant advance in ac safety. Statistics show that almost 14% of Airprox assesed by the Board in the last 6 months had involved one ac in receipt of a radar service and another which was not transponding. Without a functioning transponder a conflicting ac can not only be invisible to a controller but also, and often more importantly, to another ac's ACAS. The Board considered that advances over the last few years in electronics and battery technology must now make a technical solution achievable. That being the case, it was again the unanimous view of the Board that the CAA should continue actively to encourage, as a matter of urgency, the production of a lightweight transponder which can operate in gliders throughout their flights and regardless of their altitude (OAT). When the equipment is available, the CAA should consider mandating its use."

"In addition to publicising widely the details of this incident, the Board considered that the risk of repetition would be further mitigated by action on its two Safety Recommendations."

The Safety Recommendations made at 186/05 also apply to this Report.

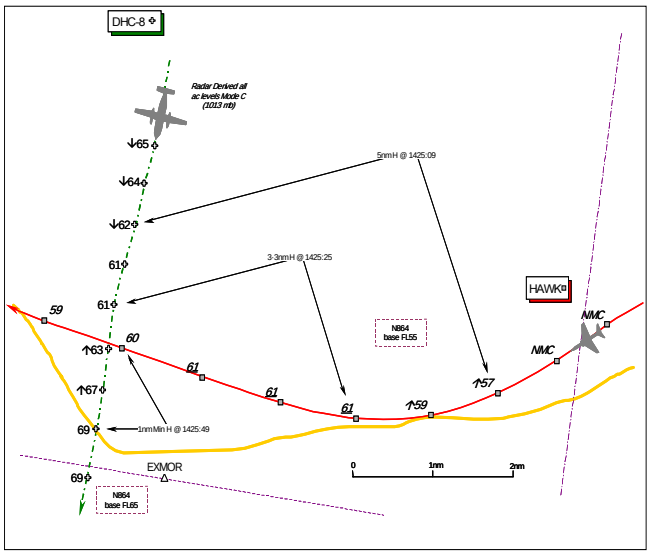
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sighting by the Hawk pilot.

Degree of Risk: A.

AIRPROX REPORT NO 192/05

Date/Time:	27 Oct 1425	
Position:	5112N 00322W (1¼nm NW of EXMOR)	
Airspace:	Airway N864	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	DHC-8	Hawk T Mk1
Operator:	CAT	HQ PTC
Alt/FL:	FL60↓	4500ft↑
	SAS	(RPS 995mb)
Weather	VMC CLAC	VMC CLOC
Visibility:	10km	8km
Reported Separation:		
	200ft V/4-500m H	1000ft V/2nm H
Recorded Separation:		
	Nil V @ 3·3nm H	
	1nm Min H @ 900ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 PILOT provided a comprehensive account reporting that his ac has a predominately white colour-scheme and the HISLs were on. Inbound to Exeter under IFR, he was descending through FL60 some 2000ft clear above cloud with an in-flight visibility of 10km whilst in receipt of a RCS from Exeter APPROACH (APR) [albeit still in Cardiff's CAS] routeing airway N-864 just N of EXMOR. They had been cleared to descend to FL45 towards TOMPO but, whilst heading about 180° at 235kt descending through FL65, APR gave them a traffic

warning and instructed them to "*stop descent at FL60*". At around FL61 [with altitude capture active (ALT*) on the Multi Function Display (MFD] the APR instructed them to "*immediate climb FL70*" and at about the same moment TCAS enunciated a TA. The 1st Officer PF immediately put the ac into a climb, applied full power and selected FL70 with ALT SEL on the autopilot whilst he – the PNF - looked out of the L window and spotted a black Hawk jet in their 7:30 position about 4-500m away. The jet was in level flight but slightly lower – about 200ft below his ac - tracking from port to starboard and passed, he thought, 4-500m astern of his ac at the closest point. A moment after spotting the Hawk jet, TCAS enunciated an RA: however, at the same moment the controller made another transmission with further instructions/information. The combined result was that both messages were garbled so neither the controller's instruction nor the TCAS instruction was comprehensible. On hearing the TCAS trying to give an instruction, he noted the PF had the ac in the climb and the IVSI needle was in the green section in accordance with the TCAS displayed instruction, although what was being commanded aurally was garbled with the controller's instruction on RT. Fortunately he had good visual contact with the Hawk and could see that it was going to pass astern and because the visibility was good he assumed the Hawk pilot had seen them. Both he and his 1st Officer PF thought they heard the word "DESCEND" in amongst all the "talk" although whether it was associated with a TCAS command or an instruction from ATC they could not tell. He assessed the risk as *"medium".*

THE HAWK PILOT, a solo student, reports his jet has a black colour-scheme and the landing lamp and HISLs were on whilst executing a mixed profile navigational training sortie. He was not in receipt of an ATS and had just completed the first half of a low-level route taking him N towards the Bristol Channel: consequently he was squawking A7001 with Mode C; TCAS is not fitted. When pulling out of low-level in LFA 2, he turned L onto a heading of 270°, maintaining VMC at all times. Climbing though 4500ft Wessex RPS (995mb) at 420-360kt, during his lookout scan he spotted a white passenger ac – the DHC-8 - in his 11 o'clock position 2nm away moving from R – L flying away and above his Hawk ac. He 'waggled' his wings to acknowledge that he had seen the other ac which passed a minimum of 2nm away and 1000ft above his Hawk as he continued with his sortie. Passing well below and astern of the DHC-8, he assessed there was no risk of a collision. He stressed that there were no distractions prior to the Airprox and despite a moderate workload, he was able to maintain good situational awareness on the surrounding airspace and a good lookout.

THE EXETER APPROACH RADAR CONTROLLER (APR) reports that the DHC-8 crew was under a RCS inbound to the Airport. When the flight was 6nm N of EXMOR, southbound, descending through FL65 for FL45, unknown fast moving traffic appeared squawking A7001 climbing through FL56 Mode C, some 8nm SE of EXMOR tracking approximately 320°. The DHC-8 crew was given traffic information about the unknown ac and instructed to climb to FL70 together with an avoiding action turn onto a heading of 230°. The unknown ac [the Hawk] stopped climbing at FL61 and passed he thought about 300m behind the DHC-8, at a position some 3nm N of EXMOR. The DHC-8 had descended to FL61 before climbing to FL70 and its pilot identified the other ac as a Hawk jet. The Hawk continued tracking NW through N864 and then descended. Cardiff RADAR confirmed the Hawk ac disappeared from their radar coverage in the vicinity of Pembrey Ranges.

UKAB Note (1): The 1420UTC Exeter METAR was: Surface Wind: 150/10kt, variable 110-180°; >10km, nil Wx; Cloud: SCT @ 1500ft; SCT @ 2400ft; QNH1004mb.

UKAB Note (2): The 1420UTC Cardiff METAR was: 1420Z Surface Wind: 150/12kt; >10km, nil Wx; Cloud: SCT @ 1600ft; QNH1003mb. The Wessex RPS from 1400-1500 UTC was 995mb.

UKAB Note (3): The Burrington Radar recording illustrates this Airprox relatively clearly. The Dash-8 flown by the reporting pilot is shown southbound descending through FL65 Mode C within N864. The Hawk is shown westbound just off the coast squawking A7001 but with No Mode C displayed initially until it is shown passing FL57 unverified Mode C at a range of 5nm from the DHC-8, as the jet penetrates the base of CAS (FL55 N of EXMOR). The Hawk ascends to a maximum of FL61 at 1425:25, as the DHC-8's descent is arrested at the same level with 3·3nm horizontal separation evident. As the DHC-8 reverses into the reported TCAS RA climb – which accords with the APR's climb instruction - the airliner crosses through the Hawk's 12 o'clock at a range of 2·3nm some 200ft above the jet still maintaining FL61. As the Hawk draws astern, minimum horizontal separation of 1nm is achieved with 900ft of vertical separation evident as the DHC-8 climbs through FL69 and the Hawk commences a gentle descent through FL60. The DHC-8 ascends to a maximum of FL70 just to the S of EXMOR whilst maintaining a steady course. The recording does not reveal any turn by the DHC-8 in compliance with the avoiding action R turn instruction onto 230° reported by the APR. Neither does the RT transcript reveal any transmission from the DHC-8 crew advising the APR that they were complying with a TCAS RA.

ATSI reports with RT transcript that the DHC-8 crew established communication with Exeter APPROACH at 1423 just levelling at FL70. The flight was identified 8nm N of EXMOR, routeing southbound on Airway N864 and the pilot was advised by the APR, at 1424, that the flight was under a RCS and instructed to descend to FL45. The base of N864 is FL55 to the N of EXMOR rising to FL65 S of this reporting point. The radar recording shows the subject Hawk squawking A7001 indicating FL36 Mode C, outside CAS, 10nm SE of the DHC-8 at the time. At 1425, about 1min after issuing the descent clearance, the APR transmitted to the DHC-8 crew *"if you just stop your descent now Flight Level 60 there is traffic unknown just to the southwest of you correction southeast of you by 4 miles indicating Flight Level 57. In fact climb back up to Flight Level 70 immediate climb Flight Level 70 please"*. The radar recording, timed at 1425:09, shows the DHC-8 at FL62 with an unknown ac squawking A7001 – the Hawk - tracking SW, 5nm ESE of the DHC-8 climbing through FL57 Mode C. This is the first time the Hawk's Mode C shows the jet apparently within the boundaries of the airway. After receiving an acknowledgement, the controller continued *"affirm the traffic now in your left half past 9 a range of mi- 2 miles indicating Flight Level 59 correction Flight Level 61 climbing. Immediate avoiding action turn right heading 230 degrees"*. The radar recording, timed at 1425:25, shows the two ac 3·3nm apart both at the same level, FL61, with the Hawk turning R through W just to the N of the airway step boundary near EXMOR where the base of CAS is FL55. By the time the DHC-8 pilot asked for the avoiding action message to be repeated the ac had passed each other, with the pilot of the DHC-8 reporting sighting a Hawk. By the time the Hawk passed 1nm behind the DHC-8, the point of minimum horizontal separation, vertical separation had increased to 900ft as the airliner climbed through FL69.

The Exeter APR complied with the action stated in the MATS Part 1, Section 1, Chapter 5, Page 13, with reference to unknown aircraft in Class A airspace insofar as:

"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."

HQ PTC comments that this appears to be an inadvertent penetration of Class A by the solo student. The forthcoming ac replacement - Hawk 128 - will have a better suite of navigational aids, however, pilots must be aware of all the limits when operating in the vicinity of CAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The HQ PTC pilot Member explained that at this stage of his flight the student pilot believed that his ac's position was further to the S and thus within the Class G airspace beneath the airway's base level of FL65, S of the airway step boundary at EXMOR. The radar recording clearly showed that this was not the case; it was evident that the student pilot's navigation and situational awareness was not quite as accurate as he might have thought and he had in fact penetrated Class A CAS. The HQ PTC Member stressed the limited navigational aids available to the student pilot within the Hawk, adding that the student's navigation plan and pre-flight brief were all conducted in accordance with SOPs. Members contended that with scattered cloud below, it was possible that the coastline was obscured, thereby possibly denying the student pilot sight of this prominent feature to assist his navigation. However, others experienced in fast jet operations considered that there might also be a supervisory issue here, suggesting that the flying supervisor who authorised the flight should have taken care to amplify the difficulties that might ensue if a navigational error was made at this juncture of the flight. Here, if feasible, limiting the planned climb-out from the LFS initially to FL50 would have neutralised any unintentional navigational errors and ensured that the student pilot remained clear below the airway until he had cleared the western boundary of Class A airspace.

The Board noted from the comprehensive ATSI report provided that the Exeter APR had detected the inadvertent penetration by the Hawk virtually as soon as it occurred and immediately provided traffic information to the descending DHC-8 crew about the jet. Whilst noting that the APR had not prefixed his avoiding action instructions as such, it was evident that the controller had quickly appreciated the developing situation and provided prompt and effective instructions to the crew. This had ensured that the DHC-8 was climbed clear above the Hawk, which by that stage was maintaining level flight. A CAT pilot Member was concerned that the DHC-8 crew had not been able to immediately distinguish the enunciated TCAS instruction from the controller's RT transmissions. In his experience, the relative audibility of the two systems is such that usually TCAS enunciations are made over a

separate loudspeaker which invariably overrides any RT transmissions. Whilst none of the Board Members were intimately familiar with the ac type flown by the reporting pilot here and thus the way that the system had been set up, being able to ascertain what TCAS was demanding is not usually problematic in modern cockpits and 'as a rule' pilots should always follow the commanded TCAS RA. Here it was not clear if an RA was actually enunciated but it was evident that the APRs instruction had proved effective. Whilst it was reasonable to presume that the Hawk student had no intention of entering CAS at all, for he had no reported reason to do so, this was the fundamental catalyst to this Airprox. The Board concluded unanimously, therefore, that this Airprox had resulted because the Hawk student pilot penetrated Class A CAS without clearance and flew into conflict with the DHC-8.

Nevertheless, having climbed up to FL61 - some 600ft within the base of the airway - the student pilot had subsequently acquired the DHC-8 at a range of 2nm, after he had levelled his jet, and had decided that no avoiding action was necessary. Although the first safety net of CAS had been breached, by this stage the airliner's TCAS had also detected the presence of the Hawk and had certainly enunciated a TA as the DHC-8 pilot had reported. Whether an RA was also demanded was not clear but the APR's climb instruction, promptly complied with by the DHC-8 crew, had proved entirely effective in preventing the situation from deteriorating further. The combined result was that although both ac were at the same level as the range closed to 3·3nm, the DHC-8's climb placed the airliner some 900ft clear above the Hawk at the point of minimum horizontal separation as the latter passed 1nm clear astern whilst being observed by the DHC-8 pilot. Although the effectiveness of TCAS might have been compromised, the avoiding action provided by ATC coupled with the visual sighting by the pilots concerned had, in the Board's view, ensured that there was no risk of a collision in the circumstances reported here.

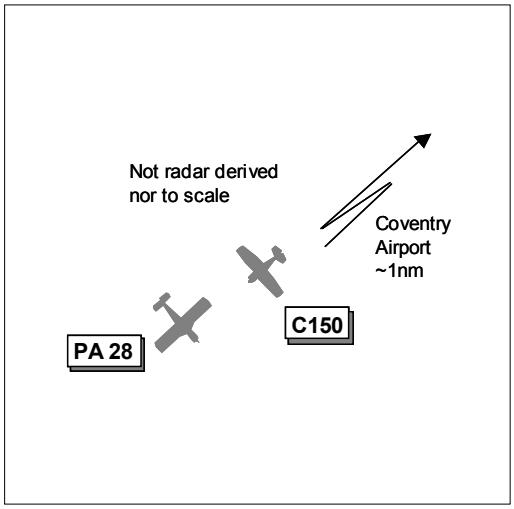
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hawk student pilot penetrated Class A CAS without clearance and flew into conflict with the DHC-8.

Degree of Risk: C.

AIRPROX REPORT NO 193/05

Date/Time:	23 Oct 1528 (Sunday)	
Position:	5221N 00130W (1nm SW Coventry - elev 267ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C150	PA28
Operator:	Civ Trg	Civ Trg
Alt/FL:	400ft↑ (QFE 1002mb)	1000ft (QFE)
Weather	VMC NR	VMC CLBC
Visibility:	8km	'good'
Reported Separation:	10-15m	250ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C150 PILOT reports flying dual cct training sortie from Coventry and in receipt of a FIS from Coventry Tower on 119·25MHz squawking 0250, he thought, with Mode C switched off. The visibility was 8km in VMC and the ac was coloured blue/white with landing, nav and strobe lights all switched on. Whilst established on final approach at <1nm from the threshold as No1 for a touch and go, ATC requested that he made the touch and go as expeditious as possible owing to a PA28 behind that was getting close. He acknowledged the call and, upon landing, retracted the flaps and set the carburettor heat to cold for the student who then continued to take-off,

accelerating to 75mph. He heard ATC call the PA28 flight instructing them to turn crosswind and become No1 in the cct pattern. ATC went on to say that the C150 ahead, his ac, would become No2. It was at this point, climbing through 400ft QFE heading 220°, he turned to look rearwards out of the rear windscreen in order to identify the PA28 and locate its position. He couldn't see the other ac along the take-off path behind nor in the crosswind leg. The student had allowed the ac to move slightly L of the extended C/L and began a gentle banked turn to the R. At this point ATC called, informing him that the PA28 would be turning crosswind to establish No1. Whilst still looking for this traffic - neither he nor his student had time to acknowledge the call – the student became alarmed of traffic in their 12 o'clock. As he now turned to look forward, he saw the PA28 20m ahead. He took control and positively pitched the ac's nose down to avoid collision but was now concerned that his ac's tailplane would contact the other ac which was clearly the subject PA28. The PA28 was in a climbing L turn and directly crossed their flight path from R to L, he estimated separation as 10-15m, with a high risk of collision. From the moment the PA28 was identified ahead, its passage was so quick that once the pitch input was made it had passed. He then acknowledged the previous ATC RT call, which had been repeated as they were taking avoiding action. Later he filed an Airprox with ATC.

THE PA28 PILOT reports flying a dual training sortie from Coventry and in receipt of an ATC service from Coventry on 124·8MHz, he thought, squawking 0250 with Mode C switched off, he thought. The visibility was 'good' in VMC and the ac was coloured blue/white with strobe lights switched on. Whilst carrying exercises 12 and 13 - ccts and landings - on final approach to RW23, ATC initially told him to 'continue' but at about 400ft QFE he was told to 'go-around'. He acknowledged the call and the student turned the ac R onto a heading of 250°, onto the 'deadside' of the RW, and climbed to 1000ft where the climb was stopped but the heading was continued. ATC next instructed them to follow the subject Cessna, which had carried out a touch and go ahead, and to call downwind No2, he thought. After acknowledging this call, ATC then told him to 'turn L and call downwind No1' as the C150 would become No2 to him. He acknowledged this call and on turning L he, the instructor seated on the RHS, was unable to see the Cessna, owing to his ac's low wing configuration, but his student saw it on his L about 250ft below and still climbing. They were now about 1nm SW of the airport on a crosswind heading of 140° at 95kt. His next call was 'downwind to land' and he was cleared to final No1. At no time did he, the instructor, see any ac close to their ac.

THE COVENTRY ADC/APP reports the PA28 was No2 on final approach in the cct to the C150. The PA28 pilot was told to go-around as he had caught-up with the C150 ahead which he could see. During the go-around on the climb-out the PA28 pilot was offered an early L turn to position ahead of the C150 in the cct. This was accepted and actioned and upon completion of the manoeuvre the C150 pilot made a comment about *"looking out"*. After landing the C150 pilot declared his intention to file an Airprox.

The Coventry METAR shows EGBE1520Z 230/8kt 18km sct1500 sct4500 14/11 QNH 1012mb QFE 1002mb.

ATSI comments that at the time of the Airprox the RW in use at Coventry was RW23 and LH ccts were taking place. It was a busy traffic situation and the controller involved was providing a combined Aerodrome and Approach Control service. A GLF4 (Gulfstream 4) was inbound and contacted the controller at a range of 6 miles on final approach. Following the GLF4 was the subject C150 which was extending its circuit to provide the requisite vortex separation. The subject PA28 was downwind positioning behind the C150.

The C150 pilot reported visual with the GLF4 and shortly afterwards, at 1521:30, the controller instructed the PA28 pilot to report final number two following the C150, which was acknowledged. At 1524:30, the PA28 pilot reported 'final touch and go' and was instructed to continue approach as the one ahead, i.e. the C150, was on a touch and go as well. At 1525:10, the controller cleared the C150 for a touch and go requesting that the pilot be as expeditious as possible as there was traffic behind. The situation continued but at 1526:10, the controller changed the plan and instructed the PA28 to go around and added '…dead side please', which the pilot acknowledged.

The controller subsequently advised the PA28 pilot that he could turn L to position ahead of the C150, which was still climbing out and the PA28 pilot agreed to this. The controller then passed TI to the C150 pilot but received no acknowledgement and so the transmission was repeated. The C150 pilot replied to the second transmission making a comment about the PA28 pilot's lookout. Subsequently, the C150 pilot advised ATC that he would be filing an Airprox. No ATC causal factors disclosed.

UKAB Note (1): The Coventry RT transcript shows the following exchange of transmissions just over 1min after ATC had given the PA28 pilot instructions to go-around:-

AIRPROX REPORT No 193/05

ATC *"and er PA28 c/s if you wish to you can make a turn to position ahead of that one five zero just climbing out if you can".*

PA28 *"PA28 c/s roger we'll do that"*.

ATC *"C150 c/s the P A twentyeight's gonna be turning ahead of you so you'll be following him downwind".*

ATC *"C150 c/s Coventry you'll be following the er P A twentyeight downwind now order is reversed".*

C150 *"yeah it would have been nice if he'd looked out but number two to them C150 c/s"*.

UKAB Note (2): The Clee Hill radar recording does not show this Airprox. A 0250 squawk is seen at 1525:08, believed to be the PA28, 2nm NE of Coventry tracking SW on final approach RW23 indicating unverified FL008 (470ft QFE 1002mb) with an intermittent primary only return, believed to the C150 0·6nm ahead. The C150 fades 2 sweeps later still 0·6nm ahead of the PA28, which commences a descent on the next radar sweep on final approach. This descent profile is continued down to FL005 (170ft QFE) before a climb is seen to commence 0·6nm NE of Coventry. A slight R turn is seen thereafter as the PA28 passes just N abeam Coventry on the deadside RW23 climbing through FL007 (370ft QFE). The PA28 continues to track SW'ly until reaching 1nm SW of the airport at 1527:48 indicating FL012 (870ft QFE). The next sweep shows the PA28 steady tracking SE'ly (crosswind) climbing through FL013 (970ft QFE) before reaching FL014 (1070ft QFE) 8secs later. The next sweep shows the PA28 maintaining FL013 (970ft QFE) with a pop-up primary only return, believed to be the C150, 0·5nm in its 6 o'clock.

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 incident had occurred after the PA28 pilot had executed a go-around which became necessary as his ac was too close behind the C150 on final approach to carry out a touch-and-go. Both the subject ac had had to extend their visual ccts to position behind a Gulfstream 4 with vortex separation increasing the required spacing.

Any 'go-around' manoeuvre should position an ac onto the deadside of the cct to allow its pilot to closely monitor the other ac's progress during its touch and go and subsequent climb-out. Thereafter, it is the pilot's responsibility to integrate back into the cct, conforming to the cct pattern, and giving way to those ac already in the cct. In this incident, the Coventry ADC had offered (*"…if you wish to..."*) the PA28 pilot a turn to position ahead of the C150 in the traffic pattern *"...if you can".* It appeared that the instructor had taken the ATC 'offer' as an instruction and had allowed his student to execute the manoeuvre without checking the relative position of the C150 himself. The Board agreed that, following a go-around, the PA28 pilot did not integrate safely into the cct and this had caused the Airprox. Members made comment that although both ac were within an ATZ under an ATS, ultimately it is the pilot's responsibility to ensure compliance with the Rules of the Air.

The PA28 instructor had lost sight of the C150 below and to his L, owing to him sitting on the RHS and his ac's low wing configuration, and had allowed his student to turn towards the C150 without ensuring adequate separation would be maintained throughout; the student had estimated that the C150 was 250ft below and climbing. The C150 instructor had endeavoured to visually acquire the PA28 by, at first, searching behind his ac. It appears that the PA28 had slowly overtaken his ac during the climb-out and would have probably been obscured for some of the time owing to the C150's high wing configuration. ATC had informed him that the PA28 would be turning ahead of him but it was only after his student's alarm had drawn his attention to the PA28 dead ahead did he see it, quickly pitching the ac's nose down as the PA28 crossed 10-15m away from R to L climbing. The PA28's flight path is seen on the radar recording and is shown to be executing a climbing L turn before levelling off crosswind at 1000ft cct height. Undoubtedly this had been a close encounter, with only the C150 pilots observing the CPA. However, taking into account the actual geometry of the incident, with both ac climbing, the Board were persuaded that the very late sighting and subsequent robust actions of the C150 instructor had just been sufficient to remove the actual risk of collision but that safety had not been assured during the encounter.

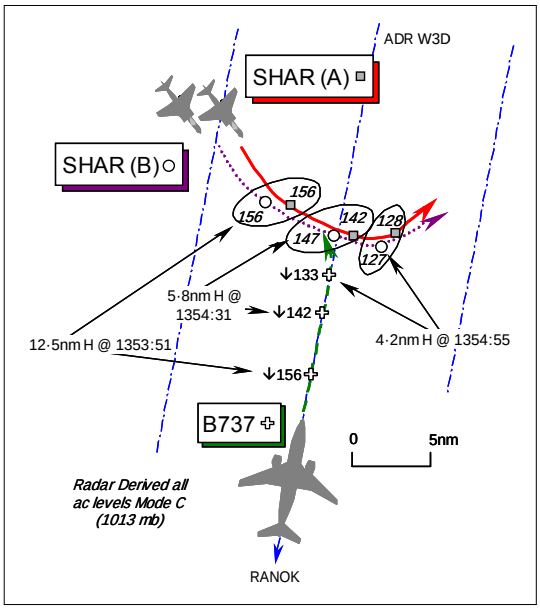
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following a go-around, the PA28 pilot did not integrate safely into the visual cct.

Degree of Risk: B.

AIRPROX REPORT NO 194/05

Date/Time:	28 Oct 1354	
Position:	5658N 00411W (16nm N RANOK)	
Airspace:	ADR W3D (Class: F)	
Reporter:	ScACC W COAST Sector	
	First Ac	*Second Ac*
Type:	B737-700	Sea Harrier pr
Operator:	CAT	C in C FLEET
Alt/FL:	FL135↓	17000ft (RPS 980mb)
Weather	VMC CLAC	VMC CLOC
Visibility:	Unlimited	10km
Reported Separation:	W Coast TAC: 500ft V/3·6nm H	
	Slightly below/3·5nm H	5nm H
Recorded Separation:	B737 v SHAR (B)600ft V @ 4·2nm MinH	
	200ft Min V @ 4·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ScACC WEST COAST SECTOR TACTICAL CONTROLLER (W COAST TAC) reports that he had just taken over the W COAST Sector and was advised by the off-going controller that two military ac squawking A4710 & A4711 – the pair of SHAR FA2s - would need to be watched against the B737 flying N on W3D. The military traffic was about 15-20nm NW of his traffic and his first transmission was to pass traffic information to the B737 crew as the trajectories of the military ac indicated that they would be in confliction with the B737; the B737 pilot responded that he had the traffic on his TCAS. He continued to give traffic information and the military ac, heading SE, had almost passed through the 12 o'clock position of the B737 when he noticed that their Mode C indicated a descent at which point he issued an avoiding L turn onto 310° to the B737 crew to take their ac behind the military jets. The B737 passed 3·6nm and 500ft clear of the military jets from their indicated Mode C. Further descent clearance below FL135 was obtained from Lossiemouth and the B737 was cleared to turn back on track to GUSSI, descending to FL85. The military jets were then observed to turn back W towards the B737 but this time they remained a satisfactory distance away from it.

UKAB Note (1): The ScACC recording of the Aberdeen Radar source, provided by ATSI, shows the B737 descending along W3D as the SHAR pair approaches from the NW on a steady SE'ly course – both SHARs were squawking A4711 with Mode C.

THE B737-700 PILOT reports he was inbound from Belfast International to Inverness under IFR and in receipt of a RAS from ScACC W COAST Sector on 127·275MHz. A squawk of A7430 was selected with Mode C.

Flying in VMC some 4000ft clear above cloud with unlimited visibility, heading northbound on W3D at 320kt, the controller passed traffic information about ac at a separation of some 20nm+ and the controller asked if he was happy to continue on their present course. Having acquired the traffic on TCAS at 20nm he responded 'yes', believing there to be no conflict with the other traffic. Whilst descending en-route through FL135, approaching a

position, he thought, about 10nm SSW of FOYLE [but actually 10nm NNE of RANOK] and after he had acquired the pair of small fast jets - possibly Harriers - visually, the jets passed through their 12 o'clock position obliquely from L – R with horizontal separation of, he noted, 5nm displayed on TCAS. As the fast jet pair crossed through to their 2 o'clock, flying away, TCAS enunciated a TA - "TRAFFIC TRAFFIC". Next the controller instructed them for "avoiding action" to turn L onto a heading of 310°. As he executed the turn the TCAS visual presentation was red but no further aural alerts were enunciated as the Harrier pair passed 3·5nm away slightly below - but he did not know the exact vertical separation. He did not quantify the risk but added that they were fully visual throughout. After landing at Inverness he spoke with the ScACC Watch Manager.

THE SEA HARRIER FA2 PILOT (SHAR) reports, some 3 months after the event, that he was leading a pair of camouflage grey FA2s operating under the control of an AWACs during a JMC exercise. The assigned exercise squawk was selected with Mode C.

Flying in VMC some 5000ft and 5nm clear of cloud with an in-flight visibility of "10km plus", the pair was tasked to patrol an exercise target area in the vicinity of AARA 14 [W of W3D]. Their tasking was then changed by the AWACS controller to a target in the vicinity of 56°55'N 004°15'W, which they attempted to reach at low level but had to abort heading E at about 57°10'N 004°30'W looking to re-enter low level in the vicinity of Aviemore. During this climb/cruise/descent they had good radar contact with the tanker operating on a tactical towline and a GR7 joined with it. Heading E at 400kt, in a level cruise at 17000ft RPS [PORTREE – 980mb] they also had AI radar contact with an ac flying N, which appeared to be level at about FL150, that was acquired visually at a range of about 15nm – the B737. They passed well clear of this B737 with minimum horizontal separation of about 5nm and had visual contact as it passed behind them. At all times they were on an AWACS monitored frequency and never considered there to be any risk whatsoever.

ATSI reports with RT transcript that at the time of the Airprox the traffic levels were low on the W COAST Sector and, accordingly, one controller was acting in both the TACTICAL and PLANNING roles. The B737 established contact with W COAST TAC at 1346:20 and reported routeing via W3D direct to FOYLE at FL230. The controller acknowledged this and placed the flight under a RAS. At 1349:45, the crew requested descent and were instructed to descend to FL130 to be level 35nm before Inverness. At this time, the two military ac were some 40nm to the N of the B737. As the B737 passed FL175, the controller passed traffic information on two military ac – the SHAR pair – at 1353:00, which were SE bound in the B737's 10 o'clock - 24nm [saying *"…I've got two military contacts off in your ten o'clock at about 15 miles at the moment converging indicating 153 and 158…"*. The B737 crew replied *"that's understood we have them on the TCAS to our left…"* and when asked by the controller *"..you happy continuing on your own.."* the B737 crew replied, *"at the moment yes…"*.] At 1353:51, the Mode C readouts of all 3 ac were indicating FL156 with the military ac in the 11 o'clock position of the B737 at a range of 12·5nm. [W COAST TAC updated the traffic information as the SHAR pair turned L into a wide turn northeasterly, *"..10 o'clock at 10 miles now indicating 157 climbing";* the B737 crew confirmed they were *"..looking.."* and when questioned confirmed at 1354:00, that *"..we have both of them on the TCAS".* The controller immediately added traffic information that the pair was *"just going through your 12 o'clock now"*. A little over 20sec later the B737 pilot reported that *"we're visual with er one of the traffic…*". As the SHAR pair crossed from L to R ahead of the B737 at 1354:31, the airliner was passing FL142 and the closest of the pair - SHAR (B) - was at a range of 5·8nm descending through FL147 with SHAR (A) also at FL142, as W COAST TAC issued avoiding action to the B737 crew *"…avoiding action turn left heading…sorry…turn left head 310°",* which the crew readback immediately *"..left head 310° as avoiding action".* Prints of the Great Dun Fell Radar recording shows that vertical separation of 200ft was recorded at 1354:37, as SHAR (B) indicated FL137 above the B737 descending through FL135 some 4·8nm away, then 300ft below at FL131 as the airliner descended through FL134. At 1354:40, the controller added traffic information *"..just in your half twelve now at 3 miles* [FL]*138"*, whereupon the crew responded *"er have that traffic…"*. At 1355:00, W COAST TAC queried whether the B737 crew was steady on the heading given, whereupon they replied that *"..we are turning through 340° now for 310°"*, after which at 1355:10, the controller added *"roger the traffic off in your 3 o'clock now at 5 miles heading northeast".* The turn instruction issued by the controller is not shown to take effect until the return timed at 1355:07, as the pair cleared to the NE. Separation was maintained against SHAR (A) but recorded horizontal separation reduced to a minimum of 4·2nm and 600ft vertically with the nearest SHAR (B) at 1354:55.]

[The ScACC Unit report states that the Lowther Hill Radar recording showed that separation reduced to a minimum of 4·1nm and 200ft with the second (nearer) ac.]

The controller had placed the B737 under a RAS and fully complied with the MATS Part 1 requirements in respect of this. Traffic information was passed, and updated, in good time and, even though the crew advised that they had the flights on TCAS and were happy to continue, avoiding action was passed a short time later. Due to the unpredictable vertical manoeuvres of the military ac it was not possible to achieve the standard 5nm or 3000ft Mode C separation.

C in C FLEET comments that the 3 month delay in obtaining the SHAR pilots report is disappointing as was the lack of AWACs and unit/station input and this example has been used within Fleet Command to stress the importance of providing accurate Airprox data in the correct time scales to ensure that the full picture is presented to the Board. Notwithstanding the paucity of information provided, the safe outcome of this encounter was safeguarded because all parties involved carried out the correct actions with regard to lookout, use of TCAS, situational awareness and the application of radar services in Class F and G airspace.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was very unfortunate that the leading SHAR pilot had not completed his report more promptly as the late submission of his account had prevented the acquisition both of appropriate AWACS recordings and reports from the AD controller involved. The Board was briefed that the AWACS controller, when asked later, understandably had no recollection of the event and so the Board could only speculate on this aspect of the encounter. The ASACS advisor to the Board explained that improvements had been made to incident reporting guidelines which, coupled with the action taken by Fleet Command, will help to ensure that a fuller picture is presented to the Board in future.

The Board was reminded that following Airprox reports between military ac and CAT within the vicinity of ADRs considered by the Board previously, HQ STC had promulgated a Flight Safety poster about Scottish civil advisory routes to flying units on 10 Dec 2004. The prudent advice contained therein entreats military crews crossing Class F airspace in the interest of good airmanship to get at a minimum a RIS but if unable to obtain a radar service; to avoid operating (or planning to operate) in and around ADRs; to cross ADRs at a quadrantal flight level at right angles and not to conduct TOO (targets of opportunity) training against ac routeing along the ADRs. Here, there was no suggestion whatsoever that the SHAR pair was conducting TOO training as they were merely proceeding about their sortie, in transit, SE-bound through Class F airspace as they were legitimately entitled to do. Nevertheless, whilst not intending to inhibit the freedom of aircrews to conduct their sorties in any way, the advice, if heeded, could lead to a safer environment for all concerned. Although in this instance the SHAR crews were operating from a CVS and thus under the authority of Fleet, such advice should still be available to them from service sources and worth repeating here in an attempt to improve awareness amongst all military fast-jet crews.

It was not clear if the AWACS controllers in communication with the SHAR pair at the time had provided a warning about the presence of the B737 approaching from the S, but from the lead SHAR pilot's own account it was clear that the formation pilots were entirely cognisant of the presence of the airliner from their ac's own AI radar. Moreover the SHAR pilot reported that visual contact was gained on the airliner at a range of 15nm and maintained throughout as they crossed the ADR and descended ahead of the B737, which the lead pilot erroneously reported was in level flight. The HQ STC fast jet pilot Member opined that good airmanship would suggest that level flight should be maintained whilst crossing through the ADR - in line with Aviation Safety Group's advice on this topic – rather than initiating a descent as the airliner descended and closed to the point of minimum horizontal separation. The W COAST controller had kept the B737 crew appraised of the SHAR's position through updated traffic information, which coupled with their own displayed TCAS information led to good situational awareness and the crew's visual sighting with one of the pair as the ac closed. However, the ScACC controller was evidently concerned enough by the SHAR formations descent to issue avoiding action as the pair crossed from L to R ahead of the B737 and he thought that the minimum horizontal separation was 3·5nm. This was when the B737 crew advised that they had the traffic visual. A civilian controller Member explained that it was this unexpected descent which had probably caused the W COAST controller concern and led to the raising of the Airprox. He stressed that ATC will respond if fast-jets descend close to traffic on the ADRs. It seemed to another controller Member that the W COAST controller might have been endeavouring to achieve the prescribed vertical separation beneath the SHARs based on their Mode C indications and the sudden decent of the SHARs even though they had crossed

ahead of the B737 had confounded this goal. As it was, the ScACC unit report had included data from the Lowther Hill Radar recording that the closest of the SHAR pair – SHAR (B) - flew no closer than 4·1nm to the B737. It was clear also from the Great Dun Fell Radar recording that had been available to ATSI that not less than 4·2nm horizontal separation pertained at the closest point so although the prescribed minima was not maintained, it was not degraded to a significant degree. Moreover, the avoiding action instruction to the B737 crew had no effect on the outcome as separation had been restored by the time the airliner was shown turning L on the radar recording. Noting that the B737 pilot had not been concerned to initiate an Airprox himself, CAT pilot Members viewed this occurrence as a minor erosion of standard separation. Weighing all these factors carefully for relevance, the Board agreed that the cause of this Airprox report was that whilst crossing the ADR, the descent of the SHAR pair had caused the controller concern. Furthermore, in the Board's opinion, with all the pilots involved visual with one another's ac this had not compromised the safety of the ac involved at all.

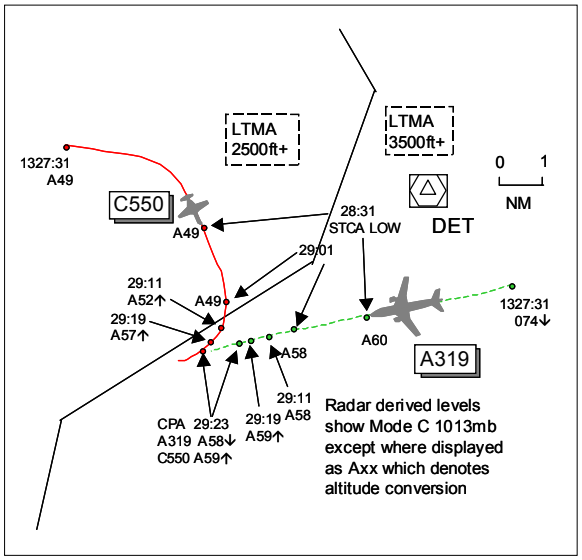
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Whilst crossing the ADR, the descent of the SHAR pair caused the controller concern.

Degree of Risk: C.

AIRPROX REPORT NO 195/05

Date/Time:	21 Oct 1329	
Position:	5113N 00026E (7nm SW DET)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A319	C550
Operator:	CAT	Civ Comm
Alt/FL:	6000ft↓	5800ft↑
	(QNH)	(QNH)
Weather	VMC CLOC	VMC CLOC
Visibility:	>10km	NR
Reported Separation:		
	700ft V/1-2nm H	2nm H
Recorded Separation:		
	100ftV/1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports inbound to Gatwick heading 260° at 200kt and in receipt of a RCS from Gatwick Director on 126·82MHz squawking an assigned code with Mode C. Established on the RW26 LLZ at 6000ft QNH and having been cleared for descent to 4000ft, TCAS showed traffic about 4nm away, 1000ft below and climbing. ATC told them to stop at 6000ft so they started a +300fpm v/s climb from about 5800ft. TCAS annunciated an RA *"descend crossing descend"* and the TCAS procedure was followed during which the 'intruder' was seen, a small white/blue coloured business jet, crossing about 1-2nm ahead from R to L and 700ft above. ATC were informed who then cleared their flight to descend to 4000ft and then further with the ILS. He assessed the risk as medium.

THE C550 PILOT reports outbound from Biggin Hill heading 180° at 250kt and in communication with London Radar squawking an assigned code with Mode C. When S of Biggin Hill heading about 180°, ATC requested them to expedite climb from 5000ft to FL70 and to turn R heading 270°. Approaching 6000ft, he thought, ATC requested that they descend again to 5000ft. They saw an A319 2-3nm to their L just above and decided to continue the climb to FL70. After levelling at FL70, ATC apologised for the mistake. He did not assess the risk. TCAS II was

fitted to the ac but no alerts or warnings were received owing to an equipment malfunction which has since been rectified by the manufacturer.

THE GATWICK FINAL DIRECTOR reports handing over the sector to the oncoming controller when STCA flashed 'white' low severity alert showing a conflict between the A319, which had just checked in, and the C550. The C550 had turned across the A319's projected flight path but appeared to be maintaining 5000ft (4900ft on SSR) so he told the A319 flight to stop descent at 6000ft. The oncoming controller had run down to the TC BIG Sector to alert the controller that the A319 was at 6000ft. As the controller returned, he was surprised to see that the C550 was climbing and the A319 flight, which had reported the C550 in sight and on TCAS, had commenced descent. The crew reported a TCAS descent and asked for clarification of their cleared level which was given as 4000ft when back under his control.

THE LTCC BIG/TIMBA SC reports having previously transferred the A319 to Gatwick Director descending to 4000ft with another ac, AC3, inbound to London City via DET, the C550 flight called airborne from Biggin Hill heading towards DET. The C550 was given climb to 5000ft to achieve 'the cross' with AC3 which was turned R 10° and descended to FL60. The C550 was then turned R onto 165° but the SC forgot about the A319 until alerted to it by an STCA low severity alert. The C550 was turned R onto 270° and climbed to FL70 as the A319 was assumed to be still descending. The Gatwick Director ran up to the Sector and said that the A319 had been stopped off at 6000ft. The SC then went back to the C550 flight and amended the avoiding action to a descent and told the flight that the A319 was maintaining 6000ft. At some point the C550 pilot reported that the traffic was visual and the SC then saw the A319 descend and the C550 climb which was presumably due to TCAS.

ATSI reports that the controller was performing the SC task of the combined BIG/TIMBA Sectors. She did not consider the bandboxing of the sector to be a contributory factor to the Airprox as her workload was low at the time.

The A319 flight established communication with the BIG/TIMBA SC at 1320, reporting descending to FL130 to be level by TANET. The flight was instructed to continue on the heading, to expect a straight in approach to RW26L at Gatwick and descend to FL110. The controller commented that she could not remember whether she or Gatwick had instigated the straight-in approach but in view of the traffic situation she had not envisaged any problems with the shortened routeing. (The Standard Arrival Route (STAR) is via DET to LARCK and TIMBA.) Subsequently, the A319 was given descent in stages to 4000ft and placed on a heading to intercept the RW26L ILS LLZ.

At 1326, the C550 flight made its initial call on the SC's frequency reporting inbound to DET. In accordance with LTCC MATS Part 2 procedures, this ac had been transferred from Thames Radar climbing to 4000ft. The flight was identified, given no ATC speed restriction and instructed to climb to 5000ft. At this time the subject ac were on potentially conflicting tracks 20·5nm apart. The SC said that she could not recollect why she had issued the climb instruction to 5000ft but confirmed that it did not relate in any way to the A319. It would appear from comments made that the SC inexplicably overlooked the presence of the A319 relative to the C550, shortly afterwards transferring it to Gatwick Approach. Consequently, at 1327:30, when she instructed the C550 to turn on to a heading of 165°, she did not take the A319 into account. She explained that the turn was intended to provide separation from a London City inbound (AC3) from the SE. Although this intention was achieved it resulted in the subject ac tracking towards each other with vertical separation not assured. The radar recording shows that when the turn instruction was issued the two ac were 11·9nm apart, with the C550 maintaining 4900ft and the A319 passing FL74 in the descent.

The SC first became aware of the confliction when STCA activated with a low severity alert at 1328:30. At the time, the A319, now under the control of Gatwick Approach, was tracking W descending through 6000ft. It was 5·4nm SE of the C550 which was still maintaining 4900ft on its assigned heading of 165°. As soon as an unrelated ac finished its RT transmission, the SC immediately instructed the C550 *"C550 c/s avoiding action climb immediately Flight Level Seven Zero turn right heading two seven zero degrees traffic is in your eleven o'cl-er sorry in your eleven o'clock range two miles"*. Following a readback from the pilot the instruction was reinforced *"expedite your climb ma'am the traffic's at flight level five eight going down"*. The SC explained that she issued a climb instruction in the belief that the A319 was descending to 4000ft as originally cleared. However, having taken this action, a Gatwick Controller appeared at her position to inform her that the A319's descent had been stopped at 6000ft. In view of this information she transmitted to the C550 flight *"C550 c/s amendment to that clearance the other traffic is now climbing it's in your eleven o'clock er at flight at altitude six thousand feet descend immediately*

descend immediately". The crew responded *"we have the traffic in sight C550 c/s"*, whereupon the C550 was instructed to *"continue the descent as much as you can"*. The crew then reported climbing to FL70.

Meanwhile, as already reported, the Gatwick Final Director (FIN DIR), at 1328:30, had instructed the A319 flight to stop its descent at 6000ft. He had also passed information on traffic, R 2 o'clock at a range of 3 miles, maintaining (he believed from observing the radar display) 5000ft. At the time, he was in the process of handing over the position to another controller and it was this controller that hurried off to alert the BIG/TIMBA SC to the action taken. Seeing that the A319 had descended below 6000ft, the FIN DIR instructed the flight to *"...make that avoiding action climb immediately to six thousand feet"*. The pilot reported having the traffic on TCAS and visual. Shortly afterwards, in response to the C550 climbing (through his level), the pilot of the A319 reported a TCAS descent.

The controller said that she could offer no reason for overlooking the presence of the A319. She confirmed that the fpss for both flights were displayed on the fps board, albeit under different designators. Even when the A319 was transferred to Gatwick, its fps had remained displayed. The radar display would have shown the flight as the recording indicates that there was no other traffic in its vicinity that could have resulted in label overlap. She did think that if the A319 had stayed under her control and continued on its STAR towards TIMBA, rather than positioning straight in, it was possible that she may have remembered its presence.

The radar recordings of the event show that the A319 arrested its descent at 5800ft at 1329:01. At the time, the C550, although having been given climb clearance some 30sec earlier as part of the avoiding action instructions, was still maintaining 4900ft. The two ac were now 2·1nm apart, with the C550 tracking S, not yet having completed its turn onto the heading of 270°. It was at this point that the BIG/TIMBA SC, having been informed that the A319 would be maintaining 6000ft, instructed the C550 to descend. However, the latter is seen to commence a climb and, at 1329:11 when horizontal separation had reduced to 1·3nm, it was passing 5200ft. At 1329:19, the A319 had commenced its climb back to 6000ft as instructed and was at 5900ft, with the C550, at 5700ft, in its 12 o'clock at a range of 1·1nm. Four seconds later, the C550 had climbed through the A319's level, 1nm ahead. The former was passing 5900ft and the latter was descending, in response to its TCAS RA, through 5800ft. Thereafter vertical separation was quickly restored as the subject ac climbed/descended respectively.

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 of two recommendations, which have been made by NATS. Firstly, the operation of priority telephone lines between sectors is highlighted in LTCC student training and to controllers via Local Competency Exam (LCE) bulletins. Secondly, the Head of LTCC Training should consider a means of providing simulator opportunities for controllers to practise avoiding action skills.

Members could add little to the incident. From the ATSI investigation and the BIG/TIMBA SC's own report, she did not take the A319 into account when vectoring the C550 and this had caused the Airprox. Having been alerted to the potential confliction by STCA, she gave the C550 crew an avoiding action (expeditious) climb to FL70 and a R turn onto W, assuming that the A319 would be continuing its descent. However, on being told by a colleague that the A319 was maintaining 6000ft, she then attempted to revise the avoiding action by giving the C550 crew an immediate descent and TI. One ATCO Member thought that the words issued by the SC were fairly clear but the crew appeared not to assimilate the instruction. However, from the radar/RT transcript timings, it appears that C550 crew had already commenced their climb and, with a visual sighting of the A319 and their high ROC, elected to continue their climb whilst continuing the R turn. From the A319 cockpit viewpoint, it was understandable the crew were concerned when ATC told them to stop their descent at 6000ft after they had already descended through the level whilst being cognisant of the C550's presence from TCAS as it was displayed below them but climbing. Having climbed back to 6000ft, TCAS then gave an RA 'descend' as the C550 continued its climb, so the A319 crew followed the TCAS guidance, visually acquiring the C550 as it passed ahead and above. The combined actions taken by both crews were enough to allow the Board to conclude that any risk of collision had been effectively removed.

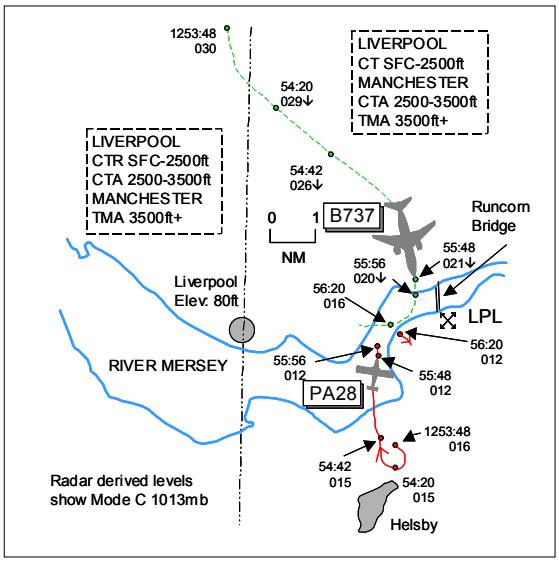
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC BIG/TIMBA SC did not take the A319 into account when vectoring the C550.

Degree of Risk: C.

AIRPROX REPORT NO 196/05

Date/Time:	2 Nov 1256	
Position:	5320N 00245W (3nm FIN APP RW26 Liverpool - elev 80ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-800	PA28
Operator:	CAT	Civ Pte
Alt/FL:	1400ft↓ (QNH 997mb)	1000ft (QFE 994mb)
Weather	VMC CLOC	VMC CLOC
Visibility:		>10km
Reported Separation:	300ft V/600-700ft H	400ft V/1000m H
Recorded Separation:	400ft V/0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT provided a brief report flying inbound to Liverpool IFR and in communication with Liverpool Tower on 126·35MHz squawking 4344 with Mode C. Turning onto final approach RW27 at 160kt descending through 1400ft QNH 997mb, TCAS gave a TA then an RA on traffic ahead. He complied with the RA guidance, which became a go-around, at which point he saw a PA28 in his 11 o'clock 600-700ft away in a banked R turn towards the S and 300ft below. He assessed the risk as high.

THE PA28 PILOT reports inbound to Liverpool VFR and in communication with Liverpool Tower on 126·35MHz squawking 0260, he thought, with Mode C. The visibility was >10km in VMC and the ac was coloured white/red/black; lighting was not reported. After orbiting at Helsby, as requested by ATC, he was then cleared to join L base for RW27 No1. Whilst on L base heading 360° at 1000ft QFE 994mb and 95kt, he was aware from RT exchanges that a B737 was on its approach. He called ATC to 'prompt' them that he was ready to turn onto final at which point he was told to do a RH orbit and that he had caused a B737 to go-around; ATC then asked for his position, he thought. He saw the subject B737 400ft above and 1000m away descending and assessed the risk as moderate.

THE LIVERPOOL ADC reports the PA28 was holding at Helsby and was then brought onto L base and told to report final No1. He then revised his plan as the PA28 reached South Bank and told its pilot to hold on L base, he thought, No2 to a B737 turning onto a 3nm final from the N. The PA28 pilot asked if he could route up towards the (Runcorn) bridge, he thought, and the ADC said 'yes'. When the B737 was straightening up on final, its crew reported traffic below. The ADC said that it could well be the traffic on L base after which the B737 crew reported going around. The light ac was then seen heading S'bound low level from the bridge.

ATSI reports that the controller described his workload as moderate at the time of the Airprox. He had been in position for approximately 40min. The Liverpool Airport weather observation, timed at 1250, was: surface wind 190/14kt; visibility in excess of 10km; cloud, scattered at 1500ft and 2800ft.

AIRPROX REPORT No 196/05

The PA28 was inbound to Liverpool VFR from the SE. Its pilot had been instructed by Approach to hold at Helsby, 6nm SE of the airport, after the APC had confirmed with the ADC that there was no other traffic holding at that position. Shortly afterwards, at 1250:50, the ADC asked for the flight to be transferred to him but to remain holding. The PA28 pilot established communication with the ADC at 1253:50, following a prompting, and was requested to report final No1 for RW27. Meanwhile, the ADC had been informed about the B737 8nm N of the airport, making a visual approach. It was accepted to route via the (Runcorn) Bridge.

When the B737 flight made its initial call (1254:20) on the Tower frequency, the ADC decided to change the arrival order and instructed the B737 pilot to report final No1. Consequently, he then transmitted to the PA28 pilot *"PA28 c/s an amendment to my last er just move up to left base please you'll be number two to a seven three seven approaching from the north"*. The pilot replied *"on to left base number two"*. The controller commented that he then turned his attention to taxying traffic, one of which was having a problem.

Just over 1min after being instructed to continue onto L base, the pilot of the PA28 reported *"we're on left base for two seven er ready to turn final"*. The ADC commented that he could not see the ac either visually or on the Aerodrome Traffic Monitor as it had faded from the display to the SE of the airport. The radar recording shows (1255:50) the PA28 on L base, less than a mile from the RW27 approach at FL12 (700ft QNH 997mb). The B737 is on R base 1·9nm NNE of the PA28 at FL21 (1600ft QNH). The ADC responded *"PA28 c/s roger remain south of the (unintelligible word) approach track there is a seven three seven approaching from the north report final number two to him"*. By now the 2 ac were 1·4nm horizontally and 800ft vertically apart. The pilot replied *"will report final number two"*. The ADC passed TI to the B737's pilot reporting a Cherokee holding on L base that would be following him. The pilot replied *"Okay we have traffic five hundred feet below us we're just turning finals now B737 c/s"*.

[UKAB Note (1): The ADC replies *"B737 c/s roger that may well be him er I'll tell him"*.]

In the next transmission the B737 pilot reported going around. The PA28 disappears from the radar recording (after 1255:56) as it approaches the B737, appearing again (1256:20) after the subject ac have passed. By then it is 0·3nm SE of the B737 and 400ft below it.

[UKAB Note (2): Replying to the B737 crew's reported go-around, the ADC transmits *"B737 c/s roger the surface wind one nine zero degrees one two knots"*. The B737 crew then repeated their previous transmission *"B737 c/s going around"*. The ADC then transmits *"er PA28 c/s report position"* to which the pilot replies *"PA28 c/s we're just er south of the bridge"*. The ADC replies *"PA28 c/s er and I think that was a bit close you caused the 'B737 company prefix' to go around if you can report final now number two"*.]

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'. It also states that in Class D airspace the minimum services to be provided by an ATC Unit are: (a) separate IFR flights from other IFR flights (b) pass traffic information to IFR flights on VFR flights and give traffic avoidance if requested (c) pass traffic information to VFR flights on IFR flights and other VFR flights'. On this occasion it is considered that rather than allow the PA28 to continue on base leg No2 to the B737, it would have been prudent to instruct it to orbit clear of the approach path. This would have had the added benefit of allowing the pilot to conform to the recommended vortex spacing behind the B737 (6nm). In the event, the ADC did not comply with the relevant procedure stated in MATS Part 1, Section 1, Chapter 3, Page 10, with reference to arriving flights: 'Where arriving flights are operating visually (IFR flights operating under the reduced minima in the vicinity of aerodromes, VFR flights, or a mixture of the two), pilots are to be informed of the recommended spacing'. He did say that if the pilot of the PA28 had reported sighting the B737, he would have advised him then of the vortex requirement.

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.

During this encounter the Liverpool ADC was responsible for passing information and instructions to both crews to allow the safe integration of the IFR B737 and VFR PA28 flights in Class D airspace. The ADC had initially asked the PA28 to report final No1 in traffic but when the B737 flight called on frequency he decided to change the order and told the PA28 pilot to position onto L base No2 to the B737 approaching from the N. The ADC had accepted the B737 from the APR for a visual approach towards the Runcorn Bridge. When the PA28 pilot then reported on L base 'ready to turn final', the ADC told him to remain S of the approach track and again gave him his position (No2) in traffic. Members discussed the shortcomings of using a position 'L base' as it was not an exact position, just a perceived track line at 90° to the FAT but at no specific range from the aerodrome. Furthermore, the instruction to 'remain S of the approach track' did not specify a separation distance to be maintained from it. It was thought that the ADC should have taken more positive action to control the situation, particularly as the PA28 was not displayed on the ATM or seen visually from the VCR. Continuing to hold the PA28 at a specific position and asking its pilot to report when he was visual with the (B737) traffic and could position safely behind it onto final could have achieved this. In this case, it appears that the PA28 pilot literally 'did as he was told' and flew very close to the FAT on L base leg whilst trying to visually acquire the B737. Moreover, one Member thought the TI given by the ADC did not give sufficient information on the B737's position (range and bearing from aerodrome or a geographical position) to the PA28 pilot for him to build and update his mental 'air picture'/situational awareness of the fluid situation. Members concluded that the cause of the Airprox was that the ADC cleared the B737 and the PA28 into conflict.

The B737 crew had self positioned, as requested, towards final approach but during the 'finals' turn had received a TCAS TA alert then an RA warning on the PA28 at about the same time as the ADC passed TI on it. The RA guidance was followed, which became a go-around, during which the PA28 was seen by the B737 crew in their 11 o'clock range 600-700ft turning away to the S and 300ft below. The PA28 pilot had commenced a RH orbit just to the S of the FAT and had visually acquired the B737 as it passed 1000m away and 400ft above to the N of his position during its TCAS manoeuvre. The radar recording had revealed separation at the CPA in the region of 0·3nm horizontally and 400ft vertically. Although this had the potential for a more serious incident, the Board agreed that the timely and robust actions taken by the B737 crew had quickly and effectively removed any risk of collision.

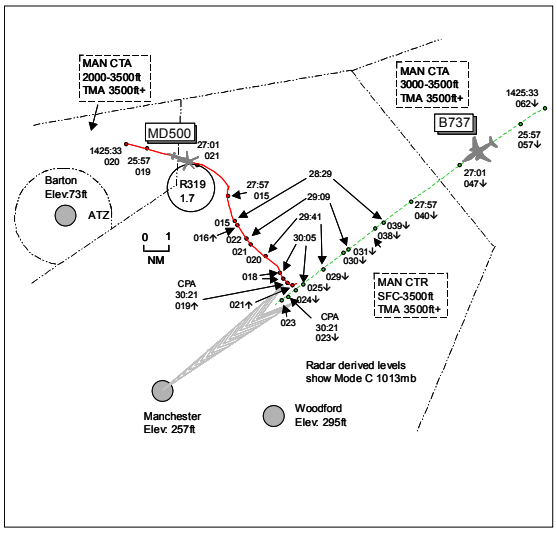
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Liverpool ADC cleared the B737 and PA28 into conflict.

Degree of Risk: C.

AIRPROX REPORT NO 197/05

Date/Time:	23 Oct 1430 (Sunday)	
Position:	5325N 00208W (6nm FIN APP RW24R Manchester - elev 257ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-400	MD500
Operator:	CAT	Civ Pte
Alt/FL:	2000ft↓	NR
	(QNH 1011mb)	(N/K)
Weather	IMC KLWD	VMC CLOC
Visibility:		>10km
Reported Separation:		
	300ft V/1nm H	500ft V/3nm H
Recorded Separation:		
	400ft V/0·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Manchester IFR and in receipt of an ATS from Manchester Tower squawking 7344 with Mode C. They had been cleared for an ILS approach to RW24R and were descending at 800fpm at 160kt. Approaching 2000ft QNH they received a TCAS TA alert then an RA 'monitor vertical speed' and then 'adjust vertical speed'. The TCAS commands were followed (only lasting about 3sec and 100ft max deviation) before ceasing which allowed the crew to continue their approach. The intruder was not seen visually as they were in IMC but TCAS indicated the other ac approached from their R before passing behind approximately 1nm away and 300ft below.

THE MD500 PILOT produced a brief report heading 180° at 110kt enroute between 2 private sites at Bolton and near Manchester Airport and in communication with Barton Radio on 122·7MHz squawking an assigned code with Mode C. The visibility was >10km in VMC flying clear of cloud and the helicopter was coloured silver/red. In the cruise, a B737 was seen in their 1030 position about 3nm away crossing L to R and they entered a LH orbit to avoid, assessing there to be no risk of collision.

THE MANCHESTER AIR 1 ARRIVALS reports as he was controlling arrivals for RW24R, APR S called and identified a VFR transit ac which would be crossing the final approach N to S. Workload was high. He noticed the Mode C on the VFR traffic increasing from 1500ft about 1·5nm N of the FAT. He gave TI to the B737 flight and the ATM indicated that the VFR traffic passed behind the B737, which continued its approach. Later the B737 crew reported that they would be filing a traffic report.

THE MANCHESTER APR S reports receiving a telephone call from Barton requesting clearance for a helicopter (MD500) to route from Bolton to near Woodford. He cleared the flight, through Barton, to R base for RW24R remaining N of final approach and to contact him on 119·52MHz whilst retaining a squawk of 7350 which was still selected from the MD500's previous transit of the Manchester Zone. At this time the MD500 was seen already to be inside the Zone NE of Barton. Barton telephoned again minutes later to confirm the cleared altitude for the helicopter which was not above 1500ft but it was observed to be at 2000ft S'bound to the N of the FAT at about 5nm final. After making blind transmissions to ascertain if the MD500 flight was on frequency, he telephoned Barton to instruct the MD500 flight to take up an immediate LH orbit owing to the subject B737 descending on the RW24R ILS. The MD500 was seen to continue tracking S'bound maintaining 2000ft converging with the B737 before commencing a L turn. At this stage the MD500 pilot called on frequency and was told to continue the LH orbit whilst he queried the MD500 pilot's clearance limit, which was unclear. The MD500 flight was eventually cleared to cross the FAT towards Woodford. Later the MD500 pilot telephoned the Watch Manager and said that the B737 was in sight 'for some time'.

UKAB Note (1): Met Office archive data shows the Manchester METAR EGCC 1420Z 19005KT 9999 FEW018 SCT023TCU BKN060 13/10 Q1011 NOSIG=

ATSI reports that the MD500 flight, operating VFR, established communication with the Barton FISO at 1425. The pilot reported *"out of a private landing site at Bolton inbound to a private landing site in the Manchester Zone at Woodford. We've got about four miles to run to your field we'd like to go overhead at two thousand feet if possible and if possible if you could have a word with Manchester Zone going through their Zone"*. The FISO requested the pilot to report in the overhead at altitude 2000ft. Barton telephoned Manchester Approach to request Zone entry for the helicopter, which was reported as 5nm N of Barton, at 2000ft, routeing to land at Adlington (6nm SE of Manchester Airport). The Manchester APR S said that *"can you just put him towards right base for two four right please I'll take him towards remaining north of the approach please"*. The contact frequency, 119·52MHz, was issued and it was agreed that the helicopter would retain the squawk that the APR S could see being displayed, which was from its previous transit of the Manchester CAS and the pilot was informed accordingly. Radar recordings show that the MD500 was actually some 5nm NE of Barton heading SE but no mention of this was made to Barton. The FISO, still believing that the helicopter was routeing towards the airfield, requested the pilot to report approaching the Barton overhead but no response was forthcoming. Shortly afterwards, Barton requested from Manchester the required altitude for the MD500 which was stated as not above 1500ft. Although no read back of this altitude was received, the pilot was advised accordingly. Shortly after 1429, Barton passed Manchester's zone entry clearance to the MD500 pilot *"clearance from Manchester not above altitude one thousand five hundred feet once within the zone and to remain north of the final approach track to route towards right base runway two four right"*. Because a read back was not forthcoming the FISO continued *"just read that back please not above altitude one thousand five hundred feet VFR right base for two four right"*. This time the pilot responded *"not above fifteen hundred feet right and heading for right base for two four for Manchester Airport"*. (NB. He did not read back for 24**R** or to remain N of the approach and no QNH was passed.) The pilot was requested again to report in the Barton overhead. The radar recording shows that by this time the MD500 was SE of Barton already on R base for runway 24R. Having tried unsuccessfully to contact the MD500 on the Approach frequency agreed, the APR telephoned Barton, somewhat later than ideal, saying *"Tell (c/s) lefthand orbit now no further south"*. By this time (1429:40) the subject ac were approximately 2·5nm apart, the MD500 at 2000ft Mode C and the B737 passing 2900ft. The helicopter pilot was informed (just after 1430) by Barton *"from Manchester if you take up a lefthand orbit present position please"*. The pilot responded *"Is that a lefthand orbit in our position now"*. This was confirmed and the FISO then added *"no further south than your present position for the moment please and contact Manchester Approach one one nine five two they have your details"*. The pilot replied *"I see the reason now airliner just gone passed us"*.

[UKAB Note (2): The CPA occurs at 1430:21 with the MD500 in a L turn indicating FL019 (1840ft QNH 1011mb) climbing with the B737 passing 0·5nm S of it descending through FL023 (2240ft QNH). The next sweep 8sec later shows the B737 still at 2300ft with the MD500 in its 5 o'clock range 0·8nm turning through an E'ly heading indicating 2100ft Mode C.]

The inbound B737 was controlled initially by the APR S before being transferred to the Director at 1424. Director vectored the flight to the ILS RW24R and once established it was transferred to the Air 1 Arrivals, at 1427, No3 in traffic. At 1429:40, the APR S telephoned the Air 1 Arrivals to warn about the MD500 helicopter, again later than ideal. Approximately 30sec later the Air 1 Arrivals transmitted to the pilot of the B737 *"if you see do see traffic on your righthand side it's going to pass behind you"*. The pilot replied *"TCAS climb"*. Almost straight away the pilot continued *"we're clear of conflict (c/s) resuming the ILS"*. He commented that he never saw the 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.

Members felt that they understood the 'rationale' of the MD500 pilot's mindset. Intending to transit through the Barton ATZ before the Manchester CTR, a request for zone entry through the Barton FISO to Manchester ATC would reduce the cockpit workload of RT transmissions and frequency changes. The Manchester APR S had received the request from the FISO, issued the clearance for relay to the MD500 pilot and would have assumed that the clearance had been passed straight away. Members wondered why the APR S did not make comment during this exchange with Barton as the MD500 was not 5nm N of Barton but to the NE. Unbeknown to APR S, the FISO was awaiting the MD500 pilot to report approaching the Barton overhead (O/H) before passing the zone

entry clearance. Shortly after this the FISO had clarified the altitude required by the APR by which time the MD500 was inside the Class D CTR. It was felt that the APR should at this point have told the FISO to transfer the MD500 immediately to his frequency as the ac continued towards the Manchester FAT. Pilot Members believed that the MD500 pilot had shown poor situational awareness during the encounter. The helicopter did not route O/H Barton and the pilot did not inform the FISO at any time that the routeing had changed to pass clear to the NE of the ATZ, even though the FISO had on 3 occasions asked for reports with reference to the Barton O/H. Furthermore, it was not until 4min after the MD500 flight made its initial call to Barton that any zone entry clearance was passed to the MD500 pilot by the FISO. Even though the MD500 pilot had requested ATC entry clearance in reasonable time, it was the pilot's responsibility to remain clear of CAS at all times until positive clearance had been received. This was not done. It was clear that the MD500 pilot entered the Manchester CTR without clearance, a part cause of the Airprox. Even though the ATC clearance relayed to the MD500 had become diluted during the RT exchange, the FISO had obtained a positive read back from the MD500 pilot of the cleared altitude of 1500ft and routeing via R base. However, it was apparent from the radar recording that the pilot had climbed above that level and, in doing so, the MD500 pilot did not comply with the ATC instruction and flew into conflict with the B737. This was the second part cause of the Airprox.

Eventually, after the APR S had tried to establish RT contact with the MD500 flight when the situation had deteriorated further, he had telephoned the Barton FISO and told him to instruct the MD500 pilot to orbit LH and route no further S. After this instruction was passed to the MD500 pilot, which needed to be repeated, the FISO told the helicopter pilot to contact Manchester. It appeared from the MD500 pilot's reply that it was only then that the conflicting B737 was seen on final approach, as it passed 0·5nm to the S. The B737 crew had received a TCAS TA alert on the approaching helicopter which was quickly followed by an RA 'monitor vertical speed' command. The ensuing 'adjust vertical speed' guidance was followed, the B737 crew adjusting their ROD briefly before continuing their approach when clear of conflict. The radar recording shows the MD500 SE'bound on a track to pass behind and below the B737 with 400ft and 0·5nm separation at the CPA with the B737 briefly adjusting its flightpath in response to the TCAS warning after the subject ac had passed. All of these elements when combined were enough to allow the Board to conclude that safety had been assured during the encounter.

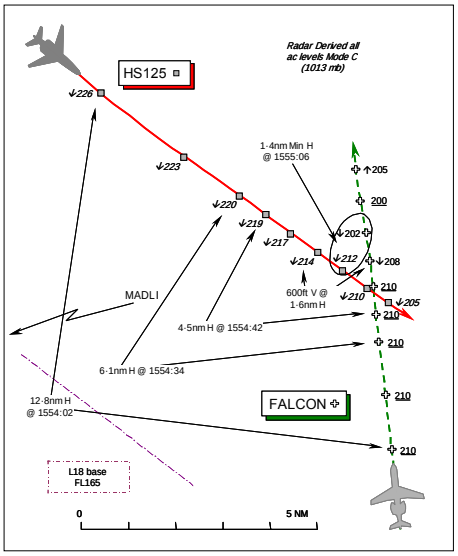
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The MD500 pilot entered the Manchester CTR without clearance and then did not comply with his ATC instructions and flew into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT NO 198/05

Date/Time:	9 Nov 1555	
Position:	5215N 00232W (17nm ENE of MADLI)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Falcon 20	HS125-700
Operator:	Civ Comm	HQ STC
Alt/FL:	FL210	FL210↓
Weather	VMC Nil cloud	VMC Nil cloud
Visibility:	10km+	Unlimited
Reported Separation:	Not seen	500-1000ft V/1-2nm H
Recorded Separation:	600ft Min V @ 1·6nm H 1·4nm Min H @ 1000ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FALCON 20 PILOT reports he was in transit from Bournemouth to Teesside and in receipt of a RIS from SWANWICK MILITARY on UHF - 275·35MHz – squawking A6401 with Mode C. The ac has a blue/white livery and the HISLs were on. TCAS is fitted.

Flying level at FL210 in VMC with no cloud and an in-flight visibility of 10km+ approaching a position 17nm ENE of MADLI, heading 022° he thought, at M0·65, traffic - the HS125 - was reported by ATC. The other ac, which had also been observed on TCAS from a range of about 20nm, was descending towards them from their 11 o'clock position whereupon TCAS enunciated a TA. An RA was then triggered commanding a descent so the PF disengaged the autopilot and followed the RA guidance whilst the PNF advised SWANWICK MILITARY of the TCAS descent. Their ac was descended to about FL195 he thought [the radar recording shows FL200] before TCAS enunciated "clear of conflict" whence ATC was advised they were climbing back up to FL210. Apparently, the HS125 crew advised they had seen his Falcon. Although they did not see the HS125 themselves, it appeared that it had directly overflown his ac but he was not able to quantify the minimum separation. He assessed the risk as *"high"*.

THE HS125-700 PILOT reports he was in transit from Valley to Northolt on an IFR FPL in VMC with nil cloud and unlimited visibility, in receipt of a RIS from SWANWICK MILITARY on UHF. The ac was crewed by two pilots and is coloured white. The HISLs were on and TCAS is fitted.

Heading 120° at 380kt in descent through FL210, traffic information about the Falcon was passed by ATC and acknowledged. The rate of descent was reduced by more than 500ft/min and a heading change of approximately 10° to starboard was made to avoid the Falcon until it was spotted visually at a range of 3-5nm some 500-1000ft below his ac. Further updates were given about the Falcon's position by ATC and the minimum horizontal separation was 1-2nm as the Falcon crossed ahead from R – L and passed to port, slightly below his ac. At no time following visual acquisition of the Falcon was there any possibility or danger of a collision between the two ac.

He stressed that avoiding action had been taken until they were visual and he assessed that there had been adequate spacing with no threat of collision. He added that they were operating under a low workload with no distractions and were aware of the situation throughout.

UKAB Note (1): A subsequent telephone call revealed that the HS125 crew received only a TA, an RA was not enunciated.

THE HS125-700 PILOTS' STATION comments that appropriate action was taken by the HS125 crew and there was no risk of collision. However, the message is clear, caution must be maintained given the density of traffic in the South of England.

MIL ATC OPS reports that the Falcon was northbound through the "Shawbury Triangle" at FL210 under a RIS from the Swanwick (Mil) CENTRAL (Tactical L) controller (CEN). CEN was simultaneously controlling the HS125 routeing from Valley to Northolt via Brize Norton. At 1552:55 the HS125 requested descent to FL60 which was approved. At 1553:28, as the HS125 was leaving CAS, CEN transmitted *"Radar Information.....traffic in your right 2 o'clock 12 miles crossing right left, northbound FL210"*, to which the pilot replied *"looking."* Some 35sec later at 1554:03, CEN advised the Falcon crew *"traffic left 11o'clock 10miles crossing left-right descending through FL225"* which the pilot acknowledged. At 1554:35, CEN called the Falcon to the HS125 crew "[HS125 C/S] *previously called traffic now 12 o'clock, range 4 miles, crossing right left"* and then the HS125 to the Falcon crew, "*…traffic left 11 o'clock range 3 miles... ... reciprocal descending now through FL220."* Shortly afterwards at 1554:52, the Falcon crew reported *"...TCAS descent"* and moments later at 1554:56, the HS125 pilot reported that *"...we've got the traffic in sight...".* The Falcon pilot reported clear of the confliction and, at 1555:13, that he was returning to FL210. There followed an interchange between CEN and the Falcon pilot confirming that the manoeuvre had been in response to a TCAS RA and at 1557:01, the pilot of the HS125 transmitted to CEN *"...we had the traffic in sight as we went down."*

Analysis of the Clee Hill radar recording at 1553:30 shows the HS125 leaving CAS 5nm to the SE of ELGAR [the next reporting point 15nm N of MADLI], tracking SE and descending slowly through FL230. At the same time the Falcon is 19.8nm SE of the HS125, tracking N indicating level at FL210. When CEN passed traffic information to the Falcon crew at 1554:03, the ac were 12·8nm apart with the HS125 descending slowly through FL225 to the NW of the Falcon. At 1554:35, the HS125 indicated FL220 Mode C with the Falcon at 12 o'clock - 6·1nm maintaining FL210. Shortly afterwards at 1554:43, the ac are 4·5nm apart with the HS125 indicating FL219 and the Falcon still indicating FL210. When the Falcon crew reported descending in response to the TCAS RA, the ac are 3nm apart with the HS125 indicating FL217 and the Falcon indicating FL210. By 1554:58, the Falcon is 1·6nm E of the HS125 indicating FL208, some 600ft below the HS125 indicating FL214. On the next sweep at 1555:06, the ac are at the point of minimum horizontal separation of 1·4nm apart, the HS125 indicating FL212 in the 7 o'clock of the Falcon descending through FL202, thereafter the ac continue to diverge as the HS125 draws astern of the Falcon. Swanwick (Mil) reports that analysis of the Mode S data shows that the HS125 maintained a descent rate of 500ft/min during the period that traffic information was being passed and that the descent rate increased to 2200ft/min when within 5nm.

It is clear that CEN passed timely and regular traffic information to both ac crews commensurate with the provision of a RIS and, with the exception of the first call, the ranges and bearings were accurate. Since the HS125 pilot did not report visual contact to CEN until after the Falcon crew had reported the TCAS RA, and the latter did not spot the HS125 visually at all, the controller acted correctly by continuing to update traffic information to both pilots.

HQ STC comments that the controller passed timely and correct information to both crews and this allowed the HS125 crew to visually aquire the Falcon and avoid it visually. This action would have been effective without the intervention of TCAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear from the comprehensive Mil ATC Ops report that both flights involved here were in receipt of a RIS from the same controller who had conscientiously provided comprehensive traffic information to both acs' crews. The Board agreed that the controller had provided a sound service to the two crews here and clearly no responsibility for the separation of the two ac was implied under the requested RIS which is, in essence, a traffic information service to assist pilots to acquire other ac visually and thus enable them to afford visual separation as needs be. Here the HS125 crew, who had a responsibility under the 'Rules of the Air' to give way to the Falcon, had acquired the twin-jet visually from a range of 3-5nm, the HS125 pilot had reported, whereas the Falcon crew had not seen the HS125 at all. Whilst it had subsequently been determined that the HS125 crew had only received a TA, the Falcon crew had reported receiving an RA commanding a descent to avoid the HS125. Whilst CAT pilot

Members opined that it was feasible for an RA to be generated in only one of the two ac involved, pilot Members were surprised that a co-ordinated RA had not resulted. The STC Member stated that the SOPs for military pilots relating to TCAS RAs were no different to those used by their civilian counterparts, insofar as there is no dispensation for pilots to disregard an RA if the other ac is sighted visually and CAT pilot Members explained that ICAO PANS-Ops allow no pilot prerogative in this respect. From the other cockpit the Falcon crew had acquired the HS125 on TCAS from 20nm away and seemed content to maintain their course until the HS125's proximity, coupled perhaps more importantly with its descent vector, triggered a DESCEND RA. A CAT pilot Member opined that whilst the HS125 crew had sighted the Falcon and were quite content with the resulting separation, they had probably given little thought to the potential for an RA when passing so close to a TCAS equipped ac. Moreover, it would have been helpful if they had reported earlier to the controller that they were visual with the Falcon and the RT call might also have been picked up by the Falcon crew themselves. Whilst it was possible that the HS125 crew might have selected their TCAS to 'TA only', this would be most unlikely. However, the STC Member stressed that as the HS125 crew had not received an RA they were probably entirely content with the situation. Pilot Members stressed the importance of giving other ac as wide a berth as feasible so as not to breach the invaluable safety net of TCAS, seemingly unnecessarily. Nevertheless, the radar recording supported the HS125 pilot's contention that he had taken positive action to avoid the reported Falcon until it was acquired visually. Whilst not doubting that the HS125 crew had believed that they had afforded adequate separation and were always going to pass astern of the Falcon, TCAS was still triggered. Clearly the Falcon crew did not know at the time that the HS125 crew were entirely cognisant of their ac and was compelled to follow the RA. A controller Member stressed the importance of pilots informing ATC about TCAS RAs, for controllers are not then permitted to intervene but merely to update pilots with traffic information if necessary until they report clear of the conflict, a point worth repeating here. As it was the Falcon descended 1000ft to FL200 but this descent was not initiated until after the ac was clearing through the 12 o'clock of the HS125. A controller Member suggested this was merely a sighting report of traffic displayed on TCAS but pilot Members considered that this Airprox would probably not have been raised if the HS125 pilot had not flown so close as to trigger an RA. Whilst that in itself was not a singular reason to file an Airprox, the Falcon pilot, unsighted on the other ac, was clearly concerned enough to report it. The Board concluded that this Airprox had been caused because the HS125 crew flew close enough to the Falcon to induce a TCAS RA. However, given that the resultant minimum vertical separation of 600ft occurred as the HS125 descended abaft the Falcon's beam, whilst fully in the view of the HS125 crew 1·6nm away and after the Falcon had already crossed ahead and was opening to port, Members agreed unanimously that no risk of a collision had existed.

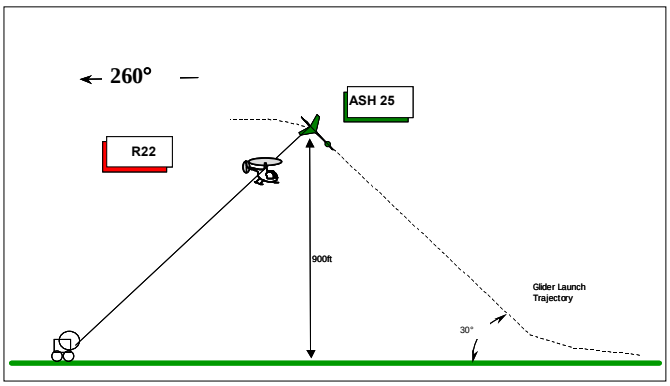
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The HS125 crew flew close enough to the Falcon to induce a TCAS RA.

Degree of Risk: C.

AIRPROX REPORT NO 199/05

Date/Time:	13 Nov 1408 (Sunday)	
Position:	5611N 00320W(Portmoak Airfield - elev 360 ft)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ASH 25	Robinson R22
Operator:	Civ Club	Civ Pte
Alt/FL:	900ft	1500ft
	(QFE)	(N/K)
Weather	VMC CLOC	VMC
Visibility:	50nm	30km
Reported Separation:		
	200ft V/200m H	NR
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCHLEICHER ASH 25 PILOT reports that he was on a winch launch, heading 260° at 60kt, at the W end of the airfield, with a pitch attitude which was initially 30° nose up then pitching down to 20° near top of launch. On passing approx 900ft agl [1,260ft amsl] a grey and blue Robinson helicopter appeared from under the nose about 200m to his left and travelling from R to L [heading SE]. By the time he first sighted the helicopter the threat had already passed and he realised at 1000ft agl that there was no need to gain any more height as at that point there was about 200ft vertical separation. (He could have climbed to 1200ft agl on the launch if needed). If the helicopter track had been displaced 200m further to the R there would have been a severe risk of collision.

THE ROBINSON R22 PILOT provided a very brief report dated 27 Dec, some 6 weeks after the event. He stated that he was flying from Perth to Perth at 1,500ft [altimeter setting not reported] in a yellow helicopter [this could not be reconciled with a photograph of the helicopter which shows it to have a white and blue colouring]; strobes and nav lights were on. He did, however, provide a sketch of his route on a map that showed that his intended route was 4nm to the W of the glider site at Portmoak. During the flight he did not see any other ac.

UKAB Note (1): The analysis of the radar recording was inconclusive. More than one primary-only contact, thought to be gliders, can be seen in the area of Portmoak at and immediately after 1407:30. Shortly after, at 1408:55, a contact squawking 7000NMC is seen to pop up 1nm NW of Portmoak and track SE directly over the glider site. On reaching the Firth of Forth near Kirkcaldy the contact turned back to the NW tracking towards Perth aerodrome and disappeared from radar close to the Perth VOR. Projecting this track to Perth aerodrome gave an ETA of about 1433.

UKAB Note (2): The track taken by the 7000NMC squawk does not match the planned track of the R22 from its pilot's sketch, diverging further to the E and extending several miles further to the S.

UKAB Note (3): The Perth Aerodrome Movement Log shows that the R22, thought to be the one involved in the Airprox, departed to the SW at 1358 and landed back at 1436.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board again observed that flying over glider winch launch sites is a most hazardous activity. Even if gliders can sometimes be seen and avoided, the cable below them is generally almost invisible and is arguably even more lethal, acting like a 'chain saw' if flown into.

A specialist colleague briefed Members on the specific characteristics of the Portmoak glider launch site and equipment. In brief it was fortunate that the glider was not at a higher nose-up attitude, as would have been the case at many other sites, as this had allowed its pilot to see the helicopter and make a decision that no avoiding action was needed by him. This incident was a salutary reminder to glider pilots that lookout even in the busy launch period can be a lifesaver.

The Board was not able to prove without doubt that the R22 traced was the one that flew over the launch site; many of the facts however weighed heavily that it was. Members noted the detailed description and the colour scheme given by the glider pilot; the take off and landing times from the Perth ATC log and the track of the ac returning to Perth which was shown on the radar recording to be directly over the gliding site.

Assuming that the R22 was the one involved, Members considered why the pilot had deviated so far from his intended track. They could not suggest any explanation other than a simple navigational error, made despite the obvious visual clues of the M90 Motorway and Loch Leven just to the W of the gliding site and the unique hill formations to the N and S. The CAA VFR chart was examined and the glider site was found to be clearly and accurately depicted. Notwithstanding the apparently contradictory information, the Board concluded unanimously that the R22 traced had been the one involved in the incident but even specialist Members could offer no explanation for the pilot flying over the site.

Members also considered the actions of the glider launch party and winch driver but considered that they would not have been in possession of any information leading them to terminate or delay the launch or in any other way to prevent the incident.

Having considered all the information available, the Board concluded that the sole cause of the incident had been the R22 pilot overflying the glider site without seeing the glider. Members also agreed unanimously that this action had compromised the safety of both his helicopter and the glider but by good fortune the flightpath of the R22 had been such that it was not in direct conflict with that of the glider, the pilot of which had little opportunity to take any avoidance.

PART C: ASSESSMENT OF CAUSE AND RISK

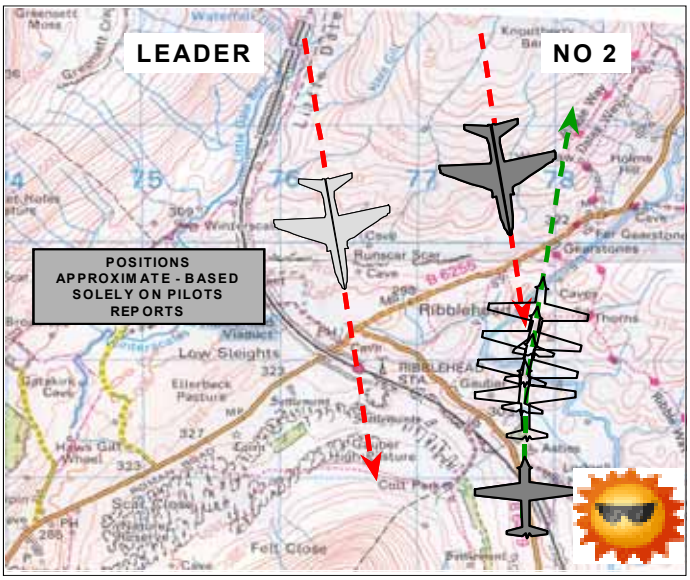
Cause: The R22 pilot flew over a notified and active glider site below cable release height into conflict with a launching glider and its cable which he did not see.

Degree of Risk: B.

AIRPROX REPORT No 200/05

AIRPROX REPORT NO 200/05

Date/Time:	18 Nov 1055	
Position:	5413N 00220W (1nm E Ribblehead Viaduct)	
Airspace:	UKDLFS LFA17	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tucano	Hawk
Operator:	HQ PTC	HQ PTC
Alt/FL:	300ft agl (RPS 1020 mb)	250ft agl (RPS 1023 mb)
Weather	VMC CLOC	VMC CLOC
Visibility:	>50km	>10km
Reported Separation:	100ft V/0ft H	0ft V/200m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO PILOT reports flying an instructional sortie with a student pilot in the front seat of a black Tucano ac with HISLs and landing lights selected on. They were listening on the LFS common frequency and squawking 7001 with Mode C. While they were heading N at 240kt and at 300ft agl, the QFI in the rear seat called visual with the Westerly ac of a slightly swept battle pair of Hawks. The student in the front seat did not acquire this ac but picked up the Easterly one of the pair directly on their nose, primarily because of the nose light. The QFI was initially unsighted but became visual as soon as he moved his head to one side and by that stage the Hawk was between 0.5 and 0.75nm away. He immediately initiated an emergency break up and to the right pulling 7.9G [an overstress]. Although they passed about 100ft above and very slightly to the R of the Hawk the horizontal component did not have time to take effect. No reaction was seen from the conflicting ac. He assessed the risk of collision as being very high.

THE HAWK PILOT reports flying solo as a QFI and number 2 of a pair of black Hawk ac on a training sortie in LFA17. At the time of the incident he was squawking 7001 with Mode C, operating on a tactical frequency and was the LH element of a two ship of Hawks in 2000yd battle formation heading 167° at 420kt and flying visually at 250ft AGL. As he was about to descend off some high ground a Tucano appeared from below and slightly to the R of his 12 o'clock, 200m away. It was already in a climbing break heading to his L and before he had time to react, the Tucano was clear of his ac. The Tucano passed from below his ac, just right of the nose, up through his 12 o'clock and passed down his LHS at a minimum distance of about 200m. At the time he had been heading into sun and he assessed the risk as being moderate as the other ac was avoiding him.

UKAB Note (1): The Hawk leader was flying dual with a student in the front seat.

UKAB Note (2): The incident occurred below recorded radar cover.

THE TUCANO STATION comments that this close encounter once again highlights the effectiveness of the Hawk nose light as an anti-collision measure. However it does rely on the pilot looking in the right place at the right time and restricted angles of view present their own problems. The provision of TCAS would most probably have resolved this potential collision much sooner, significantly increasing safety margins. The Tucano is expected to have TCAS capability from Feb/Mar 06, with fleet embodiment by Mar 07.

UKAB Note (2): At the time of writing 4 Tucanos have TCAS fitted and the programme was ongoing. Initial reports are that it has proved very successful.

THE HAWK STATION comments that this was a fairly close call in circumstances when it would have been difficult for the Hawk pilot to see the other ac. While maintaining the tactical formation and descending into lower ground much attention would have been focused on the other Hawk ac and it would have been difficult to spot the dark Tucano against the similar background. This event has once again reminded crews of the need for a high level of lookout at all times.

HQ PTC comments that this was a close encounter in the UKLFS that was resolved by an aggressive avoiding manoeuvre by the Tucano. TCAS, once fitted, should allow future conflicts to be resolved much sooner.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar video recording (which did not show the incident) and a report from the ac operating authority.

The Board considered that notwithstanding the lack of confirmatory information, the geometry of the incident was clear from the pilots' reports and accurate positions therein. Members noted that the Hawks, for good operational training reasons, had been flying S into sun in mountainous terrain which restricted their pilots' ability to detect and avoid other ac in a timely way. When it first appeared, the Tucano was head-on and below - possibly well below - the horizon from the No2 Hawk pilot's elevated viewpoint. Nevertheless the main reason for flying in battle formation is to provide mutual cross-cover and to allow the early detection of incoming fighters. Members determined therefore that at least one of the Hawk pilots should have seen the Tucano earlier, suggesting that the cause of the incident had been a sighting issue.

Specialist opinion was that although it emerged from behind the terrain late, probably at a distance slightly in excess of 2nm, the front seat Tucano pilot (the student) should have been able to acquire the No2 Hawk - which was head-on to him - from its headlight as it appeared above the horizon, somewhat earlier than the 0.75nm reported by the crew. However, even at 0.75 nm (which equates to 4 sec at their closing speed) the front seat Tucano pilot had time, albeit limited, to react to the Hawk that remained on a steady closing course. In the event the QFI took control when he saw the Hawk fractionally (probably about 1 sec) later: therefore the reaction had been delayed and the separation between the ac was reduced.

Members agreed that this had been a very close encounter. However, the Tucano instructor's avoidance manoeuvre had been effective (at least in the more effective vertical plane) in deconflicting the flight paths of the 2 ac. Members also agreed that due to the lateness of the crew's reaction there had been a compromise to the safety of both ac. There was much discussion regarding the degree of risk; on reassessment however a substantial majority of Members agreed that, due to the Tucano instructor's successful avoidance manoeuvre, there had not been any actual risk of collision.

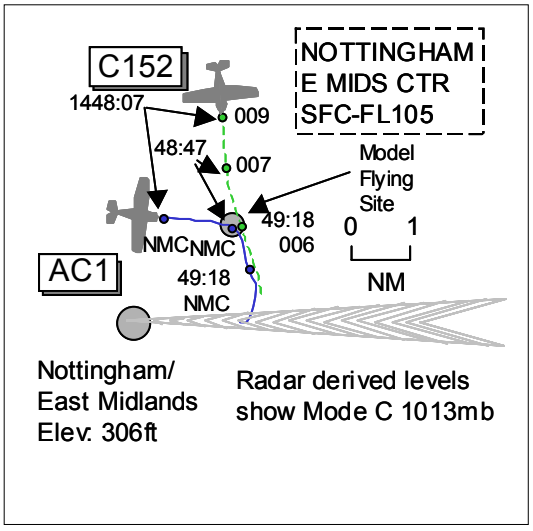
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sightings by the Hawk crews and late sighting by the Tucano crew.

Degree of Risk: B.

AIRPROX REPORT NO 201/05

Date/Time:	19 Nov 1449 (Saturday)	
Position:	5252N 00117W (2·5nm NE East Midlands - elev 306ft)	
Airspace:	CTR/ATZ	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	C152	Model ac
Operator:	Civ Trg	N/K
Alt/FL:	1000ft↓	
	(QFE 1022mb)	(N/K)
Weather	VMC SKC	
Visibility:	9km	
Reported Separation:	Nil V/30ft H	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying a dual training sortie from East Midlands and in communication with East Midlands Tower on 124·0Mhz squawking 7000 with Mode C. The visibility was 9km in SKC VMC and the ac was coloured white/blue with strobe, nav and anti-collision lights all switched on. Whilst on R base leg for RW27 heading 180° at 90kt and 1000ft QFE 1022mb, a model ac was first seen as it 'shot up' through their flight path. It appeared to be dark in colour although at the time he was facing into sun. The model came from below, very close, and only just R of the nose, unseen until it passed their level. It was seen to roll over the top of the climb in a loop towards them and descend vertically back down through their flight path. A slight roll to the L was taken to avoid but the model was travelling at a good rate as it passed, leading them to believe that the manoeuvre the model performed was not that of an out of control model. He estimated the miss distance as 30ft horizontally at the CPA, as the model descended vertically. He went on to say that had the model hit them, the damage caused would have been quite serious especially if it had hit the fuel tank, flap or aileron when it would be a more serious case.

UKAB Note (1): During a subsequent telephone conversation with the UKAB Secretariat, the instructor explained that he was familiar with the model ac operations in the Airprox position having flown for many years from East Midlands. He had seen models before but they were always well below cct height. He had followed another ac into the cct and both it and the model had appeared dark in colour, owing to the light hazy backdrop flying towards the sun, even though the preceding ac was known to be light in colour.

THE MODEL AC FLYING CLUB collated several reports from model ac operators present at the time of the incident. The Club have been operating at the site for over 40 years and are fully aware and conscious of the safety requirements of their co-existence with East Midlands light ac cct traffic. All members are advised of the situation during the formal induction section of the enrolment procedure. The Club continues to operate under the umbrella of the British Model Flyers Association (BMFA) and strictly follow its codes of practice and relevant Air Navigation Orders. The Model Club are negotiating with local land owners to relocate some 1km to the N. Factors influencing this move include flying training sorties from East Midlands passing over the existing site, sometimes at low level, and the emergence of an adjacent shooting club which discharges weapons in towards their site. The proposed new site will be to the N of the light ac cct, in line with the power station cooling towers, which will preclude the overflying of the site by ac low level in the East Midlands cct.

On the day of the Airprox, one member flew a yellow coloured 50" span aerobatic model early PM and he and others remarked that a light ac flying in the vicinity appeared to be very low directly over their RW. He flew his model well away from the ac, understanding that models have to keep well away from full size ac. Another member flew a similar sized model, coloured white/red/blue, briefly during the afternoon, as there were engine problems, making the flights of short duration. He was aware of the occasional passage of light ac over the field but was not aware of any model ac flying that would have been considered too high. Two other members were

not flying but witnessed flying operations and saw a light coloured Cessna ac flying at 500ft agl on the downwind leg in the East Midlands cct, passing O/H and to the S of their site. Another member flew his model on several occasions during the afternoon but did not see any light ac in the immediate vicinity of his model whilst he was operating at and below 300ft. These flights were seen by others as he was to the NE of the site RW and the light ac passed 'behind' his position to the S.

THE NOTTINGHAM/EAST MIDLANDS ADC reports operating as the combined AIR/GMC controller when the C152 pilot reported a 'near miss' with a model ac shortly after commencing descent on R base to land RW27. He, the ADC, was unaware of any model ac flying in the vicinity. Later, the pilot telephoned him to submit an Airprox report.

The East Midlands METAR shows EGNX 1450Z 00000KT 9000 SKC 05/02 Q1031=

ATSI comments that the Nottingham/East Midlands ATC Manager was unaware of any model flying operations from the subject site.

UKAB Note (2): The Airprox is not seen on recorded radar. The subject C152 is seen at 1448:07 approx 4nm NNE of East Midlands tracking 175° squawking 7000 showing FL009 (1170ft QFE or 1470ft QNH) on wide R base leg for RW27 with another ac (AC1) squawking 7000 NMC 1·75nm N of East Midlands downwind RH in its 2 o'clock range 2nm. AC1 commences a turn onto R base, passing O/H the site turning through a heading of approximately 110° at 1448:47 by which time the subject C152 is 1nm to the N and indicating FL007 (970ft QFE or 1270ft QNH). Shortly thereafter the C152 is seen tracking 165° 1nm in trail of the preceding ac (AC1) and passes almost O/H the model site at 1449:18 maintaining FL006 (870ft QFE or 1170ft QNH). No other radar returns are seen in the area.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of the reporting ac and the model ac flying club operators, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members wondered whether a model ac operator would be able to see what the model was actually doing if flown at the height reported by the C152 pilot (1000ft) even though the model would probably be within radio range. That said and although models weighing <7kg are not height restricted under BMFA guidelines, it would be unusual to fly model ac above 500ft. Another unusual point was the ATSU being unaware that model flying was taking place from a site on the boundary of the ATZ, although it was accepted that normal model flying operations would not conflict with cct traffic. The Model Club had collected reports from their members on the day, none of whom had seen or reported flying a model in close proximity to the reporting C152. Without doubt the C152 pilot had seen the model manoeuvre as it climbed, rolled and then descended through his level, estimating that it passed within 30ft of his ac after he had made a slight roll to the L to avoid it just to the R of the ac's nose. As the size of the model was unknown, Members opined that any estimate of separation would be more difficult without any known reference (e.g. wingspan) as a baseline measurement. Without any further corroborating information available, Members were mindful of assessing the Airprox purely on the limited facts available. Consequently the Board could only conclude that this had been a conflict with an untraced model ac on the boundary of the Nottingham/East Midlands ATZ and that the information available was insufficient to determine the degree of risk.

PART C: ASSESSMENT OF CAUSE AND RISK

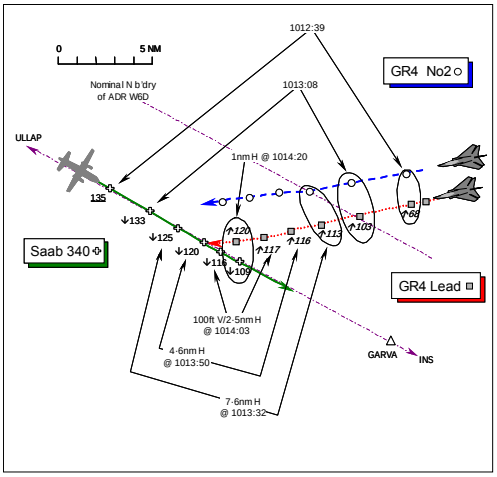
Cause: Conflict with an untraced model ac on the boundary of the Nottingham/East Midlands ATZ.

Degree of Risk: D.

AIRPROX REPORT No 202/05

AIRPROX REPORT NO 202/05

Date/Time:	22 Nov 1014	
Position:	5747N 00446W (27nm NW of INS)	
Airspace:	ADR W6D	(Class: F)
	Reporting Ac	*Reported Ac*
Type:	Saab 340B	Tornado GR4 pr
Operator:	CAT	HQ STC
Alt/FL:	↓FL115	FL120↑
Weather	VMC CLOC	VMC NR
Visibility:	50km	20km
Reported Separation:		
	Nil V/300-500m H	Nil V/2nm H
Recorded Separation:		
	100ft V @ 2·5nm H	
	1nm Min H @ 1100ftV	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340B PILOT reports he was inbound IFR to Inverness from Stornoway, routeing ADR W6D and in receipt of a RAS from Scottish CONTROL on 127·275MHz. A squawk of A7416 was selected with Mode C and TCAS is fitted. There was no cloud and the in-flight visibility was 30km.

Flying in a level cruise at, he thought, FL115 [but actually descending from FL135 to FL115] in VMC at 292kt, heading 128° some 20nm NW of INS, Scottish CONTROL informed them about unknown traffic – the Tornado GR4 pair - in their 11 o'clock position climbing. The other ac was displayed on TCAS in their 11 o'clock at a range of 10nm as an open diamond climbing beneath them through FL43. Although he tried to acquire the traffic visually nothing could be seen, but whilst monitoring the TCAS the ac was shown turning towards them and climbing up toward their level. TCAS enunciated a TA warning of "TRAFFIC TRAFFIC" whereupon a GR4 Tornado was visually acquired some 1½nm away to port in a level turn. Thereafter, they quickly received a "DESCEND" RA demanding a RoD of 1500ft/min. At the same time ATC issued an immediate avoiding action R turn onto 180° with which they also complied. The Tornado GR4 passed down their port side at a range of about 300m at the same level. TCAS enunciated "MONITOR VERTICAL SPEED" and they levelled their Saab 340 at FL100, before climbing back to their assigned level of FL115 and turning back on track for Inverness. He assessed the risk as *"very high"* and reported the Airprox to ATC on RT. Commenting that the other ac may have been departing from Tain Range.

THE TORNADO GR4 PILOT reports he was leading a pair of grey GR4 ac in 'Fighting Wing' formation whilst climbing out from Tain Range following a practise First Run Attack (FRA). On departure from the range they routed to Dornoch Bridge and climbed to FL50 in VMC on a track of 250°(T), with his No2 following "swept" at 1½-2nm, whereupon they free-called SCOTTISH MILITARY on their ICF 249·47MHz for a RIS. The controller advised that they were below radar coverage and so they began a further climb to FL150, heading 260° at 360kt, but SCOTTISH MILITARY instructed them to stop their climb at FL120 because of traffic descending through FL130. This traffic - the Saab 340 - was called at 12 o'clock - 10nm and the controller advised an avoiding action R turn which was commenced. However, his No2 reported that he was visual with the reported traffic and called it to him on an intra formation frequency. He acquired the Saab 340 visually at a range of 3nm, assessed that there was no collision risk so ceased turning and informed Scottish MILITARY that they were visual with the traffic. A 10° level turn was made to avoid the Saab 340 which passed no closer than 2nm away at the same level with "nil" risk of a collision. He cited poor radio communication with SCOTTISH MILITARY as a factor to their cockpit workload.

THE ScACC WEST COAST SECTOR CONTROLLER (W COAST SC) reports that the Saab 340 was southbound from Stornoway to Inverness, receiving a RAS at FL135 on W6D. About 40nm NW of Inverness the crew asked for descent and was instructed to descend to FL115 as per the standing agreement with Lossiemouth. When the Saab 340 was approximately 35nm NW of Inverness, another contact appeared on the displayed Tiree Radar source squawking A4510 to the NW of Inverness tracking SW climbing through FL80 Mode C. Traffic

information was passed to the Saab 340 crew when the other ac – the Tornado GR4 - was in their 11 o'clock at about 10nm. Seeing the '1' in the A4510 squawk, and recognising the squawk being that of ScATCC (Mil) Console 1, he initially attempted to contact Console 1 for information on their direct access (DA) landline. This line was not answered but the Scottish Military ALLOCATOR (ALLOC) line rang immediately. The ALLOC confirmed she was working the A4510 squawk and asked for the type of ATS he was providing to the Saab 340 flight. At this he hung up the line and gave an avoiding action R turn onto 180° to the Saab 340 crew but this call, using the Tiree and Lowther Hill transmitters, was not answered so he changed to the Mangersta transmitter and gave the avoiding action transmission again. Prescribed separation was lost and the Saab 340 pilot reported he was taking "TCAS action" and descending, so he passed traffic information again. When the other ac was approximately 1nm N of the Saab 340, the pilot reported he had seen a Tornado and was climbing back to his cleared level of FL115 after descending to about FL110 during the TCAS RA manoeuvre.

MIL ATC OPS reports that the formation of 2 Tornado GR4s (GR4 formation) climbed out of Tain Range and freecalled the ScATCC (Mil) ALLOCATOR (ALLOC) at 1011:38. The GR4 formation leader reported "[GR4 formation C/S] *pair of Tornado GR4s just climbing out of Tain Range, 1013 set and FL50 requesting RIS*". ALLOC issued a squawk of A4610 and requested the formation leader's intentions. Some RT problems were encountered before at 1012:42 ALLOC stated "[GR4 formation C/S] *I believe you're below my radar cover at the moment*". GR4 formation lead reported their level passing as FL85, requesting FL200 and ALLOC asked the lead crew to squawk 'ident'. The GR4 formation was identified at 1013:09, placed under a RIS and their climb stopped at FL120 by ALLOC. At 1013:16, ALLOC passed traffic information "[GR4 formation C/S] *traffic 12 o'clock, 10 miles, crossing right - left is indicating descending through FL130*". The GR4 formation leader acknowledged the traffic information, whereupon further traffic information was passed by ALLOC at 1013:31, "[GR4 formation C/S] *previously reported traffic in your 12 o'clock, 8 miles, crossing right - left indicating descending through FL125, are you visual*?" GR4 formation lead replied negative and ALLOC advised at 1013:50, "…*suggest a right turn of 30° avoiding action against that traffic, now in your 12 o'clock, 5 miles right - left indicating desc…"* This transmission was interrupted 7 sec later by a "*Visual"* call from the GR4 formation leader. The GR4 formation climbed to FL200 and then requested a frequency change.

Analysis of the Tiree Radar recording shows the Saab 340 40nm NW of Inverness tracking southeasterly along ADR W6D maintaining FL135 Mode C. The GR4 formation lead ac appears in the Saab's L 10 o'clock - 18nm, crossing R - L tracking 260°, climbing through FL60 Mode C and squawking A4510, with the wingman positioned about 2nm N of the lead ac. The leader is seen to squawk 'ident' at 1013:08, whilst passing FL103, with the Saab 340 in the GR4 formation lead's R 2 o'clock - 10¾nm away descending through FL133. Horizontal separation reduces to 4·6nm at 1013:50, with the lead GR4 indicating FL116 climbing, some 400ft below the Saab 340 descending through FL120 Mode C. Horizontal separation at 1013:57 was 3·7nm and just after the ac cross vertically, 2·5nm horizontal separation is evident at 1014:03, with the GR4 formation lead passing FL117 climbing and the Saab 340 descending through FL116. The next sweep shows the point of minimum horizontal separation of 1nm at 1014:20, but by this stage the combination of the GR4's climb and the Saab's TCAS descent has established 1100ft of vertical separation. No turn is observed from either ac.

The GR4 formation leader called ALLOC on climbout from Tain Range. The formation was below the base of ALLOC's radar cover until approx 1012:57 when the horizontal separation between the GR4s and the Saab 340 was approx 13nm. ALLOC realised that the GR4 formation was squawking incorrectly and applied the 'ident' feature to facilitate identification. ALLOC identified the formation, applied a RIS and stopped their climb at FL120 to try and gain vertical separation against the descending Saab 340 whilst also passing traffic information to the crews. ALLOC passed further traffic information on the Saab 340 at 1013:31 and asked the GR4 lead crew if they were visual. The GR4 leader replied negative and ALLOC suggested an avoiding action turn: however, at 1013:57 the GR4 formation leader interrupted the transmission to report visual contact with the Saab 340. At this stage the GR4s were 3·6nm away from the Saab 340. ALLOC then recleared the GR4 formation to climb to FL200 and the flight continued without further incident.

ALLOC had correctly applied a RIS to the formation and indeed had passed a suggested avoiding action turn to increase the radar separation between the ac. However, the GR4 leader elected to take visual separation against the Saab 340 after becoming visual at a range of about 3·6nm.

ATSI reports that the Saab 340 was inbound to Inverness via ADR W6D. In accordance with standard procedures, at 1003:30, the estimate and squawk were passed to Lossiemouth APPROACH by the ScACC W COAST sector. Traffic levels were low on the W COAST Sector and so one controller was responsible for both the PLANNER and

TACTICAL controllers' duties. The crew of the Saab established contact with the W COAST controller at 1004:15 and reported passing FL79 in their climb to FL135. The controller identified the ac and placed it under a RAS. At 1012:38, the crew requested descent and were instructed to descend to FL115, the standing agreement level. A radar return was visible shortly before the controller issued descent instructions displaying A4510 and indicating FL68 Mode C climbing. At 1013:07, when the Saab 340 was 27nm NW of Inverness, the controller passed traffic information on this contact [the lead GR4] which was observed by him to be some 10nm E of the Saab and tracking towards it and climbing through FL103. As the military traffic continued to converge with the Saab the controller attempted to contact ScATCC (Mil) Console 1 to establish if they were working the aircraft [ATSI Note: 4510 is not a code assigned to ScATCC (Mil), but the correct code allocated to the flight was 4610, which is a ScATCC (Mil) code] but received no answer. Some 26sec after initiating the call, the ScATCC (Mil) ALLOCATOR intercepted it and advised that she was working the traffic. By now, at 1013:32, the lead GR4 was passing FL113 in the climb and the Saab FL125 in a descent. The ALLOCATOR was then heard to pass an advisory R turn instruction to the GR4 formation at the same time as the W COAST controller transmitted at 1013:53, "[Saab C/S] *avoiding action turn right immediately heading 1 8 0°*". The Saab 340 crew did not acknowledge this and so the controller repeated the instruction 9sec later. The crew responded to this second transmission and at 1014:10 advised that they were "*…doing a TCAS avoidance*".

The W COAST controller advised that, under the pressure of the moment, he had mis-interpreted the squawk. He had read it as A4610 and incorrectly tried to contact Mil Console 1 when in fact this squawk is one of the ALLOCATOR's SSR block. Given the geometry of the confliction he was reluctant to give avoiding action to the Saab 340 crew, as he did not feel that there was 'a good direction of turn'. Once he heard the GR4 formation being instructed to turn R, he instructed the Saab 340 crew to turn R also thus taking the ac away from each other. The unit's investigation determined that the horizontal separation was 2·9nm, when the GR4 pair and Saab 340 were at the same level.

HQ STC comments that although the GR4 formation were given an avoiding turn by ATC, the crews became visual with the Saab and elected to continue their climb and track to avoid it visually. It would appear that their visual spacing was insufficient, on this occasion, to ensure that the Saab crew's TCAS was not alerted.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A controller Member familiar with the operation of the ScACC W COAST Sector explained to the Board that the Sector is a geographically-large one and it was unfortunate that the controller had misinterpreted the displayed squawk of the lead GR4. Whereas the controller opted to try to contact ScATCC (Mil) Console 1 in the first instance, this might have had the adverse consequence of delaying the initiation of an avoiding action turn under the RAS being provided to the Saab 340 crew. Although the controller's intent was plain here, insofar as co-ordination might have resulted if he had contacted a ScATCC (Mil) controller in time, a Member thought that given the high closure speed – in excess of 650kt - an avoiding action turn right away might have been preferable in an attempt to preserve what horizontal separation there might have been before seeking co-ordination.

The Mil ATC Ops report had shown that the GR4 leader was in the process of establishing a RIS from the ScATCC (Mil) ALLOC whilst climbing up toward the ADR boundary and thereby closing on the descending Saab 340. It was clear to the Members that the ALLOC had identified the confliction promptly after the GR4's were displayed to her as they climbed into coverage and wisely opted to offer avoiding action even though the leader had only requested a RIS. The avoiding action was firstly a level stop beneath the observed level of the Saab and then, when it was apparent to ALLOC that the airliner was descending through FL125 and it had been established that the lead GR4 crew were not visual, by a 30° avoiding action R turn to preserve horizontal separation. Whilst some might question the ALLOC's response by suggesting an avoiding action manoeuvre under the RIS, in the Board's view this showed sound appreciation of the developing situation by the ALLOC in the short time available. A military controller Member added that the ALLOC's area of responsibility covered an even larger area than the W COAST Sector and controller Members opined that the ALLOC had acted wisely in an attempt to forestall a close quarters situation. At that point however, the GR4 leader having already commenced the R turn away from the Saab advised ALLOC that they had established visual contact, reportedly at a range of about 3nm. So it was apparent that the Saab 340 pilot who reported sighting the GR4s some 1½nm away to port had spotted the other

ac after the GR4 crews had seen the airliner. Although at this point the W COAST controller had already transmitted to the Saab crew an avoiding action R turn onto S after overhearing ALLOC on the landline when the latter called, Members noted that the radar recording did not evince a significant course deviation at this point, despite the instruction being transmitted again on different transmitters. Perhaps this was not surprising as the Saab crew were following the TCAS commanded descent and by that stage could see the GR4s passing 1nm away to the N, the recording illustrated, as the GR4s climbed 1100ft above the Saab 340.

During this encounter Members stressed it was the GR4 leader who elected to establish his own visual separation having sighted the Saab with the assistance of the traffic information provided by ALLOC and a prompt from his No2, but military Members suggested that he had still flown close enough to instil concern on the part of the Saab 340 pilot. Another military controller Member suggested that if the leader had taken the proffered avoiding action advice that had been declined as they closed on the airliner an Airprox might have been avoided but it was clear that this was entirely the GR4 leader's prerogative under the RIS. The HQ STC fast-jet Member observed that despite copious advice, fast-jet crews were still not affording a wide enough margin to passenger-carrying TCAS equipped ac. A CAT pilot Member stressed the importance of the way that TCAS avoidance manoeuvres are predicated on time; he believed that this was important to stress when endeavouring to educate other airspace users about the impact that their ac's proximity - and more importantly their dynamic vectors - will have on the way that RAs are generated in TCAS equipped ac. Military fast-jet crews should be in no doubt that, in general terms, if they point their ac anywhere toward the surveillance 'bubble' of a TCAS equipped ac and fly or climb/descend energetically towards it an RA will invariably result, giving rise to the possibility of concern on the part of the other pilot. The HQ PTC Member echoed the views of his STC colleague and the DASC Advisor explained that this issue had been recognised and DASC were doing their best to proffer appropriate advice to the military aviation community in the UK. Aircrew should note that SOPs compel a CAT pilot to follow any TCAS RA enunciated even if visual with the other ac, the reason being that another unseen ac and not just the one that the pilot might have sighted might have triggered the RA. A CAT pilot Member also cited one effect perhaps not often considered insofar as an airliner crews' justifiable reaction to a TCAS RA might possibly result in an injury to passengers if they were not seated and strapped in. For their part, it was evident that the Saab 340 crew could have done nothing more to avert this encounter in Class F airspace and were promptly complying with their ATC instructions and the RA commanded by TCAS. However one controller Member was of the view that the lead GR4 crew had not paid due regard to the possibility of encountering traffic on the ADR. Following this wide ranging discussion the Board concluded that this Airprox had resulted because whilst crossing an ADR, the Tornado GR4 formation flew close enough to the Saab 340 to initiate a TCAS RA and cause concern to its pilot. However, it was also evident that both crews were aware of each other's ac and had taken complementary actions to avoid each other thereby preventing any possibility of an actual collision. Moreover, as the GR4 leader had climbed above the descending Saab at a range of 2·9nm and passed no closer than 1nm to the N, the Board agreed unanimously that no risk of a collision had existed in these circumstances.

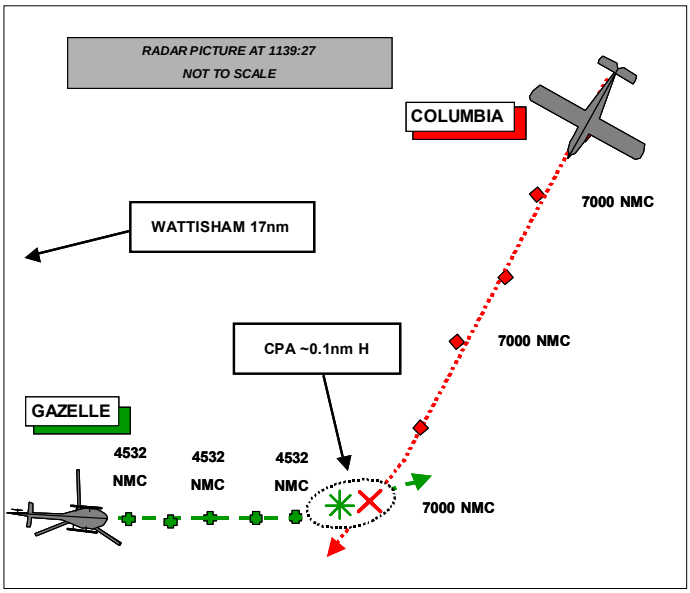
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Whilst crossing an ADR, the Tornado GR4 formation flew close enough to the Saab 340B to initiate a TCAS RA and cause concern to its pilot.

Degree of Risk: C.

AIRPROX REPORT NO 203/05

Date/Time:	22 Nov 1139	
Position:	5207N 00126E (Bentwaters Disused Airfield)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Gazelle	Columbia 400
Operator:	JHC	Civ Pte
Alt/FL:	2300ft (QNH 1038 mb)	2250ft (QNH 1037 mb)
Weather	VMC	VMC HAZE BC
Visibility:	unltd	9km
Reported Separation:	0ft V/150ft H	600ft V/0ft H
Recorded Separation:	~0.1nm (600ft) H/NR V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports heading flying solo with a passenger in a green helicopter on a familiarisation flight, in receipt of a FIS from Wattisham and squawking 4532 [Wattisham]. At the time he was straight and level heading 090° at 100kt while talking to Wattisham about an AH64D [Apache] at Woodbridge approximately 2nm to S. After visually identifying the Apache he looked to the front and saw a single engined low winged ac appear from behind the passenger and cockpit frame, in the 11 o'clock position about 150ft away at the same level. He initiated a hard turn to port as the fixed wing ac appeared to be climbing and turning starboard. He assessed the risk as being very high.

THE COLUMBIA 400 PILOT reports flying a dual private flight from Earls Colne with all lights on squawking 7000 with Mode C selected off. While flying straight and level tracking 215° inbound CLN, he saw a green military helicopter about 5nm to his right and at about 1500ft, apparently in a climb and on a converging track. The ac was displayed on his TCAS showing no Mode C. When the other ac came within 1nm of him he climbed to 2500ft in a right turn to remain visual with it. The helicopter did not change its heading or rate of climb, apparently not taking any avoiding action. Since he kept the helicopter visual throughout he considered there to be no risk of collision. [UKAB Note: The Columbia was in receipt of an A/G service from Earls Colne.]

WATTISHAM APP reports that the Gazelle was under a FIS from him in the Woodbridge/Bentwaters area. After lengthy discussion with three ac, of which the subject ac was one, the Gazelle pilot reported that a light ac had crossed in front of him by 200ft. The other ac was not in communication with Wattisham.

HQ JHC notes that information provided on this Airprox is rather sparse. The solo Gazelle pilot indicates that the Columbia aircraft appeared from behind a blind spot and that the risk of collision was very high. Therefore, this Command is very concerned that the Columbia pilot allowed this situation to develop to a point when an Airprox was filed, despite being visual with the Gazelle for the previous 5nm. JHC note that this has happened on several other occasions and consider it to be basic airmanship to give other airspace users a wide berth.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar video recording, reports from the air traffic controllers involved and reports from the Gazelle operating authority.

The Board was not able to resolve positively the geometry of this incident and in particular why the Columbia pilot had turned right towards the Gazelle rather than away from it and thereby increasing the separation. The Board noted the slightly erratic disposition of the Columbia radar returns, probably due to track jitter, which - depending

on the mean course chosen - could alter significantly the precise geometry of the encounter. One Member suggested that the Columbia pilot might have dropped a wing to keep the Gazelle in sight rather than making any deliberate turn. Also, Members were unable to offer an explanation for the Gazelle turning towards the Columbia. Members considered whether the Columbia pilot might have seen the Apache to the S and not the Gazelle; a further analysis of the radar recording showed that the Apache (also with a Wattisham Squawk) disappeared from the radar, suggesting that it might have landed, in the Woodbridge area a short time before the incident. Members therefore considered it to be unlikely that the Columbia pilot had seen the Apache rather than the Gazelle.

There were two aspects of this incident that appeared to be certain, namely that the Gazelle pilot saw the Columbia late and that he was very concerned by its proximity. That being the case, the Board considered that as the Columbia pilot had been in visual contact with the Gazelle - which had right of way under the Rules of the Air – the Columbia pilot had flown unnecessarily close to the Gazelle.

The Board was unsure as to the type of TCAS fitted to the Columbia and as to what indications or warnings would have been given to its pilot. Suffice to say that the Gazelle, although it was squawking a Wattisham Mode A code, was not squawking Mode C, therefore only a TA (at best) would have been generated.

Notwithstanding the Columbia pilot having seen and avoided the Gazelle, the Board considered that his selected miss-distance had not been sufficient to assure the safety of both ac.

PART C: ASSESSMENT OF CAUSE AND RISK

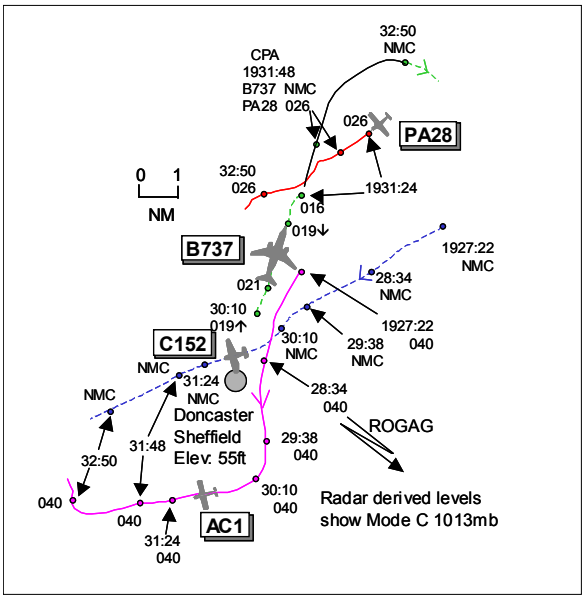
Cause: The Columbia pilot flew close enough to the Gazelle to cause its pilot concern.

Degree of Risk: B.

Contributory Factors: A late sighting by the Gazelle pilot.

AIRPROX REPORT NO 204/05

Date/Time:	NIGHT17 Nov 1932	
Position:	5334 N00057W (6nm NNE Doncaster/ Sheffield - elev 55ft)	
Airspace:	FIR	(Class: G)
Reporter:	Doncaster/Sheffield ADC/APP	
	First Ac	*Second Ac*
Type:	B737-500	PA28
Operator:	CAT	Civ Pte
Alt/FL:	↑FL50	NR (QNH)
Weather Visibility:	VMC CLOC	VMC
Reported Separation:	1000ft V	NR
Recorded Separation:	0·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DONCASTER/SHEFFIELD ADC/APP provided a very full and detailed report with all of the salient points being captured within the ATSI report (below).

UKAB Note (1): Met Office archive data shows the Doncaster/Sheffield METAR as EGCN 1920Z 29006KT CAVOK 01/M02 Q1020=

THE HUMBERSIDE APR reports working a C152 and PA28 en route from the Humber Bridge to Sheffield. He contacted Doncaster and asked if their unit wished to work this traffic, given that both ac would pass adjacent to the Doncaster overhead (O/H), as he could see they had traffic in the vicinity at FL40. The controller declined as a ROGAG departure from Doncaster would be working Waddington and could he speak to them. The Waddington controller also declined to work the traffic and said that they would call back to coordinate if necessary as the Doncaster departure was not for another 5min. He told the traffic (C152) of the pending departure from Doncaster and asked the pilot to report visual with Doncaster airport. As the ac passed N abeam the airport, the APR gave TI on a primary only return which was seen to pass close down the RHS of the traffic before fading from radar. No SSR return was seen on the other ac but the pilot (C152) reported visual with the departing traffic which was believed to be a B737.

THE B737 PILOT reports outbound from Doncaster/Sheffield IFR and in receipt of an ATS from Doncaster squawking an assigned code with Mode C. They had received clearance during their taxy to join CAS on track ROGAG expecting FL160 with a local departure clearance of a RW02 E noise departure climb to FL70. There was a light ac (AC1) holding O/H in the hold at FL40 which was told by ATC to track S of the airfield. They lined up on RW02 and both crewmembers saw the holding traffic O/H tracking S and therefore behind them. An amended clearance to maintain RW heading to FL50 was received followed by take-off clearance. Once airborne heading 020° at 200kt they were cleared for an early R turn to ROGAG but this was declined as proximate traffic appeared on TCAS (C152). Almost simultaneously further TCAS traffic (the subject PA28) was observed closing from their 1 o'clock range about 5nm 500ft above which was then seen visually on a conflicting course above. The FO, PF, was told to level off and then descend from about 2200ft to 1900ft, the MSA. Visual contact was maintained and a shallow turn towards the N was conducted to increase lateral spacing. The closer of these 2 contacts he thought was about 3nm away to the E and 600ft above. [RT transcript reveals the crew reporting the first ac, the C152, as *"...3 o'clock high"* and the second ac, the PA28, as *"...passing overhead us now one thousand above"*]. Throughout this encounter they were in contact with Doncaster Tower who were informed of all of their actions. The only traffic they had been told about was the original light traffic at FL40 in the O/H. Neither a TA nor RA warning was generated by TCAS and when visually clear of the last ac the climb was recommenced to FL70 and a R turn to ROGAG was started before they were then transferred to Waddington. After Waddington had identified the flight and given them their joining clearance, the Captain queried where the ac they had to avoid had come from. He was informed that the ac had been with Humberside Radar on track to Doncaster which inferred that the Waddington controller had also observed the ac on radar. He opined that although the ac were close, owing to an early visual identification thanks to the very clear evening, they were able to manoeuvre clear without any excessive flight path deviation. Had the weather been IMC this would not have been the case. He felt that with 2 radar controllers observing the ac approaching Doncaster, more information should have made available to him – a delay on the ground would have been far more desirable than avoidance in the air.

THE PA28 PILOT had originally sent his report to the UKAB shortly after the incident but it was not received. A short narrative was received 2 months post incident recalling as much detail as possible. He departed Sheffield City on a navigation exercise via the Humber Bridge before returning, a flight he had made on numerous occasions and, as a night exercise, the landmarks en route were excellent for good navigation. He could not recall anything in particular about the flight which was flown using the same procedure that he used on every previous trip. He had left Sheffield ATC when outbound, after the M1/M18 VRP, for Doncaster Approach and requested a FIS, conscious of informing the appropriate ATSU of his position and intentions. Following the M18 towards Thorne and when approaching the Trent, Doncaster normally requests him to change to Humberside – the return journey is a reversal of the stated procedure. He did not remember seeing an ac in close proximity and no mention was made by the controllers of anything untoward during the flight.

ATSI reports that at the time of the Airprox, the B737 was in communication with the Doncaster Sheffield ADC/APP and the PA28 as well as a C152 were in communication with the Humberside APR. The Doncaster Sheffield ADC/APP described both the workload and traffic loading as 'medium to busy', whilst the Humberside APR described his as both 'light'.

The radar unit that provides coverage for Doncaster Sheffield (hereafter referred to as Doncaster) is situated at Liverpool. However, at the time of the Airprox the notified operational hours were 0900–1900, and so Doncaster

Approach Radar had closed for the day. The three units involved in this Airprox form a triangle with Humberside being located 25nm ENE of Doncaster whilst Waddington is located 25nm SE of Doncaster.

AC1, another PA28 (not the subject ac), made contact with the Doncaster ADC/APP at 1912:50, and reported inbound to the FNY beacon, which is located on the airport, at 3600ft for ILS training. This ac had been booked in for training but arrived after Doncaster Approach radar had closed for the day. The ADC/APP placed the ac under a FIS and shortly afterwards, at 1913:50, he cleared AC1 to the beacon at 3600ft. A short time later, the B737 flight called on the Tower frequency and requested push and start for Amsterdam. The ADC/APP approved this and advised that the departure RW would be RW20. A few minutes later the pilot of the B737 requested RW02 for departure and this was approved. In accordance with standard procedures, the ATSA requested an airways joining clearance for the B737 from MACC as well as passing the initial details to Waddington. The ADC/APP asked the pilot of AC1 his range from the beacon to which the reply was "*six point two miles*". The controller acknowledged this and instructed the pilot of AC1 to climb to FL40 and change frequency to Doncaster Tower. This was correctly acknowledged and so both ac were now on the same frequency. The ADC/APP accepted that at this point AC1 was now under an approach control service and was aware of the associated separation responsibilities.

At 1920:00, AC1 pilot reported level at FL40 and was instructed to report established in the hold. Shortly afterward the B737 started to taxi for departure and was passed the following clearance: "*...after departure runway zero two east noise abatement procedure, climb Flight Level Seven Zero expect further with Waddington Radar when advised to One Six Zero squawk of Three Six One One*". This was correctly read back by the crew. This is the 'standard departure clearance' issued to such flights and the 'east noise' procedure is defined in the UK AIP AD 2-EGCN-1-9. (*Straight ahead to 500ft aal or D0.5 whichever is the later, turn left onto track 360º. At D3 turn right onto track 080º. At 3000 ft turn onto required track*). The ADC/APP informed the B737 pilot that his airways joining clearance, as issued by Manchester, was to join CAS at ROGAG, FL160. (*ATSI note: ROGAG is located approximately 30nm SE of Doncaster and 9nm NE of Waddington*). At 1924:00, Humberside Approach telephoned advising *"…I've got two that are gonna transit to very close to your overhead if you want to take the details*". The Doncaster ADC/APP replied that he had a B737 about to depart to ROGAG and this ac would be working Waddington so could they (i.e. Humberside) coordinate with Waddington. The Humberside APR replied that he would.

The two ac to which the Humberside APR was referring were a C152 and the subject PA28. Both were engaged on night navigational exercises and being provided with a FIS from Humberside. Shortly before the Humberside APR had telephoned Doncaster, both flights had reported turning in the vicinity of the Humber Bridge and now routeing back to Sheffield. The lead ac, the C152 had reported maintaining 3000ft (RPS 1014mb) whilst the subject PA28 was some 6nm behind at 2600ft (RPS). Almost immediately after Humberside had contacted Doncaster, the pilot of the C152 asked whether he should give Doncaster a call "*…we'll be routeing via their overhead*". The Humberside APR advised that he was just about to contact Waddington, as they would be working outbound traffic from Doncaster.

Meanwhile, back at Doncaster, AC1 pilot had reported entering the hold overhead the FNY beacon at FL40. The controller instructed the flight to cross over the beacon and continue on a S'ly heading, which was correctly acknowledged. By now the Humberside APR had made contact with Waddington and passed details of the overflying traffic: however, the Waddington controller advised that Humberside should keep the traffic as the departing B737 would be transferred climbing to FL70 but it would 'not be airborne for another 5 minutes'. (*ATSI Note; It is not known where this information came from as, at no time, did Doncaster specify any estimated departure time*). The squawks on the two ac were passed to Waddington who advised that if she had to coordinate she would call and 'sort something out'. The Humberside APR informed the pilot of the C152 to remain on the Humberside frequency as neither Doncaster nor Waddington wanted to work the flights. The APR added that there was traffic manoeuvring overhead Doncaster at FL40 which he had observed on his radar.

At 1925:10, the Doncaster ADC/APP contacted Waddington and advised that the B737 was shortly ready for departure from RW02 bound for ROGAG. He added that he was controlling a PA28 (AC1) in the hold at FL40 and that he would transfer the B737 when clear of it. Waddington replied "*Okay so you'll get him up flight level five zero and above and then send him to me*", to which the Doncaster ADC/APP replied "*Yes*". At this point the holding PA28, AC1, advised that his ADF was not working properly and so the Doncaster ADC/APP asked Waddington whether they would like to take control of the ac and provide radar vectors to keep it in the hold. The Waddington controller declined this invitation. Following this exchange, the Doncaster ADC/APP reiterated that he would

transfer the departing B737 when clear of the holding PA28, AC1. The Waddington controller advised "*Okay there's two ac from Humberside but they're at three thousand feet so once they're clear of your guys they'll be clear of those as well*". Although the Doncaster ADC/APP had received this call he did not register that the Waddington controller was providing a reminder of the Humberside traffic. These two overflying ac constituted known traffic to the Doncaster ADC/APP. Unfortunately, no position was stated and, at that time (1927:20), the first of the overflights, the C152, was 7nm NE of Doncaster, tracking towards the overhead at 3000ft whilst the holding PA28, AC1, was 4nm NE of the airport at FL40 also tracking towards the overhead.

Manchester Centre contacted the Doncaster ADC/APP, at 1927:40, and advised that the B737 was released. The controller then instructed the pilot to line up on RW02 and passed TI on AC1, the PA28 holding overhead and tracking outbound from the beacon on a S'ly heading. The crew of the B737 reported 'visual' with the traffic and at 1428:30, they were cleared for take off climbing initially on the RW heading to FL50. One minute later (1929:40), the Doncaster ADC/APP instructed the holding PA28, AC1, to turn onto a W'ly heading as he maintained visual separation between it and the departing B737. By now the first overflight, the C152, was only 2·4nm NE of Doncaster and the Humberside APR had asked the pilot whether he was still visual with the traffic manoeuvring overhead Doncaster. The C152 pilot replied that he was and that he was just about to cross overhead the airport. At 1929:50, the Doncaster ADC/APP instructed the B737 to climb to FL70 and report passing FL50. This was acknowledged and, almost immediately afterwards, the crew reported (1930:10) *"B737 c/s we've got traffic three o'clock high"*. The controller replied *"B737 c/s roger stop your climb and turn onto correction continue heading*". The radar recording at 1930:10 shows the B737 appearing on radar indicating FL19 (2100ft QNH 1020mb) with the C152 in its 3 o'clock at a range of 0·6nm. Meanwhile, the Humberside APR was transmitting to the C152 pilot "*…there's traffic possibly passing down your right hand side possibly the seven three seven getting airborne*". The pilot responded with "*Roger we're vis that traffic we're maintaining three thousand feet*".

Shortly after 1930, Waddington contacted the Humberside APR to request coordination against the two overflying ac. Waddington were advised that they were both maintaining 3000ft on the Barnsley RPS and the pilot of the first ac (C152) was visual with the departing B737. Waddington replied that their traffic, i.e. the B737, would be not below FL40. At 1930:35, the Doncaster ADC/APP telephoned Waddington advising that the B737 had reported traffic 1 o'clock and 600ft above and requested assistance from the Waddington controller. The Waddington controller advised that the traffic was that of which Humberside had previously advised Doncaster. The Doncaster ADC/APP replied that he had requested Humberside to coordinate those ac with Waddington due to the anticipated departure of the B737. Waddington added "*That ac was visual with you but there is further traffic for B737 c/s right one o'clock two miles crossing right left indicating five hundred feet above*". This information was passed onto the crew of the B737 who had, a few moments earlier, reported visual with the second ac which they reported as 4 miles in their 1 o'clock and 600ft above, adding that they were descending now to 2000ft. Shortly afterwards they reported (just after 1931:20) maintaining 1700ft and the traffic was passing overhead them 1000ft above. On receipt of the information from Waddington, as passed by the Doncaster ADC/APP, the crew of the B737 advised the traffic was now clear of them, and they were happy to climb and turn R.

[UKAB Note (2): The B737 fades from radar after 1931:24 when it is indicating FL016 (1800ft QNH 1020mb) just as the subject PA28 appears on radar 2·2nm to its NE, SW bound, showing FL026 (2800ft QNH). The B737 reappears at the CPA, 1931:48, showing NMC and passing 0·6nm W of the subject PA28 at FL026 (2800ft QNH).]

The radar recording, timed at 1932:50, shows the B737 reappearing on radar in a position 8·3nm NE of Doncaster, the subject PA28 (the second overflight) 5nm N, the C152 (the first overflight) 2·9nm SW and AC1 4·5nm SW still at FL40 in a holding pattern over the airport. The Doncaster ADC/APP instructed the crew of the B737 to climb to FL70 before transferring them to Waddington. Further heading instructions were passed to AC1 to keep the ac overhead before, at 1933:00, passing TI on the first overflight.

The Doncaster ADC/APP reported that he had formulated a plan to provide reduced separation in the vicinity of an aerodrome between the departing the B737 and AC1, which was holding overhead. The weather was clear with no low cloud and he was confident that this could be achieved. When the crew of the B737 requested RW02 rather than RW20 for departure he opined that this may have been a distraction but he did not think it was a major one. The call from Humberside was unexpected as traffic from them often passes overhead Doncaster at 'medium level' and does not pose a problem, otherwise light ac are 'free-called' without coordination. The departing B737 was coordinated with Waddington: however, there is no Letter of Agreement (LoA) between the two units, simply a Supplementary Instruction (17/05) and a Temporary Operating Instruction (TOI 04/05), both of which were in place on the date of the Airprox. The typical way of dealing with such an outbound would be to request a clearance

from MACC when the ac started its engines. Coordination with Waddington would then take place and a Waddington squawk and frequency would be issued. Initial climb would be to FL70 and Waddington would facilitate the ac's climb to its joining level before transferring the flight to MACC. As a direct result of this LoA omission, the following ATSI recommendation is made: '*Doncaster, Humberside and Waddington shall, urgently, jointly review their procedures leading to the production of a Letter of Agreement. This must include a description of what services will be provided by each unit and the areas within which these services are available*'.

When Humberside telephoned with the details of the overflights, the Doncaster ADC/APP thought it somewhat unusual but did not produce a strip on the flights. He had believed that Humberside would coordinate with Waddington and so any potential conflictions between these ac and the B737 would be resolved. The Doncaster TOI, referred to above, states that when an ac is approaching the holding point, the Doncaster controller is to ring Waddington to ask if there is any conflicting traffic. On this occasion this action was not carried out. As the ac was taxying Doncaster rang Waddington to agree that the B737 would be transferred when clear of the holding traffic. As stated previously in this report, the Waddington controller mentioned the two Humberside overflights during this conversation but this part of the exchange did not register with the ADC/APP. He was concentrating solely on separating the B737 from his traffic in the hold.

The Humberside APR advised that in the area of Doncaster the lowest level that he could expect solid SSR coverage from Great Dun Fell was FL45, as is detailed in the Unit's MATS Part 2 page 4.16. Flights, such as the two overflights in question, were quite common and, as a matter of routine, placed under a FIS. He confirmed that no Letter of Agreement existed between Humberside and Doncaster and, in his opinion, this had been a problem in the past. Aircraft departing from airfields close to Doncaster had called Humberside direct, which then necessitated coordination. He believed that by using a geographical feature, for example the River Trent, traffic to the W could work Doncaster and that to the E Humberside, which in itself would assist with the provision of ATS in the area.

Having been advised by Doncaster to coordinate with Waddington, the Humberside APR was a little surprised that they did not wish to work the traffic. He emphasised that although he had passed their details as 'maintaining 3000 feet' this was meant as basic TI as the ac were only in receipt of a FIS. Had any coordination been effected then he would have informed the pilots accordingly. He had, at one point, considered free calling the ac to either Waddington or Doncaster but he was also aware that there was no requirement for them to change frequency. When asked what separation he planned to use between the overflights and the holding traffic at Doncaster he confirmed that the overflights were only in receipt of a FIS and so, once they reported visual with the traffic his responsibility had been discharged. He added that as Waddington had advised they would come back and coordinate if necessary, there was little point in contacting Doncaster again to remind them of traffic passing through their overhead. Finally, he reported that the departing B737 appeared only for a few sweeps as a primary return and during his transmission to the C152, the return faded before reappearing a short while later after the Airprox had occurred. Furthermore, Humberside were not in a position to control the B737 immediately after departure as it would have been both below solid SSR coverage and also below the Minimum Sector Altitude of 2700ft.

MIL ATC OPS comments that initially the Doncaster/Sheffield controller was contacted by Humberside ATC to be offered TI on traffic transiting "very adjacent to the overhead". Unfortunately, the Doncaster controller did not take the details and asked the Humberside controller to pass the details direct to Waddington Lower Airspace Radar Service (LARS) as they would be working "*a 737 departure for ROGAG*". Humberside passed TI to LARS regarding the 2 tracks which were routeing through the Doncaster O/H at 3000ft. LARS advised Humberside that they would call them back if they required co-ordination. This TI was passed to LARS prior to Doncaster prenoting the B737's departure. Doncaster contacted LARS to prenote the B737 and state that they had a 3rd ac (AC1) in their hold at FL40 and they would get the B737 above the holding traffic before transferring it to LARS frequency. At 1926:00, Doncaster rang LARS to inform him that AC1 in the hold had a malfunctioning ADF and was requesting radar vectors to stay in the hold; LARS advised that they were unable to provide vectors to stay in the hold. Doncaster advised they would keep AC1 on frequency and reiterated that they would transfer the 737 when clear of the holding traffic. LARS stated that "*there's 2 aircraft from Humberside but they are at 3000ft so once they're [737] clear of your guys, they'll be clear of those as well*". At 1930:30, Doncaster rang LARS requesting assistance with conflicting traffic against the B737 and was then informed that the B737 crew were taking a TCAS descent.

A major factor in this Airprox was the breakdown in communication between Doncaster, Waddington and Humberside. It is evident that Waddington LARS expected the departing B737 to be above the 3rd ac (AC1) in the Doncaster hold, which was at FL40, and as such vertically separated from the Humberside transits at 3000ft. Waddington cannot provide a departure service to ac departing from Doncaster but would be able to provide TI on any conflicting traffic if requested. No LoA was in operation at the time of the Airprox between Doncaster and Waddington pertaining to departures from Doncaster. An LoA is now being produced by Doncaster, in conjunction with SATCO Waddington, with particular reference to responsibilities during handover.

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 briefed Members on the progress towards the production of LoAs. A review of procedures has been undertaken with Waddington and agreement on two outstanding points is needed before an LoA can be finalised. Formal operating procedures have been devised and agreed with Humberside with an LoA shortly to be finalised. Also, since this Airprox, the notified operational hours for Doncaster Radar have been extended to 0600-2200 Winter and 0500-2100 Summer.

Pilot Members sympathised with the B737 crew's situation, being unaware of potentially conflicting ac prior to becoming airborne. Departing into Class G airspace crews should fully expect to encounter GA traffic which could be operating without being in receipt of an ATS. However, on this occasion the pertinent traffic, the C152 and PA28 flights, were in communication with an ATSU, the Humberside APR, and were seen by Waddington on radar to be approaching the Doncaster O/H. The Humberside APR had done what he could. Firstly, he had offered the C152 and PA28 flights to the Doncaster ADC/APP who had asked him to coordinate with Waddington who would be working the departing B737. Waddington had told Humberside to keep the 2 flights but they would call him back if necessary. ATCOs thought that this could have lulled the Humberside APR into a false sense of security although he had told the C152 pilot of the impending B737 departure and about the holding PA28, (AC1) O/H Doncaster at FL40. The Doncaster ADC/APP had elected to visually separate the B737 and AC1 and following his telephone call to Waddington, when the B737 was ready for departure, he had agreed to transfer the B737 to Waddington when it was above AC1. Waddington had agreed to take the B737 above FL50, clear of AC1 at FL40, which would also be separated from the C152 and PA28. Although there was no LoA between the 3 ATSUs, the ADC/APP was required to check for conflicting traffic with Waddington prior to releasing the B737. However, the Doncaster ADC/APP had not assimilated the importance of the Waddington controllers TI, reminding him of the Humberside traffic (the C152 and PA28), which were in potential confliction – the Doncaster ADC/APP was unaware that Waddington had declined to work the C152 and PA28. Members opined that there appeared to be a disconnect between the Doncaster ADC/APP's and the Waddington controllers' perceptions of how/where separation would be afforded between all of the flights which was not unsurprising owing to the lack of any LoAs. However, Members agreed that the Doncaster ADC/APP had been informed of all the traffic and should have provided an Approach Control Service to all of the flights involved. To fulfil this, the ADC/APP should have afforded separation between the B737 and the 2 overflying ac (the C152 and PA28), as well as AC1. This was not done and had caused the Airprox.

Looking at risk, the C152 pilot had received TI from the Humberside APR and seen the B737 but it had passed the PA28 pilot unsighted. Fortunately shortly after the B737 crew had become airborne, TCAS had indicated the C152 as 'proximate traffic' which enabled the crew to visually acquire it passing clear to their R and above. ATC were informed, who told them to stop their climb, but almost immediately another ac (the PA28) was observed in their 1 o'clock about 5nm away 500ft above on a conflicting flight path. The ADC/APP was informed about the PA28 who then relayed updated TI on the PA28 from the Waddington controller. The B737 crew had by now seen the PA28 visually, levelled-off and then commenced a descent as well as turning slightly L to increase separation. The PA28 flight path was monitored and it was seen to pass clear slightly to their R 1000ft above. Although the ATC elements were untidy, the Board were clear that the prompt actions taken by the B737 crew and their visual sightings had been effective in removing any risk of collision.

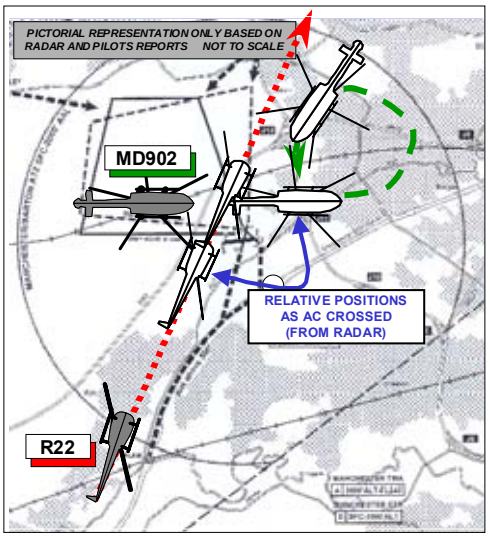
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Doncaster/Sheffield ADC/APP did not fulfil the provisions of an Approach Control Service with respect to known traffic in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT NO 205/05

Date/Time:	17 Nov 1325	
Position:	5329N 00222W (2nm NE Barton- elev 73ft)	
Airspace:	Barton ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	MD902 Explorer	Robinson R22
Operator:	Civ Comm	Civ Pte
Alt/FL:	1000ft (QNH)	1400ft (QNH 1018 mb)
Weather	VMC	VMC CLBC
Visibility:	NR	>10km
Reported Separation:	200ft V/100m H	300ft V/300ft H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MD902 EXPLORER PILOT reports flying a yellow and black ac orbiting at 70kt while engaged on a photographic task in connection with a police task. The location of the task was on the NE edge of the Manchester Barton ATZ and, due to its nature, it was necessary to fly at 1000ft. Prior to departure, Barton ATC was made aware of the task by radio (he passed both height and location) and he requested them to inform all traffic on their frequency of their close proximity to the circuit. The request was acknowledged and he heard ATC pass the information to several ac on the airfield frequency.

A short time later a helicopter reported on the frequency and requested a transit through the overhead from SW to NE. Its pilot was passed the fixed wing circuit height of 1000ft, the overhead joining height of 1800ft and warned of the proximity of the police helicopter. The MD902 pilot saw the other helicopter 2km away between his position and Barton Airfield. He was concerned that it appeared to be at a similar height to him and on a converging track so he broadcast his location, height and his intention to enter a LH orbit while listening out on the Barton frequency. Both Barton ATC and the pilot of the other helicopter acknowledged this call, he thought. [UKAB Note (1): Neither this call nor any acknowledgement by the R22 pilot is shown on the transcript of the Barton frequency. Although the R22 pilot reported that he was visual with the police helicopter, no mention of the route or of the intended operating location of the police helicopter was made after the R22 reported on frequency]. He continued the manoeuvre in the belief that since the pilot of the other helicopter had acknowledged his call and was in sight of him, he would avoid the MD902.

On completion of the first full orbit he noticed that the other helicopter had not deviated from its original track or height so the MD902 pilot took avoiding action by diving his ac to below 800ft. Once the immediate danger had passed he informed Barton ATC that he had had to take avoiding action and asked if the helicopter was Barton based. At that point the pilot of the other helicopter came on frequency, apologised for the fact that the MD902 had needed to take avoiding action but reassured him that he had his ac in sight continuously and had been prepared to take avoiding action if the MD902 pilot had not. Later he informed Barton by telephone that he would be reporting an Airprox.

He assessed the risk of collision as being high.

THE ROBINSON R22 PILOT reports flying from Hawarden to Sherburn in Elmet VFR in good weather 600ft below cloud. Having obtained the airfield information he flew at 1400ft on the QNH and was heading 060° [radar shows about 020°] at 75kt, talking to Barton who cleared [sic] him to route through their overhead. The R22 was just short of the centre line when the MD902 Explorer was still on the ground and he had it visual throughout the incident. Although he understood that a transmission might have been made by the police pilot to notify him of their intentions the R22 pilot did not receive it. He took no avoiding action as none was required and since he was visual with the other ac throughout assessed the risk of collision as being minimal. It was his view that the MD902 pilot had flown into the (non-immediate) proximity of his ac. No instruction was given to him by Barton radio and he was simply following a track to his destination in straight and level flight.

UKAB Note (2): Both ac can be seen only intermittently on the recording of the Clee Hill radar. Although both are seen before and after the time of the incident, the actual Airprox is not recorded. Both tracks suffered from jitter so tracks/positions on the diagram above are approximate.

UKAB Note (3): The base of the Manchester TCA in the area of Barton is 2000ft. The Barton ATZ is a 2nm circle up to 2000ft aal.

ATSI reports that both pilots were in communication with the Barton FISO at the time of the Airprox. The R22 was routeing northbound through the Barton overhead at 1100ft agl. The MD902 departed from Barton to operate at Worsley Church, near the end of the runway 27 right hand downwind leg. The FISO reported visual with the R22 as it reported *"just about to route north of your airfield"*. Shortly afterwards, the pilot was advised of the presence of the MD902, which he reported visual. No traffic information was issued to the MD902 pilot but in his written report he said that he had visual contact with the R22. The MD902 pilot reported commencing a couple of orbits. He later commented on the frequency that he had taken avoiding action concerning the R22.

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 ATC authorities.

Consideration of incidents concerning police ac on apparently high priority missions is generally problematical for the Board as many Members consider that such flights should have some over priority over routine GA movements, this is not normally the case as they are offered little or no priority or protection under the ANO or AIP.

That being the case, and since no protection is offered, the lookout requirements, despite the complexity of the task being undertaken, are the same as for any other ac.

Members fully appreciated the challenge for a pilot of maintaining a lookout for other ac when the nature of the mission will from time to time require concentration on events on the ground whilst listening to different RT frequencies, often in a tense, high workload situation. This was the second incident assessed by the Board in three months where such considerations had been factors. Although the Board Member with personal experience of police flight operations could not be present, another Member familiar with such flying briefed the Board in detail regarding the difficulties that can be encountered by pilots conducting such flights. One experienced helicopter pilot Member considered that in some situations it might not even be possible to maintain VFR with a single pilot. Even though it may not be recognisable to other pilots, the Board considered that the use of a police priority callsign would ensure appropriate, priority handling by ATC (not A/G) units with the attendant safety benefit.

In this Airprox the Robinson pilot had taken the correct action by informing the Barton FISO in good time of his position, intentions and route. He had been aware of the police helicopter from its take off and if unaware of the location of the police helicopter's task, he could have asked Barton. This would have facilitated, as good airmanship, giving the Explorer a wider berth thereby allowing the latter's pilot to continue uninterrupted on his task. That the Explorer was orbiting makes it difficult to determine right of way under the Rules of the Air. Members were sympathetic to the Explorer pilot's situation: after he gained visual with the R22 he subsequently lost sight of it. It was stressed however, that the R22 pilot did not break any rules or procedures and might indeed have had right of way depending on the precise 'snapshot' of the situation considered. Since however both pilots

had been visual with each other's ac and their estimation of the separation had been very similar and most likely accurate, there had not been any risk that the ac would have collided.

At the Board's request the Chairman agreed to contact the CAA Safety Regulation Group's flight operations specialists regarding aspects of police AOC operations that have arisen during recent Airprox investigations.

Post Meeting Note: CAA Flight Operations Inspectorate Department advises that the normal crew complement in a Police helicopter is one pilot and two Police observers, one in the front left-hand seat and one in the rear starboard seat. Although legally classified as passengers, the observers are required to be fully trained to assist the pilot with a variety of tasks including lookout. In addition, all Police aircraft have been fitted with TCAS 1 equipment. The observer is trained to take the TCAS display into his normal scan; interpret the display and inform the pilot when a potential 'threat' has been identified. All observer training emphasises the overriding priority of airborne safety over the Police task.

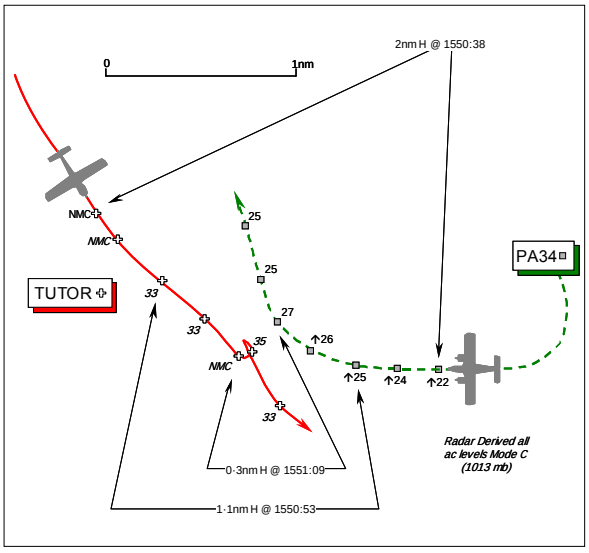
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The R22 pilot flew close enough to the MD902 to cause its pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 206/05

Date/Time:	13 Nov 1551 (Sunday)	
Position:	5234N 00225W (6½nm SW of Cosford - elev 272ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA34	Grob Tutor
Operator:	Civ Trg	HQ PTC
Alt/FL:	3500ft (QNH 1029mb)	FL35-FL50 (SAS)
Weather	VMC CAVOK	VMC CLOC
Visibility:	>10km	5km into sun
Reported Separation:	~100ft-200ftH	400ft V/300ft H
Recorded Separation:	0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA34 PILOT reports his ac is coloured white with a brown stripe but the HISLs were on whilst operating VFR on a local flight from Wolverhampton and in contact with Wolverhampton INFORMATION on 123·00MHz. A squawk of A7000 was selected with Mode C; TCAS is not fitted.

He was conducting an instructor multi-engine, skill test in CAVOK conditions, which included asymmetrical effects of engine failure – yaw-roll-pitch-spiral. Heading 320° some 3-4nm S/SW of Cosford, flying straight and level at 3500ft QNH (1029mb) at 140kt, the white Tutor was first seen climbing through his level in a vertical climb some 100-200ft away on his port beam. To avoid the Tutor he turned R hoping that its pilot did not execute a barrel roll but the Tutor then inverted and entered a 'cuban' manoeuvre. He next saw the Tutor to the S and called Wolverhampton to report the Airprox. He assessed that it had been an "A" and in his view there had been an actual risk of a collision. Later he spoke to the Tutor pilot on the telephone who said that he had his PA34 in visual contact throughout, which surprised him.

AIRPROX REPORT No 206/05

THE GROB TUTOR PILOT reports he was operating from Cosford conducting an air experience flight with a cadet. He was operating under a FIS from Cosford combined TOWER/APPROACH on 135·875MHz and squawking A7000 with Mode C. There was no cloud in the vicinity of his operating area and the in-flight visibility was generally 10-15km, albeit into the sun the visibility was reduced to about 5km in haze.

Between executing some aerobatic manoeuvres at 100-130kt some 3-4nm N of Bridgenorth, the other ac – a low-wing white twin engine light ac - was seen approximately 400-500ft below and 300-400ft to starboard [he quoted a slant range of about 500ft] in straight and level flight on a relative diverging heading of about 20°-30° to the R. As no confliction was apparent, aerobatics were resumed but on a more positively diverging heading by turning L away from the other ac. The minimum horizontal separation was 300ft and the PA34 was not less than 400ft below his ac. He assessed the risk as "none" but stressed that the into-sun visibility was poor due to the low sun and adding that the inexperienced cadet onboard was a distraction.

COSFORD COMBINED TOWER/APPROACH CONTROLLER reports that the Tutor was operating under VFR in good weather conditions doing aerobatics and was 1 of 4 such ac on his frequency. The first the controller knew about the incident was the following day when he talked to the PA34 pilot: nothing had been mentioned on RT to indicate that an Airprox had occurred. Although the PA34 pilot did not call Cosford at any time for traffic information, had he called for a FIS on 135·87MHz he would have been informed that there were Tutors in the area, their heights and positions unknown. He opined frankly that whilst that may not have helped much, the Tutor pilot would have heard the position and level of the PA34 thus possibly allowing him to recognise any potential for a confliction earlier.

MIL ATC OPS had nothing to add to the investigation.

THE GROB TUTOR PILOTS' UNIT had nothing further to add.

UKAB Note (1): The Clee Hill Radar recording illustrates this Airprox although the gyrations of the Grob Tutor pilot's aerobatic manoeuvres are not readily apparent. At 1550:38, the PA34 is shown steadying westbound climbing through 2200ft Mode C (1013mb) as the Grob Tutor is shown SE bound but with NMC displayed. The ac are shown 1·1nm apart as the PA34 climbs slowly through 2500ft (1013mb) - some 800ft below the Grob at 3300ft, whereupon the PA34 turns R NNW. The Grob executes some tight manoeuvres, which might be associated with the reported aerobatics, but NMC is shown as the ac pass about 0·3nm apart at a point about 6½nm SW of Cosford.

HQ PTC comments that the rapidly changing flightpath generated by an aerobating ac can be disturbing to other pilots, especially if they are unsure whether the aerobating ac's pilot has seen them. As the Tutor pilot states that he was visual throughout this encounter, there would appear to have been no risk of collision, however, the pilot of the PA34 perceived there was an actual collision risk. Whenever possible, ac engaged in high energy manoeuvres should increase their margins of separation or make a positive effort to indicate to the other traffic that they have been seen.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, reports from the air traffic controller involved and a report from the appropriate ac operating authority.

Whilst operating in the 'see and avoid' environment of the 'Open FIR', in the Board's view each pilot had a mutual overall responsibility to detect and remain clear of each other's ac as appropriate at the time. In this dynamic and very fluid scenario after the PA34 pilot turned westbound toward the SE-bound Grob and climbed up towards it, the PA34 pilot had a responsibility to 'give way' to the Grob as he approached the other ac from its port side in accordance with the 'Rules of the Air'. However, the 'Rules' can only work if you see the other ac in good time to apply them and from the PA34 pilot's frank account it was clear that he was the first to detect the presence of another ac when he saw the Grob as it climbed up through his level – he thought some 100-200ft away on his port beam. However, by that stage the geometry had changed entirely and thus the Grob pilot was apparently already engaged in his aerobatics when first seen from the PA34's cockpit. Unfortunately, the intermittent nature of the Grob's Mode C - probably as a result of the robust manoeuvres - did not allow a complete picture of the geometry of this encounter to be developed with certainty. The Board did not doubt the veracity of the PA34 pilot's account but the radar recording did not show the Grob below the PA34 at all so it seemed that this climb through the PA34's

altitude must have occurred in the very tight manoeuvres evinced on the radar recording after 1551:09. Whilst discussing the nature of the Grob Tutor pilot's aerobatics, one pilot Member observed that this might possibly be a little low to be conducting manoeuvres of this nature. Recognising the apparent 480ft differential between the observed Mode C indication from the radar recording that was related to a datum of 1013mb compared to the QNH in use of 1029mb, the PTC Member explained that aerobatics at this altitude was entirely in accord with SOPs and he stressed to the other Members that the Grob pilot was operating quite legitimately. The Member added that the Grob pilot had checked the airspace before he commenced his aerobatics as part of his normal checks but had, unfortunately, not detected the presence of the PA34 beforehand. Perhaps the white colour scheme of the PA34 coupled with the more or less head-on aspect with little relative motion to draw attention to it was the reason behind this unseen danger here. In the PTC Members opinion, the PA34 was there to be seen but from the Grob pilot's own account it seemed that he did not spot the other ac until he had turned his own ac about NW'ly. At that point the PA34 had opened forward of the starboard beam and was in straight and level flight on a diverging heading, which was illustrated on the radar recording, again after 1551:09. Whilst it was suggested that the Grob pilot had flown close enough to the PA34 to cause its pilot concern, the Board concluded that this Airprox had resulted from a late sighting by the Grob Tutor pilot whilst he was executing his aerobatics.

Whilst assessing the risk inherent within this encounter, the Board accepted that the Grob flew through the PA34's level and although only one of the pilots involved had spotted the other pilot's ac at that stage, the radar recording evinced that the horizontal separation was never less than 0·3nm. Whilst not ideal this was sufficient to remove the actual risk of a collision and it was increasing thereafter as the PA34 opened to the N and the Grob drew astern. So although it was at this point that the Grob pilot spotted the PA34 himself and turned away, the Board concluded that no risk of a collision had existed in the circumstances reported here.

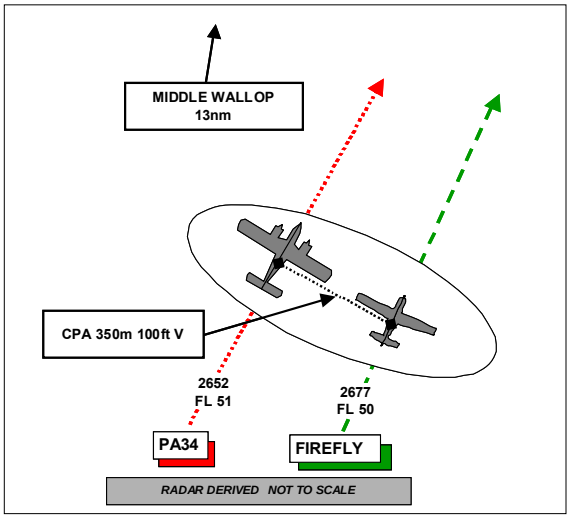
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the Grob Tutor pilot.

Degree of Risk: C.

AIRPROX REPORT NO 207/05

Date/Time:	29 Nov 1120	
Position:	5056N 00140W (13nm SSW Middle Wallop - elev 297ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Firefly	PA34
Operator:	HQ DAAvn	Civ Trg
Alt/FL:	FL50	FL50
Weather	VMC CAVOK	VMC CAVOK
Visibility:	50km	
Reported Separation:		
	50m V/50m H	500ft V/1nm H
Recorded Separation:		
	100ft V/0.2 nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FIREFLY PILOT reports flying a local grading flight with a candidate in a yellow and black ac with all lights on, squawking a Middle Wallop conspicuity squawk and listening out with them. They were flying straight and level at FL50 and heading 027° in perfect weather, revising deceleration/acceleration from 100-80-100kt IAS, when a black and white PA34 overtook them so close that he was able to read the registration. The other ac appeared suddenly to his left, coming from below the left wing in close proximity as it overtook them, and continued on heading and straight and level. He was unable to take any avoiding action and assessed the risk of collision as being very high and reported the incident to Middle Wallop by radio.

THE PA34 PILOT reports flying a dual training flight in a blue and white ac with the beacon and HISLs selected on in receipt of a RIS from Boscombe Radar. At the time of the incident they were heading 030° at 140kt in transit from Bournemouth to Oxford following an IFR practice diversion. The weather was CAVOK in almost perfect conditions; however, the student's forward and sideways visibility was deliberately restricted by blind flying screens and the instructor was seated in the RH seat. They were receiving a RIS but had not been advised of this particular traffic although they had been warned of multiple contacts in the area.

He spotted a yellow Firefly ac to the R of their ac at a distance of less than 1nm and at a similar level. The other ac passed to their R, slightly above and behind their PA34. He did not need to take any avoiding action and none was apparent from the Firefly that appeared to wave its wings in an acknowledgement of their presence. No RT communication was made with this ac but ATC later asked them to confirm their registration: no notification of an Airprox was indicated. They maintained course and height to their destination without further incident.

UKAB Note (1): Both ac can be seen on the recording of the Heathrow radar. Although the recorded track of the Firefly suffers from slight jitter it is estimated from projection that the PA34 overtook the Firefly on the port, displaced by about 350m and indicating 100ft below (Mode C).

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

The PA34 was routing from Bournemouth to Oxford at FL50 receiving a RIS from Boscombe Zone (ZONE). At 1118:25 the ZONE broadcast *"[PA34 C/S]...identified FL50, Radar Information, multiple contacts in your 12 o'clock 1mile, 3miles, indicating FL50, believed to be a Firefly."* The PA34 pilot acknowledged and ZONE continued to call traffic to other ac on the frequency. At 1120:24 ZONE again called the traffic to the PA34 pilot *"...traffic right 2 o'clock, 1 mile, similar heading, no height information"* and the pilot acknowledged again. At 1121:54, after Middle Wallop had informed ZONE of the Airprox, they requested the PA34's registration.

Analysis of the Heathrow Radar Recording at 1118:25 shows the PA34 1.5nm SW of the Firefly on a similar track but catching it up gradually with both ac indicating FL50. Both ac appear to manoeuvre, closing to within 0.2nm of each other as the PA34 overtakes the Firefly at around 1119:43.

ZONE called the traffic in accordance with the requirements of a RIS, albeit with a very minor range discrepancy which is inevitable with light ac manoeuvring in close proximity. The TI should however have been sufficiently accurate to allow the PA34 pilot to acquire the Firefly in his 12 o'clock at the same level less than a mile away but the PA34 pilot did not report visual nor did he request any updates.

HQ DAAvn comments that this incident occurred in a well known area of high traffic density, in particular where local military and civilian airfields take advantage of good met conditions for training, including aerobatics, stalling and spinning. Add to this the weight and accuracy of TI given on the Firefly in this instance, it is surprising that the PA34 instructor did not consider earlier heading adjustment to provision a greater margin of separation during the overtaking process. It may have been a calculated assumption that the Firefly would maintain its heading and pass safely down the right side. Fortuitously in this case the Firefly did not or intend to execute any steep banking or diving manoeuvres. The consequences could have been much worse than just surprise of having another appear alongside.

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 Board considered that this had been a fairly straightforward overtaking incident. From the transcript it was evident that the PA34 pilot had been given accurate and timely TI specific to the Firefly being overtaken. Having seen the Firefly 1nm ahead, the PA34 instructor chose to overtake on the left contrary to the Rules of the Air (Rule 17(4)). This may have been because of the IF screens on the left hand side of his ac which, coupled with his ac's position to the left of the Firefly, would have made it very difficult to keep the Firefly continuously in sight. Although the side chosen on which to overtake can be relatively unimportant depending on the circumstances, the separation selected should be sufficient to ensure safety and not alarm the pilot of the ac being overtaken. In this instance it was the unanimous opinion of the Board that the PA34 instructor should have taken control from the student who was flying on instruments and avoided the Firefly visually by a larger margin thereby further ensuring the safety of both ac.

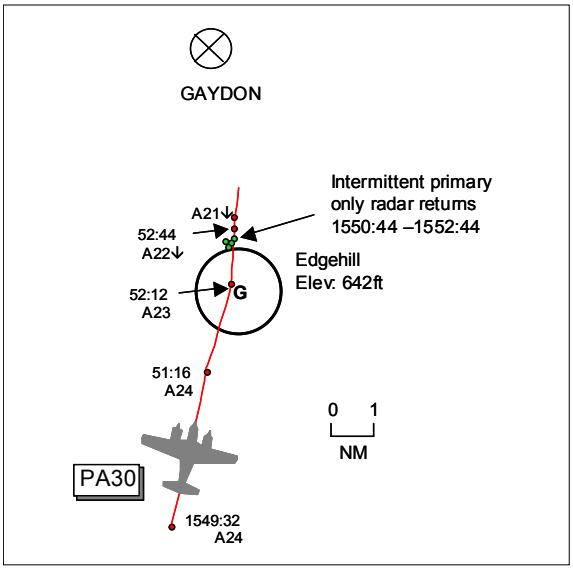
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following timely and accurate TI, the PA34 pilot flew sufficiently close to the Firefly to cause its pilot concern.

Degree of Risk: B.

AIRPROX REPORT NO 208/05

Date/Time:	27 Nov 1552 (Sunday)	
Position:	5206N 00128W (O/H Edgehill/ Shenington - elev 642ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	KA13	PA30
Operator:	Civ Club	Civ Pte
Alt/FL:	1450ft (QFE)	NR↓ (N/K)
Weather	VMC CLBC	VMC CLOC
Visibility:	>10km	20km
Reported Separation:	100-150ft V/<100m H400ft V/500m H	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KA13 PILOT reports flying a dual sortie (2 instructors) overhead (O/H) Edgehill/Shenington glider site at 1450ft QFE. The visibility was >10km in VMC and the ac was coloured white/blue/yellow with no radio or lighting fitted. He had just released from a N'ly winch launch (15-20sec previously) and had trimmed the ac to cruise at 45kt heading 330° towards the ridge N of Edgehill, handing control over to the other pilot. They both then saw a light twin engined type as it appeared, having passed behind, to his R 100m away and 100-150ft above travelling in a N'ly direction in straight and level flight. No avoiding action was taken as the ac had already passed. He was concerned that the other ac's course through the airfield O/H had taken it across the line of the winch cable at an insufficient height for this transit to be executed without risk of a potential collision with the steel winch cable. He had not sighted the ac earlier as his vision was restricted owing to it approaching from behind.

THE PA30 PILOT reports heading 020° at 180kt enroute VFR to Coventry in good weather conditions. He had been receiving a RIS from Brize Norton and had started descent to remain clear of CAS, leaving the Brize frequency as he approached Edgehill before he intended to contact Coventry at Gaydon. He flew the route every week and knew that gliders were often in the vicinity of Edgehill, especially at weekends. He first saw a glider 2nm ahead, Edgehill was just to the R of his ac's nose and, as his flightpath would have taken him O/H the glider, he altered course slightly to the R to keep it in sight, passing 400ft above and 500m behind it passing O/H the glider site, before banking to resume course whilst maintaining visual contact. He believed there was no risk of collision as, even if he had not seen the glider, they were flying at different altitudes and he would have passed well over the top of it.

UKAB Note (1): Sunset was calculated to be 1601Z.

UKAB Note (2): The UK AIP promulgates Edgehill/Shenington as a Glider Launching Site centred on 520507N 0012828W where aerotow launches take place and winch launches may be encountered up to 2500ft agl during daylight hours; site elevation 642ft amsl.

UKAB Note (3): The Met Office provided a calculated QNH for Edgehill of 998mb.

UKAB Note (4): Analysis of the Clee Hill radar recording does not show the Airprox. The PA30 is seen at 1549:32 approaching Edgehill with about 5nm to run from the SSW at altitude 2400ft (LON QNH 997mb). A slight track deviation about 10° to the R is seen after 1551:16 at range 2nm from Edgehill. Thereafter the PA30 passes almost O/H the Glider Site (0·15nm W) at 1552:12 showing 2300ft LON QNH. The PA30 then alters its track about 10° to the L as it tracks towards Coventry and then commences descent just over 30sec later. During the period 1550:44 and 1552:44 intermittent pop-up primary only radar returns are seen between about 1-1·5nm N of Edgehill

in the area of the NW facing ridge which are believed to be from another glider. The reporting KA13 pilot confirmed, during a subsequent telephone conversation with the UKAB Secretariat, that the Airprox occurred shortly after cable release O/H Edgehill as he was setting course for the ridge. The KA13 pilot's reported height of 1450ft QFE equates to approx 2100ft QNH.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members noted that the PA30 pilot had intended to pass almost O/H Edgehill/Shenington Glider Launch Site at a level that was below the maximum cable release height. The site is clearly shown on 1:500 000 topographical charts with the maximum altitude attainable by the winch cable (2500ft height added to the site elevation 642ft) shown rounded up to the nearest 100ft (3200ft amsl). Owing to the nature of operations, where gliders can be releasing from a winch launch within a short period of time (<60sec after getting airborne), the recommendation to avoid overflight below maximum cable release height was sound, particularly at some sites where multiple cables are used leading to a short time period elapsing between successive launches. Although ground launch parties had a responsibility to detect an approaching ac, thereby ensuring that the airspace into which any glider was being launched was clear, there was a finite limit to the time available to the party to detect an approaching ac, owing to its GS, before giving the all clear signal to the winch operator to commence the launch. In that vein, Members thought the PA30 pilot had shown poor airmanship as he intended to fly O/H Edgehill, cognisant of the fact that it was active, and he should have given the site a wider berth. However, on this occasion the PA30 pilot had seen the KA13 in good time and turned slightly R to pass 500m behind and 400ft above it whilst maintaining visual contact. The KA13 pilot was concerned as he had only seen the PA30 as it appeared clearing <100m to his R and 100-150ft above his level, having already passed behind his glider and having overflown the glider site below the cable release height. Although this had had the potential for a more serious incident, for the reasons discussed earlier, the Board was clear that during this encounter the PA30 pilot had discharged his responsibilities for 'see and avoid', albeit passing O/H an active glider site during the process, and that this had been no more than a sighting report by the KA13 pilot where any risk of collision had been effectively removed by the PA30 pilot's actions.

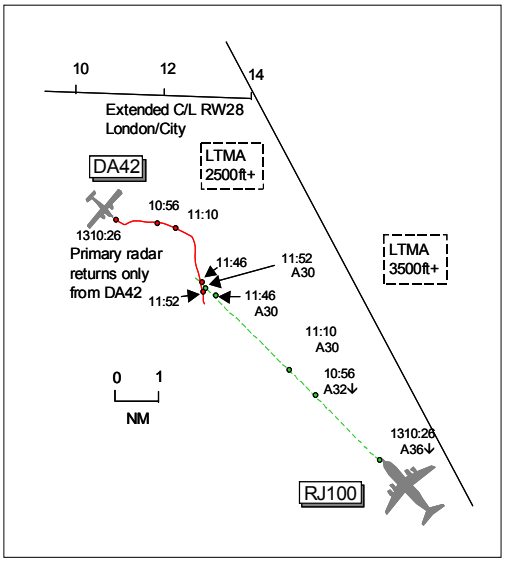
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 210/05

Date/Time:	6 Dec 1312	
Position:	5125N 00024E (14nm SE London/City - elev 19ft)	
Airspace:	LTMA/LFIR	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	RJ100	DA42 Twin Star
Operator:	CAT	Civ Trg
Alt/FL:	3000ft (QNH)	<2400ft (QNH)
Weather	VMC CLAC	VMC CLOC
Visibility:	>10km	5-8nm
Reported Separation:	300ft V/400m H	600-700ft V/1-2nm H
Recorded Separation:	0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RJ100 PILOT reports inbound to London/City IFR at 190kt on radar heading from Thames Radar on 132·7MHz squawking 5743 with Mode C. About 15nm SE of London/City level at 3000ft QNH above a layer of cloud (VMC on top), a white coloured low winged light ac (possibly a home-built fibreglass type) passed down their port side about 300ft below and 400m laterally. The other ac was not transponding thus it was not displayed on TCAS. It appeared to be maintaining VMC on top of cloud which they entered at 2600ft once cleared for descent on the ILS. No avoiding action was taken as the other ac was only seen at the last minute but the event was reported to ATC.

THE DA42 PILOT reports flying a local dual training exercise from Stapleford VFR and in communication with Stapleford on 122·8MHz; the transponder was switched off. The visibility was 5-8nm operating above and below broken cloud and the ac was coloured white with strobe lights switched on. Whilst general handling between 1500ft-2400ft at 120kt he saw the reporting ac in his 1·30 position about 1-2nm away and 600-700ft above and did not consider there to be any risk of collision.

THE THAMES RADAR CONTROLLER reports that the RJ100 was inbound to London/City at 3000ft on radar heading 320°. The crew reported passing close to a light ac that was about 200ft below. He advised the crew that he could see an intermittent primary only radar contact in the area and that such traffic should be 2400ft or below. The pilot reported that the ac appeared to be trying to stay VMC on top of cloud and later advised, through City Tower, that he would be making a report.

ATSI reports that there are no apparent civil ATC implications in this Airprox, which took place at 1311:52, close to the base of Class A CAS of the LTMA. Inbound to London City from Geneva, the RJ100 was, at the time of the incident, receiving an Approach Radar Control service from Thames Radar. The flight had been placed on a radar heading of 320° and issued with a descent clearance to 3000ft altitude on QNH 1006mb. The radar recording of the Thames Radar position shows that by 1311:10 the flight had just levelled at 3000ft.

In this part of the LTMA, the base of CAS is 2500ft amsl, hence the flight was being provided with 500ft vertical separation above the base of CAS, the minimum recommended in MATS Part 1, Reference Section 1 Chapter 6 Page 4, Para 9: Use of Levels by Controllers which advises *"Except when aircraft are leaving controlled airspace by descent, controllers should not* (ie strongly advises against) *normally allocate a level to an aircraft which provides less than 500 feet vertical separation above the base of a control area or airway. This will provide some vertical separation from aircraft operating beneath the base of controlled airspace."*

At 1311:19, the flight was instructed to report established (from its current heading) on the ILS LLZ for RW28 at London City. Thirty five seconds later the pilot of the RJ100 called Thames radar and at 1311:59 transmitted *"Yeah we've seen a light aircraft obviously not transponding just literally pass down our left-hand side probably two hundred feet below us three hundred feet below tops".* The controller responded *"Okay th- there is a primary con-faint primary contact on radar got no other information he should be twentyfour hundred feet maximum outside controlled airspace but if you want to report er an Airprox er just let me know",* to which the pilot said *"Yeah it looked a lot closer than that he seemed to be holding on top of the cloud here once I've got the cloud as we go through the top I'll have an idea what level he was at".* No further reference to the encounter was made by the pilot on the Thames Radar frequency, however later he informed the London City ADC of his intention to file a report.

The radar recording timed at 1310:26, 1·5min before the incident, shows the presence of a primary only target, tracking SE in the RJ100's 12 o'clock at a range of approximately 8nm. At this point the target is almost obscured by the label of another flight. By 1310:56, the range is about 5nm, the target appearing to be manoeuvring, while the RJ100 is passing 3200ft, Mode C. Thereafter, the target commences a slow RH turn commencing in the RJ100's 1 o'clock position when at a range of about 3nm.

[UKAB Note (1): At 1311:46, the DA42 is just R of the RJ100's 12 o'clock position, crossing/converging R to L at 0·4nm. CPA occurs on the next sweep at 1311:52, the DA42 having passed ahead and is now in the 9 o'clock of the RJ100 separated by 0·1nm.]

MATS Part 1, Section 1, Chapter 5, Page 13, Para 14.1 defines an Unknown Aircraft as *"A radar return which cannot be associated with an aircraft known by the radar controller to be operating within the airspace concerned shall be considered to represent an unknown aircraft".* In addition, Para 14.2 describes the action taken by controllers to avoid *'unknown aircraft'* in various types of airspace. For Class A Airspace, it states that *"Neither avoiding action nor traffic information shall be passed unless radar derived information or other information indicates that an aircraft is lost, has experienced a radio failure, or has made an unauthorised penetration of the airspace".* On this occasion, the Thames Radar APR had no information to indicate that an ac in the vicinity fell into any of the categories that would require action on his part.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members were disappointed that the DA42 pilot had not switched on the ac's transponder. Selection of Mode A and Mode C, if fitted, below FL100 is recommended in the UK AIP as ac then become more conspicuous on radar and the 'squawk' allows the TCAS (where fitted) and STCA 'safety nets' to function if necessary. There was no information to suggest that the DA42 pilot had climbed above 2500ft, the base of the LTMA, during his sortie. The pilot had reported operating between 1500ft and 2400ft whilst flying VFR, above and below broken cloud, in VMC. Noting the disparate separation distances reported by both crews, Members thought one possible reason was that the RJ100 crew's perception had been based on seeing a 'home-built' fibreglass type ac close-by. A colour photograph of a DA42 was shown to the Board during the discussion. A Pilot Member familiar with the ac explained that in fact the DA42 is a new generation low wing twin-engined ac, quite large, made of carbon composite materials with distinctive winglets. This could have given the RJ100 crew the impression that separation was less than actually pertained at the time because they were seeing a larger ac that was flying further away. Also, the RJ100 crew had reported seeing the other ac apparently flying on top of cloud. After they had commenced descent on the London City ILS, further to the NW, they reported the cloud tops as 2600ft. This may have further reinforced their mental picture that the other ac had been above that level and closer to them although the cloud structure could well have been different from that in the incident area, with a varying level of cloud tops. The radar recording shows the subject ac passing about 0·1nm laterally with the RJ100's Mode C showing altitude 3000ft. Some Members believed this had been a conflict close to the base of CAS but the majority did not share this view. After a vote the Board concluded that, on the balance of probability, as both crews saw each other whilst flying in accordance with rules and regulations, with the DA42 probably just below CAS and the RJ100 500ft above the base level, this incident had been no more than a sighting report and that safety had been assured during the encounter.

AIRPROX REPORT No 211/05

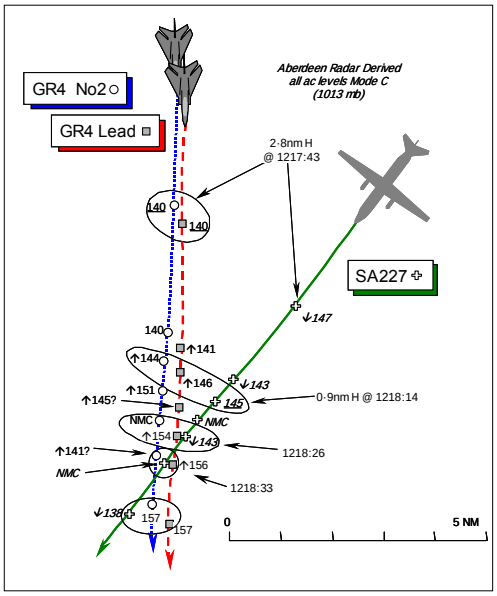
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 211/05

Date/Time:	1 Dec 1218	
Position:	5808N 00122W (27nm NE of Scotstown Head)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	SA227 Metroliner	Tornado GR4 pr
Operator:	CAT (Non-sched)	HQ STC
Alt/FL:	FL140↓	FL140
Weather	IMC NR	VMC CLAC
Visibility:	30km	35km
Reported Separation:		
	150ft V/150m	2000ft V
Recorded Separation:		
	Min V 100ft @ 0·9nm	
	0·22nm H @ 1100ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FAIRCHILD SWEARINGEN SA227 METROLINER PILOT reports he was inbound to Aberdeen from Kristiansund/Kvernberget under IFR in IMC at FL160. His ac has a predominantly white colour scheme and the HISLs were on. He was in receipt of a *"Flight Information"* service [actually a RIS] from Scottish CONTROL as they started their descent inbound to Aberdeen whilst squawking A6135 with Mode C. Tracking the AND 035° radial inbound to the VOR, Scottish informed him of unknown traffic that was approaching at high speed. At a range of 10nm, TCAS displayed a contact and shortly afterwards - heading 220° at 240kt - he established visual contact with two fighters which he thought were steering towards his ac. Descending through FL140 he believed that these two jets had attempted to fly in formation with his ac whilst maintaining the same speed and RoD as his Metroliner but continuously closing in until TCAS enunciated a CLIMB RA. He advised Scottish CONTROL of the TCAS CLIMB RA while following the commanded TCAS instruction. It then appeared to him that the fighters had started climbing as well, before TCAS then demanded a descent instead. He followed the instructions and started descending. The fighters then directly overflew him about 150ft above his ac with minimum horizontal separation of approximately 150m at the closest point. He reported the Airprox to Scottish CONTROL on RT and assessed the risk as *"medium"*.

THE TORNADO GR4 PILOT reports he was leading a pair of Tornados VFR under a RIS from Boulmer on a tactical frequency squawking exercise codes – A1611/1612 - with Mode C. They were flying in VMC some 10000ft clear above cloud, with an in-flight visibility of 35km. Neither TCAS nor any other form of CWS is fitted.

Heading 180° at 350kt and approaching a position some 43nm NE of Aberdeen in a level cruise at FL140, an ac - previously called by Scottish MILITARY [UKAB Note (1): at *"…12 o'clock 25nm southbound descending through FL175"*, which was acknowledged] before they switched to the CRC - was reported by Boulmer at BRA (range & bearing) 140/5, which was then seen from 5nm away tracking SW at FL150. He called "*tally"* on the low-wing turbo-prop whereupon Boulmer then called the "stranger" – the Metroliner - 2nm to the SE descending through FL140. As his formation was southbound at FL140 and visual with the Metroliner, to avoid the other ac he climbed

his Tornado formation to FL155 to maintain separation. The Metroliner passed some 2000ft beneath and behind his Tornado formation by some 600m as he continued with his exercise. He assessed the risk as *"low".*

THE MORAY SECTOR CONTROLLER reports that he was monitoring a trainee on the bandboxed MORAY TACTICAL/PLANNER position and using the Aberdeen Radar Head when he observed a track on an easterly heading displaying a ScATCC (Mil) assigned SSR code. He took over the RT in order to demonstrate to his trainee co-ordination with ScATCC (Mil). At a range of about 20nm from the Metroliner, the military ac changed squawks to A1611 & 1612 – the GR4 pair. As this indicated the ac were no longer in contact with ScATCC (Mil) he passed traffic information about the unknown ac to the Metroliner crew, who were descending through about FL160 for their assigned level of FL100. The A1611/2 squawks were indicating FL140 Mode C at this point and their projected track was going to go behind the Metroliner. At a range of about 8-10nm he gave further traffic information at which point the other ac squawking A1611/2 turned S towards the Metroliner, but the crew reported they had two military jets in visual and TCAS contact – the GR4 pair. As the ac closed, the Metroliner pilot reported a "full" TCAS alert and he advised him to follow his TCAS. The military jets appeared to climb over the Metroliner by less than 1000ft whereupon the Metroliner pilot reported he would be filing an Airprox report.

UKAB Note (2): Initial investigative efforts by the UKAB were hampered because Boulmer could find no record of the GR4 flight. It was not until the lead GR4 pilot helpfully provided a copy of HUD recording, which included the RT, that it was then clearly evident that Boulmer was indeed providing a service to the GR4 pair at the time of the Airprox.

MIL ATC OPS reports that because of the time elapsed before identifying that ASACS were controlling the Tornado GR4 pair – in the order of 6 weeks - the controllers involved had little recollection of the incident. The pair of GR4 ac was operating under a FIS from CRC Boulmer (BOU) during a major military exercise. At 1217:32, traffic information was passed by BOU as "[GR4 C/S] *stranger BRA 140/5nm*". Although no acknowledgement of the traffic information is heard on frequency, analysis of the HUD tapes from the lead GR4 ac reveals the lead crew stated internally on intercom "*I'm tally with him*". Some 20secs later, further traffic information was passed but BOU used an erroneous callsign prefix - "*stranger BRA southeast 2 indicating FL140 descending".* Again, no acknowledgement was heard on the frequency but a statement is heard on the HUD recording stating "*I'm going to climb*". [UKAB Note: A subsequent telephone conversation with the lead GR4 pilot revealed that this was a comment on intercom from the pilot to his navigator. Moments later, heard on the lead GR4 HUD recording is a statement *"climb mate climb"* as the lead ac enters a nose-up pitch into a continuous climbing attitude; this statement was confirmed by the pilot as a transmission from the lead pilot to the No2 on intra formation RT commanding the climb. BOU then called the *"merge with the stranger"* as the ac is shown on the HUD levelling at an indicated FL156 before ascending to a maximum of FL157.] At 1218:33, the Lead GR4 crew reported to BOU "[GR4 C/S] *visual with stranger climbed over the top*".

At the time of the Airprox, BOU was being manned by a trainee, screened by a qualified mentor. The workload was moderate for this type of military exercise. BOU applied a FIS to the GR4 formation and traffic information was passed to the GR4 formation on the Metroliner when it was 5nm away and again at 2nm. The formation leader did not acknowledge the traffic information but did report visual with the Metroliner and that they had climbed above it. There are no Military ACC contributory factors within this Airprox. However, it would appear that the Metroliner crew continued to descend into confliction with the GR4s despite having become visual with them at a range of about 5nm.

[UKAB Note (3): Analysis of the Aberdeen radar recording shows the GR4 pair some 40nm W of MORAY tracking E squawking A1611/12 – the lead GR4 and No2 respectively - whilst both maintain FL140, as the Metroliner is seen 15nm E of the GR4s, tracking 230° indicating FL166 Mode C and descending. (The GR4 squawks are herein deemed to be accurate (+/- 200ft), given the provision of an ATS by ScATCC (Mil) immediately before the Airprox whilst indicating a level cruise.) The GR4s continue on their easterly track which suggests that they will pass about 3nm behind the Metroliner, but at 1216:35 the radar recording evinces the commencement of a R turn by the GR4 pair - still maintaining FL140 - with the Metroliner some 8nm to the SE, descending through FL157 towards them. The GR4s steady on a southerly track with the Metroliner in their L 10 o'clock - 5nm. The Metroliner maintains its descent and upon passing FL150 at 1217:25, the GR4s are just abaft the Metroliner's starboard beam at a range of 3·9nm still maintaining FL140 whereupon STCA activates. Separation reduces to 2·8nm horizontally and 700ft vertically at 1217:43, with the Metroliner descending through FL147. At 1218:07, a climb is first observed from the lead GR4 (the closest of the pair) to FL141, out on the Metroliner's starboard beam some 1·27nm distant as the latter descends through FL143. From this point it is difficult to determine the horizontal separation on the

recording. Moreover, each sequential Mode C iteration had also to be checked individually. However, the GR4s continue to indicate a climb as 0·9nm horizontal separation is reached at 1218:14, with the lead ac passing FL146 and the No2 indicating FL144 as the Metroliner ascends briefly through FL145, this being the only indication of a response to the TCAS CLIMB RA reported. At 1218:20, the lead GR4 Mode C then anomalously indicates a climb through FL145 (after previously showing FL146) as the No2 indicates FL151 on the next sweep but with NMC from the Metroliner some 0·45nm away. However, analysis of the Lead GR4 ac's HUD recording reveals that once initiated the pilot climbed steadily to an indicated FL156 and at 1218:20, indicated 15450ft HUD (1013mb). At about 1218:26, the lead GR4 passes FL154 in the climb - indicative of the lag intrinsic with Mode C - with NMC from the No2 whilst the Metroliner indicates that a descent has been resumed through FL143 with horizontal separation of 0·22nm. From this point the lead GR4 climbs through FL156 as it appears that the No2 indicates anomalously FL141 Mode C and the Metroliner NMC at 1218:33. However, it appears that with the three ac in such a small area the three acs' SSR returns might have become garbled with the No2's Mode C possibly transposed with that of the Metroliner which, by interpolation, would most probably be passing through this level in descent as the tracks have crossed between sweeps and 0·22nm horizontal separation is again evident. From this point it is now again difficult to determine the relative geometry of the displayed contacts. Nevertheless, at 1218:39 the lead GR4 indicates it has achieved FL157 Mode C, with NMC apparent from the No2 GR4, as the Metroliner descends through FL140, but which is indicated for a further sweep at 1218:45. Both the lead and No2 GR4's indicate FL157 at 1218:51, as the Metroliner descends through FL138, and thereafter through FL137 as over 2000ft of vertical separation becomes evident and subsequently increases. However, analysis of the Lead GR4 ac's HUD recording reveals that once initiated the pilot climbed steadily to an indicated FL156 before ascending to a maximum of FL157 over the period. In summary, it appears that minimum observed vertical separation on the Aberdeen recording occurred at about 1218:14, with the lead GR4 indicating FL146 - some 100ft above the Metroliner - and the No2 indicating FL144, some 100ft below the Metroliner, which was at a horizontal separation of 0·9nm from the closest of the pair – the lead ac. At the point of minimum recorded horizontal separation of 0.22nm, the lead GR4 indicates FL154 1100ft above the Metroliner descending through FL143.]

ATSI reports that as traffic levels were low the ScACC MORAY Sector was manned by a trainee controller carrying out the tasks of both PLANNER and TACTICAL controller with a training instructor in place as the mentor. The Metroliner was inbound to Aberdeen at FL180 and had established contact with the sector at 1154:00. The trainee controller correctly identified the flight and advised the Metroliner crew that they were now in receipt of a RIS. At 1213:55, the Metroliner crew requested descent from FL180 and were advised that there was no known traffic to affect their descent to FL100. Shortly afterwards at 1215:40, the mentor took over the RT and passed traffic information on two contacts in the Metroliner's 2 o'clock at a range of 10nm, indicating FL140 (unverified Mode C) – the GR4 pair. One was squawking A1612 and the other A0000 [SSR Data unreliable]. Very soon afterwards this changed to A1611 & A1612, which indicated that they were involved in an exercise operating under the auspices of NATO CAOC 9 (Combined Air Operation Centre). The mentor continued to update the traffic information and it appeared that the GR4 pair would pass behind the Metroliner. However, at approximately 1216:55, the formation turned S and started to close on the Metroliner. This was passed to the Metroliner crew who reported the GR4 pair in sight at 1217:00, "…*we have..two aircraft in formation at our three o'clock at the moment flying parallel to us"* [UKAB Note: when the lead GR4 was at a range of 5nm from the Metroliner]. At 1217:25, STCA activated as both military ac were indicating FL140 and the Metroliner was descending through FL150. At 1217:50, the Mentor asked whether the Metroliner crew still had the formation in sight to which they replied "*Affirm and they're closing in we're getting TCAS warnings now*" whereupon the Mentor advised the crew to follow their TCAS. The displayed SSR labels were now garbled and it was difficult to see the exact readouts of all 3 ac. The ScACC unit investigation stated that separation between the Metroliner and the two military ac reduced to 0.2nm and 100ft and 0.1nm and 100ft respectively [UKAB Note: see Part B]. The STCA activation ceased at 1218:36 and some 10sec later, the Mentor transmitted a CAS joining clearance to the Metroliner crew prior to reaching Aberdeen's CAS boundary. This GAT flight was in Class G airspace in receipt of a RIS at the time of the Airprox, where the MORAY controller fully complied with the MATS Part 1 requirements for providing such a service.

HQ STC comments that it may be that the Metroliner pilot was mistaken as to the geometry of the GR4s in relation to his ac. Having been given traffic information on the GR4 formation, and sighting them, he did not appreciate that they were level below him. The GR4 leader also received traffic information on the Metroliner and, seeing that it was continuing to descend, elected to climb above. It may well be that the combination of the two GR4 squawks, and the proximity, resulted in the climb/descend instructions from TCAS.

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 & HUD video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was evident to the Board that this Airprox had occurred in the 'see & avoid' environment of Class G airspace where the GR4 crews, operating under VFR, were in receipt of a FIS from CRC Boulmer whilst the reporting Metroliner pilot was receiving a RIS from the ScACC MORAY Sector. Although a RIS may be requested by a pilot under any flight rules or meteorological conditions, under this form of radar service 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. To do that in Class G airspace the pilot must be able to detect and avoid the traffic appropriately: therefore, it follows that a RIS is essentially an ATS best suited to operations in VMC. Consequently, under the two forms of ATS being provided in this Airprox both acs' crews were solely responsible for affording appropriate separation against other observed traffic in the FIR. The Metroliner crew had reported flying under IFR in IMC but with a flight visibility of 30km. The GR4 crew reported flying some 10000ft clear above cloud with a visibility of 35km, these conditions being substantiated by the HUD recording from the GR4.

The concise ATSI report had shown that the ScACC MORAY Mentor had ensured that traffic information was passed and he had stressed to the Metroliner crew that the GR4 had turned southbound maintaining FL140, the correct quadrantal cruising level, as the Metroliner descended towards them. Thus the latter's crew was aware of the GR4 formation from the controller's comprehensive traffic information; their own TCAS (which displayed a contact to them from a range of about 10nm, the pilot reported), and finally from their own visual sighting that was apparently at a range of about 5nm - at about the same point that the lead GR4 pilot reported spotting the Metroliner. The Metroliner pilot believed that these two jets had attempted to fly in formation with his ac but from the lead GR4 pilot's report it was clear that this was never their intention whatsoever and the pair were merely proceeding about their legitimate tasks in transit through Class G airspace to their exercise area to work with another formation. In this situation the 'Rules of the Air' required the Metroliner crew to give way to the GR4s as the Metroliner closed from the L, and descended towards them. CAT pilot Members were concerned that the Metroliner pilot had not taken positive action at an earlier stage to avoid the GR4 pair, despite the good flow of traffic information provided by MORAY, until TCAS enunciated a CLIMB RA and then reversed into a DESCEND RA. From the lead GR4 pilot's perspective he had received traffic information about the Metroliner earlier from ScATCC (Mil) as he transited in a level cruise through Class F airspace before he then switched to BOU on an operational frequency and turned S enroute to his exercise area to the S within Class G airspace. The lead GR4's HUD and cockpit RT recording revealed two further transmissions of traffic information about the Metroliner from BOU, the last indicating clearly that the Metroliner was descending towards his formation and that the lead pilot had sighted the Metroliner. The lead GR4's cockpit voice recording also evinced that the GR4 crews were very busy at that stage, preparing for their exercise on their operational frequency. But Members noted that as the Metroliner crew were not 'giving-way' to the GR4s and were continuing to descend towards the pair, the leader elected to climb his formation to avoid the Metroliner himself. Although TCAS II will co-ordinate RAs with other ac so fitted, it cannot when they are not and the GR4s are not equipped with an ACAS (although funding has been approved for fitment of a CWS and development work continues to provide military pilots with such an aid). Here then, CAT pilot Members observed, was the clue as to why the Metroliner's TCAS initially commanded a CLIMB above the GR4s in a level cruise and then enunciated a DESCEND RA – because the GR4 leader had to climb to get out of the Metroliner's way not knowing at the time that its TCAS was itself commanding a climb. Weighing all these factors carefully and following a comprehensive debate, the Board concluded that this Airprox had resulted because the Metroliner crew descended into conflict with the Tornado GR4 pair.

Turning to the risk inherent here, the Board considered the minimum separations reported during the encounter. The Board was briefed that the ScACC unit report had concluded that the separation between the Metroliner and the lead GR4 reduced to 0·2nm and 100ft and against the No2 GR4 to 0·1nm/100ft. With respect to this conclusion, the UKAB Secretariat's analysis of the radar and HUD recordings showed that although 100ft of vertical separation was indeed evident at 1218:14, with the lead and No2 GR4s respectively above and below the Metroliner when the latter was at FL145, this was just after the lead GR4 pilot had elected to climb and at this point the Aberdeen Radar recording evinced 0·9nm horizontal separation between the lead GR4 and the Metroliner. When that range had decreased to 0·22nm, at 1218:26, the Aberdeen Radar recording evinced vertical separation of 1100ft with the lead GR4 passing FL154 and the Metroliner descending through FL143. Clarification had been

sought on this point from ATSI and the Advisor reported the Unit's view suggesting that the CPA was closer and a little later. This could not be reconciled with the UKAB analysis, specifically the integrity of the two anomalous Mode C responses shown on the Aberdeen recording and that from the lead GR4's Mode C at 1218:20, indicating a climb through FL145 thereafter, and also that from the No2 at 1218:33 indicating FL141 Mode C. However, the Board was briefed that it was evident from the HUD recording (which was provided for Members to view and the accuracy of which was not in any doubt) that the lead ac had climbed continuously from the cruising level at FL140 steadily throughout the encounter to FL156, finally settling at FL157. Thus when the Aberdeen recording shows the lead GR4 indicating a climb through FL145, the HUD recording clearly evinces that at the same time, 1218:20, the ac was actually at 15450ft HUD (1013mb). This showed that the Mode C indication displayed on the Aberdeen recording from the lead ac at this point was indeed wrong. Some military controller Members were surprised that it had been suggested that the Aberdeen recording might display a potentially incorrect Mode C so the issue of the No2 GR4's Mode C indicated level of FL141 at 1218:33 was discussed at length because this also seemed anomalous, but if it was correct suggested that the CPA was a lot closer than the UKAB analysis would indicate.

There was no HUD recording available from the No2 GR4 and thus no corroborative recorded data to substantiate the UKAB analysis at Note 3 above. The HQ STC and PTC Members confirmed that in all probability the No2 GR4 had been in formation throughout and it would have been very unlikely that the wingman would have strayed significantly from his leader – certainly not the 1500ft difference suggested by the radar recording as even SSR Mode C lag should not have produced such a variation in level between the leader and his wingman and this was only one return amongst three others giving NMC – 'No Mode C'. It was therefore agreed that assurance would be sought that the No2 ac had indeed climbed, maintaining station on the lead ac - see Post Meeting Note. The Board was briefed on the sequence of the Mode C indications observed from the No2 as displayed on the Aberdeen recording during this period, this was:

Time	GR4 Lead	GR4 No2	Metroliner
1218:01	140	140	↓144
1218:07	141↑	140	↓143
1218:14	146↑	144↑	145
1218:20	**145↑**	151↑	NMC
1218:26	154↑	NMC	↓143
1218:33	156↑	**141↑**	NMC
1218:39	157↑	NMC	↓140
1218:45	157	NMC	↓140
1218:51	157	157	↓138

Given the sequence and the dearth of displayed Mode C values over this period it seemed plausible to the majority of the Members that the 141↑ displayed by the No2 was an anomalous value. This point was reinforced by an experienced fast-jet AD navigator but nonetheless it was confirmed that this point would be re-checked outwith the meeting (see Post Meeting Note).

One CAT pilot Member perceived that there was an element of risk within this encounter because of the uncoordinated TCAS RA reversal as a result of the GR4 pilot's own high energy avoiding action climb. Another stance was that with the conflicting views over the values of the recorded separation it was not feasible to determine the risk which should remain unassessable [Risk: D]: this was not widely supported, however. The prevailing view was that given the visual sighting by the pilots involved and the robust avoiding action taken by the GR4 leader when the Metroliner crew descended into conflict with his formation, there was no inherent risk of a collision. Taking all these disparate views into account the Board concluded by a majority vote that no risk of a collision had existed in the circumstances reported here.

[Post Meeting Note: Further discussion with the lead GR4 pilot revealed that at no stage did his No2 stray significantly out of station and throughout the encounter remained in formation off the leader's starboard wing as the pair climbed up to avoid the Metroliner. Furthermore, when the lead pilot was questioned again about the vertical separation he reported, compared to the values suggested by the radar recording, he refuted entirely any suggestion whatsoever that either he or his wingman flew as close as the 0·2nm/100ft and 0·1nm/100ft reported by ScACC.]

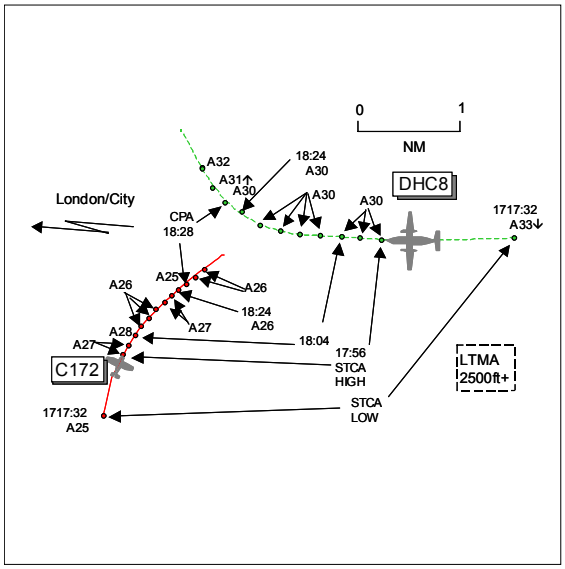
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Metroliner crew descended into conflict with the Tornado GR4 pair.

Degree of Risk: C.

AIRPROX REPORT NO 212/05

Date/Time:	NIGHT 29 Nov 1718	
Position:	5130N 00018E (9nm E London/City - elev 19ft)	
Airspace:	LTMA/LFIR	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	DHC8	C172
Operator:	CAT	Civ Club
Alt/FL:	3000ft	2300ft
	(QNH 1009mb)	(QNH 1008mb)
Weather	VMC CLOC	VMC NR
Visibility:	>10km	NK
Reported Separation:		
	3-5nm	NR
Recorded Separation:		
	500ft V/0·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports inbound to London/City IFR at 180kt and 3000ft QNH and in receipt of an ATS from Thames Radar on 132·7MHz squawking an assigned code with Mode C. Established on the LLZ RW28 at 9d, Thames Radar advised them of 'unidentified traffic' at 10 o'clock and gave them a R turn onto 360°. Simultaneously, TCAS annunciated 'traffic' followed by an RA 'monitor vertical speed'. During the turn TCAS gave an RA 'climb' command, which was followed (240ft altitude deviation) before 'clear of conflict' was received. ATC were told of the TCAS manoeuvre and, after they returned to 3000ft, a L turn was given towards the LLZ in order to continue the approach. The 'intruder' was not seen visually and they estimated it passed 3-5nm clear.

THE C172 PILOT reports he was unaware of an Airprox until post flight but was able to provide full details of his flight which was a local sortie with 2 passengers from Earls Colne turning overhead (O/H) Southend along the River Thames to the QE2 bridge before returning. Approaching Maldon (10nm N of Southend) at 2000ft Earls Colne QNH 1007mb, he changed frequency to Southend Radar on 130·77MHz squawking 7000; mode C was not selected on, he thought. Initially he had trouble hearing Southend RT clearly which necessitated him asking for ATC to repeat their complete broadcast. He was given a heading to take his ac slightly to the W of the Southend O/H and was told to fly at 2300ft. He couldn't remember being given the QNH of 1008mb but he had already heard the pressure being given to another flight and had set it. He was asked to, and subsequently did, report O/H Southend and then set course onto 250° towards the QE2 Bridge whilst remaining with Southend ATC under a 'radar' service. ATC asked him to confirm his altitude which he did as 2300ft, he thought, 1008mb. He turned at the bridge onto 035° and ATC asked him to report at Hanningfield Reservoir (9nm NW Southend), which he did before changing to Earls Colne Radio approaching Witham. During his joining procedure he was asked to squawk (7040 he thought) and then he completed his landing. He was asked to telephone ATC and was told that his flight had been tracked from the QE2 Bridge and that he had penetrated CAS. He was surprised and concerned but was told that radar had shown his ac squawking 7000 with Mode C reporting 2700ft. From his knowledge he had not flown above 2500ft and he was surprised that altitude reporting was on, as he had not set the transponder on Alt.

UKAB Note (1): Whilst flying the C172 at 3500ft QNH some three weeks after the Airprox, the CFI conducted a transponder check with the assistance of Essex Radar. The controller reported the Mode C readout as 3700ft then 3800ft then 3600ft whilst the CFI confirmed that the ac was flying straight and level during the period and the transponder switch was set to Mode A only. Following these findings, the CFI requested the maintenance organisation to remove the transponder from the ac until the equipment could be checked by an avionics company. This was planned to be carried out after the Christmas period when the transponder would be re-installed in the ac and the system checked and calibrated as necessary. On 26 April 2006, the avionics company carried out a Mode C check on the subject transponder which was found to be within 100ft accuracy. At the time of writing it is not known if the subject transponder has been re-installed into the C172, checked for correct functioning and released to service.

THE THAMES RADAR CONTROLLER reports the DHC8 was established on the LLZ RW28 at 3000ft when he noticed an unknown ac apparently commence a climb into the LTMA indicating 2700ft altitude 1·5nm SW of the DHC8. He passed TI to the DHC8 crew and then broke-off the ac's approach with an avoidance turn onto 360°. The unknown ac passed behind the DHC8 which was then resequenced onto the ILS. The DHC8 crew reported a TCAS RA and a miss altitude of 300ft. The unknown ac was tracked by the Traffic Manager to Earls Colne and was identified as the subject C172 using an assigned code of 7045.

THE SOUTHEND APR reports that a flight called on frequency to the N of Southend and, owing to other IFR traffic in close proximity, he turned the ac away from it for identification. The flight, the subject C172, requested to route towards the QE2 bridge so, when clear of other IFR traffic, its pilot was advised of the MSA as he entered the SW sector from Southend. The C172 climbed to 2300ft and was provided with a RIS.

The Southend METAR shows EGMC1650Z 29002KT 9999 FEW019 SCT045 03/M02 Q1008=

ATSI reports that the incident took place at night, close to the base of the LTMA in an area where the lower limit of Class A CAS is 2500ft amsl. The DHC8 flight established contact with Thames Radar at 1713. The flight, which was descending to altitude 4000ft, was instructed to continue on its present heading (SW'ly) and establish on the ILS LLZ for RW28 at London City Airport. The radar recording shows that at this point it was about 28 miles from touchdown. At 1716:25, when 16 miles from touchdown, the flight was cleared to altitude 3000ft. The pilot read back the clearance and reported establishing on the LLZ. The DHC8 would soon enter an area of the LTMA where its base is 2500 feet amsl. By then, 500ft of vertical separation would be provided above the base of controlled airspace, the minimum recommended in MATS Part1, Section 1, Chapter 6, Page 4, Para 9: Use of Levels by Controllers, which advises *"Except when aircraft are leaving controlled airspace by descent, controllers should not* (ie 'strongly advises against') *normally allocate a level to an aircraft which provides less than 500 feet vertical separation above the base of a control area or airway. This will provide some vertical separation from aircraft operating beneath the base of controlled airspace."*

Also visible on the radar recording at this time is traffic 2 miles S of the RW28 centreline, tracking W and in the DHC8's 10 o'clock position at a range of 7 miles. This traffic, later identified as the subject C172, is wearing the Conspicuity code 7000 and indicating at 2400ft, unverified Mode C and in an area of the LTMA where the base is 2500ft amsl. A minute later, at 1717:32, the unknown traffic can be seen having made a R turn, placing it on a converging track with that of the DHC8. This manoeuvre caused the STCA equipment to activate in low severity mode between the DHC8 and this traffic, which is 'unknown' to the Thames radar controller. The traffic is now in the DHC8's 10:30 position at a range of 4·3 miles and indicating at altitude 2500ft, Mode C. (Note: Geographically, the C172 is, at this point, in the vicinity of the QE2 Bridge at Dartford). Noting that the unknown traffic was now indicating a climb into CAS, the Thames controller transmitted to the DHC8, at 1717:50 *"…There's er traffic showing in controlled airspace at left eleven o'clock range 2 miles showing two thousand seven hundred not identified going to break you off this approach his intentions are not known turn right heading three six zero".* Immediately after the pilot's read back of the turn instruction, the controller re-confirmed the other traffic's position, adding that it was now indicating at 2600ft. The pilot responded *"That's copied..*(c/s)*..we have him on TCAS".* A few moments later the DHC8 was advised that the traffic had passed clear behind and was then instructed to turn L onto a heading of 240º from which it would subsequently re-establish on the ILS LLZ for RW28. The pilot reported that during the encounter he had experienced *"…a small TCAS climb…"*, adding that he considered the vertical separation from the other ac had been less than 300ft.

The action taken by the Thames Radar controller was in accordance with the guidance provided in MATS Part 1 in respect of unknown traffic in Class A airspace: Section 1, Chapter 5, Page 13, Para 14.2 (version current at the

time of the incident) stated *"Neither avoiding 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.".* It is calculated that 20 seconds elapsed from when the DHC8 received the instruction to turn R off the centreline (onto 360°) to when the turn first became apparent on the radar, by which time horizontal separation between the ac had deteriorated to 1·2 miles. Given the proximity and track of the unknown traffic at the time the first transmission was made, it may have proved beneficial in reducing the risk had the controller included the term "Avoiding Action" in this instruction.

The radar recording shows that during the sequence, the unknown traffic (C172) stopped its R turn on a NNE'ly track, its Mode C indicating that at one point (1718:04) the Mode C reached 2800ft altitude. It was then at a range of 2·2 miles in the DHC8's 10 o'clock position. Thereafter, the distance between them reduces further and at 0·9 mile the Mode C difference is 400ft. By this time (1718:24) however, the DHC8 has just commenced the R turn as instructed, so placing the C172 in a less threatening position of 9 o'clock. The C172 was now indicating at 2600ft Mode C while the DHC8 is still showing at 3000ft.

[UKAB Note (2): The CPA of 0·8nm occurs on the next sweep at 1718:28, the C172 showing 2500ft with the DHC8 500ft above at 3000ft. The DHC8 is seen to commence a climb 4sec later, attaining 3200ft 1nm to the C172 showing 2600ft.]

Although the identity of the C172 was determined soon after the incident (it was tracked to Earls Colne aerodrome), it was not revealed until a few weeks later, when its pilot submitted a written report, that the flight had been in receipt of a *"radar"* service from Southend ATSU at the time. Southend had no record of the incident taking place and therefore, maybe not surprisingly, the APR concerned could not recall the flight's movements in detail. The Southend transcript shows that the C172 had established contact with the APR at 1701, some 17 minutes before the incident. The pilot reported at 2000ft en-route from Earls Colne to the QE2 Bridge and return, on a 'navex'. Being 'night', the flight was, therefore, IFR. (Note: Southend ATSU is not SSR equipped) It was subsequently identified, placed on radar heading to avoid local traffic and, according to the controller's report, provided with a RIS, though this was not communicated to the pilot. At 1705, the APR advised the flight that the minimum sector altitude to the SW (of Southend) is 2300ft and instructed the flight to climb to this level, which the pilot read back. The flight was released on its own navigation at 1706:40 and seven minutes later in response to a level request, the pilot reported *"…we're still at two thousand feet".* The radar recording shows the ac about 2 miles S of the RW28 centreline, tracking SSW, but with the Mode C readout indicating 2300ft, unverified.

At 1717:30, the C172 pilot reported at the QE2 Bridge and turning towards Earls Colne. At 1718:02, the Southend APR transmitted to the C172 *"…unknown traffic right er correction north-east of you two miles fast moving er crossing right to left westbound level unknown".* The pilot responded *"…we have that traffic now and we are heading back towards Earls Colne".* Bearing in mind the time and the relative positions of the subject ac observed on the radar recording, there is little doubt that the C172 was being provided with traffic information on the DHC8. MATS Part 1, Section 1, Chapter 5, Page 3, Para 1.5, states that *"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."* Accordingly, it can be concluded that the Southend APR acted appropriately within the terms of the RIS, which she was providing to the C172.

UKAB Note (3): Several recorded radars were analysed for this incident. The Heathrow SSR shows 1 return on the C172 at 1718:04 at 2800ft Mode C (London QNH 1009mb corrected) altitude. The Stansted SSR shows 2700ft, Gatwick 2600ft with Pease Pottage interrogating at 1718:00 and 1718:06, both altitude readouts of 2700ft. The next sweep at 1718:08 the C172 is showing 2600ft on the Heathrow recording. The C172's height readout is seen to fluctuate on all radar heads during the analysis, sometimes varying 200ft on successive 4sec 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.

From the information available to Members, there appeared to be up to 300ft discrepancy with the indicated Mode C from the C172's transponder. This was in addition to an apparent fluctuation with the height readout whilst the

AIRPROX REPORT No 214/05

C172 was in level flight, all whilst the ac's altitude reporting feature was switched 'off'. The C172 pilot had reported flying not above 2500ft at all times and had received TI from the Southend APR on the crossing DHC8 which he saw. After the Thames Radar controller had been alerted to a possible conflict when STCA triggered, he had broken-off the DHC8's approach by turning it R. The DHC8 crew had seen the C172 on TCAS and had received an RA 'climb' command which when combined with the R turn had resolved the apparent confliction. However, these actions were only taken after the C172's unverified Mode C had indicated a penetration of CAS which Members thought, on balance, to be erroneous, but had undoubtedly led to the filing of an Airprox report by the DHC8 crew. Taking this into account, the Board were in no doubt that safety had been assured during the encounter.

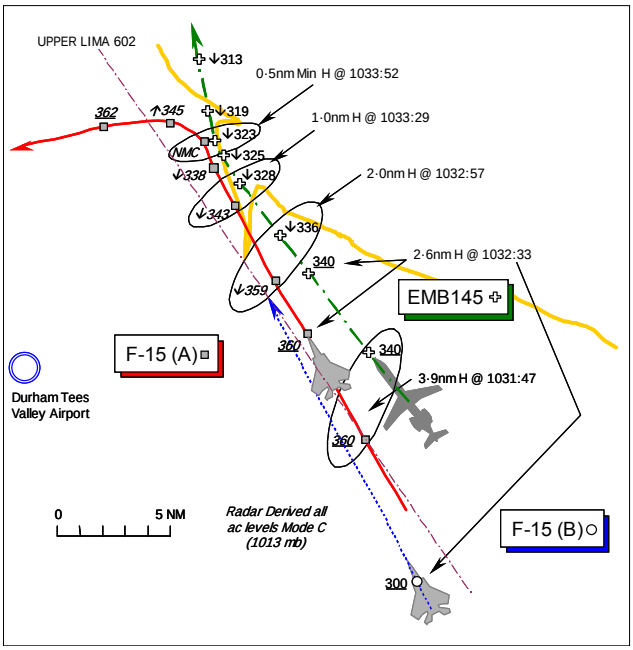
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C172's unverified Mode C indicated a penetration of CAS.

Degree of Risk: C.

AIRPROX REPORT NO 214/05

Date/Time:	16 Dec 1033	
Position:	5440N 00111W (13nm NE of Durham Tees Valley Airport)	
Airspace:	UAR UL602	(Class: B)
Reporter:	ScACC MONTROSE SC	
	First Ac	*Second Ac*
Type:	Embraer 145	F-15E
Operator:	CAT	Foreign Mil
Alt/FL:	FL320↓	↓FL360
Weather	VMC CLOC	VMC CLAH
Visibility:	>10km	>10km
Reported Separation:		
ScACC MONTROSE SC: 1000ftV/1nm H		
	1400ft V/1nm H	Not seen
Recorded Separation:		
	1300ft V @ 0·7nm H	
	0·5nm Min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ScACC MONTROSE SECTOR RADAR CONTROLLER reports that the EMB145 was inbound to Edinburgh and routeing UAR UL602 under IFR within Class B airspace. At about 1025, LATCC (Mil) Controller 15 (CON15) co-ordinated their traffic – the subject F15 that was negative RVSM (not Reduced Vertical Separation Minima compliant) – as not below FL360 against the EMB 145 flying at FL340. The LATCC (Mil) controller stated this co-ordination would be transferred to ScATCC (Mil) when the F15 was handed over. About 5min later at 1030, the EMB145 crew was given descent to FL260 to be level by NEW VOR. Next, she called ScATCC (Mil) CONTROLLER 2 (CON2) - who was working the F15 [F-15 (A)] - about co-ordination with another ac whereupon she observed F-15 (A) indicating a descent as she heard CON2 questioning its pilot about his level. The EMB145's Mode C level was not showing as the SSR was garbling so she issued an immediate avoiding action heading change of right onto 060°. At this moment the EMB145's level showed FL334 descending and she reaffirmed this was avoiding action on the heading of 060° and passed traffic information on the F15 as the latter turned L and climbed. Once prescribed separation was established the EMB145 was routed to NEW.

THE EMBRAER 145 PILOT (EMB145) reports he was in receipt of a RCS from SCOTTISH CONTROL whilst inbound to Edinburgh. About 25nm S of NEW VOR in an en-route descent through FL320 at MACH 0·76 a TCAS TA was enunciated. The pilot-in-command (PNF) acquired an F15 visually in their 9 o'clock position some 1500ft above them as it overtook them to port on a parallel course in a shallow descent. ATC issued an instruction to turn R onto a heading of 060° that was then upgraded to 'avoiding action' away from the F15, which passed 1nm away and above them at the closest point with a "low" risk of a collision. Just as the R turn instruction was upgraded the F15 pilot commenced a climbing turn to the W. He added that he was visual with the F15 throughout and TCAS showed separation reduced to 1400ft vertically.

THE F-15E PILOT (F-15 (A)) reports his ac has a dark grey air defence camouflage scheme, but the 'strobes' were on. They were en-route to LFA 14 in Scotland at FL360 and in receipt of a RCS from ScATCC (Mil). The assigned squawk was selected with Mode C.

Some 20-30nm S of Newcastle heading 330° at 350kt he requested a radio-check from Scottish (Mil) due to broken and unreadable radio calls and "heard a response about FL300". After a couple of enquiries about the change in flight level, confirmation from another F-15 flight on frequency [F-15(B)] and, he believed, a read-back to ScATCC (Mil) he began a gradual descent from FL360 to FL300 around 20nm S of Newcastle at 1033:00. He then heard the other F-15 (B) flight query Scottish (Mil) about his – the subject F-15 (A) pilot's - approved level being FL330 and the other flight's being FL300, which he thought Scottish (Mil) had confirmed. A short while later at about 1033:50, Scottish (Mil) instructed them to stop their descent and climb back to FL360 whereupon they started climbing back up to FL360. The lowest they got was FL334 according to their ac's recording system. At 1034:05, he turned hard L onto a heading of 270° as they were at FL356. Later at 1036:00, the controller cleared them back on course heading 345° level at FL360.

He added that he never saw the ac they had been given avoiding action against and they never heard any instructions issued on GUARD – 243·0MHz. He stressed that poor radio contact with the ScATCC (Mil) controller was a factor, whose transmissions were broken and unreadable. The risk was not assessed.

THE ScATCC (MIL) CONTROLLER 2 (CON2) reports that this Airprox occurred when operating as a Mentor to a relatively inexperienced trainee controller whilst working two UHF frequencies under a medium workload with eventually 3 ac under an ATS. F-15 (A) was handed over from LATCC (Mil) with co-ordination against civilian traffic - the EMB145 - at FL 340, which required F-15 (A) to maintain FL360 [negative RVSM]. At the same time F-15 (B) was handed over flying level at FL300. The pilot of F-15 (A) called ScATCC (Mil) at 1030 and was placed under a RCS at FL360 by the trainee controller. He, as the Mentor, noticed however that an incorrect frequency was selected. Upon selection of the correct frequency, F-15 (B) who had now subsequently checked-in on the frequency, was placed under a RCS at FL300. F-15 (A) incorrectly responded to this call by stating that he was descending to FL300 whilst F-15 (B) acknowledged the RCS at FL300. As Mentor he took over the RT and transmitted to F-15 (A) to maintain FL360 because of co-ordinated traffic 3nm to the NE at FL340 – the EMB145. The pilot of F-15 (A) responded that he was receiving ScATCC (Mil)'s transmissions badly so he repeated his instruction to maintain FL360. At this point co-ordination was being effected with the MONTROSE SC regarding further GAT with which F-15 (A) was also in confliction. The Mentor then noticed that STCA had activated between F-15 (A) and the EMB145 showing both ac in descent. He issued an avoiding action turn hard L onto 270° and a climb to FL360 to F-15 (A) whilst also passing traffic information regarding the conflicting EMB145. He confirmed with the pilot of F-15 (A) that he had received the avoiding action call, as an acknowledgment of the instruction was not received, whereupon F-15 (A) then complied with the avoiding action instruction and standard separation was regained.

ATSI reports that the EMB145 was maintaining FL340 routeing from Brussels to Edinburgh. The crew had established contact with the MONTROSE Sector at 1021:00 and reported routeing inbound to the Newcastle VOR. At 1027:30, when the EMB145 was approximately 60nm SE of Newcastle, the LATCC (Mil) Controller15 telephoned the ScACC MONTROSE Radar controller and requested coordination with respect to an F-15 [F15 (A)]. The request was "*not below flight level 360 negative RVSM against* [the EMB145 callsign]". The MONTROSE controller agreed to the request and was advised that F-15 (A) would shortly be handed over to ScATCC (Mil) and the agreed coordination would be passed on. At that time F-15 (A) was maintaining FL360 and in the 7 o'clock position of the EMB145 at a range of 11nm. At 1025:30, the controller instructed the EMB145 crew to continue on their present heading. Later at 1032:10, she instructed the crew to descend to FL260 to be level abeam Newcastle. At this time the EMB145 was E abeam Durham Tees Valley Airport and F-15 (A), now displaying a ScATCC (Mil) squawk, was in its 8 o'clock at a range of 3·2nm. MONTROSE telephoned ScATCC

(Mil) to co-ordinate another flight when she observed that the Mode C of F-15 (A) was indicating a descent and so she transmitted at about 1033:29, "[EMB145 callsign] *turn right immediately heading er 060*". The crew acknowledged this and reported visual with the traffic. At this time the EMB145 was passing FL328 with F-15 (A) due S of it at a range of 1nm and indicating FL343. The MONTROSE controller repeated the avoiding action and passed further traffic information. Meanwhile, on the open telephone line, MONTROSE could hear ScATCC (Mil) instructing the F15 to turn hard L heading 270º and advising that they had descended on top of civil traffic in their 1 o'clock.

MIL ATC OPS reports that F-15 (A) was flying on a NW'ly track along the line of UAR UL602 to the SE of Teesside. The ac had been co-ordinated by LATCC (Mil) CON15 as not below FL360 against an EMB145 under the control of the MONTROSE Sector at FL340. At 1029:32, LATCC (Mil) CON15 called ScATCC (Mil) CON2, which was manned by a Mentor and UT team, to initiate a *"...handover with co-ordination..."* on F-15 (A). The relevant ac were pointed out to ScATCC (Mil) CON2 by LATCC (Mil) CON15 and at 1029:59, CON2 read-back *"...traffic you're handing me* [F-15 (A) C/S] *identified. Traffic you're handing me... ...not below FL360."* The handover continued as CON15 pointed out other co-ordinated traffic and ScATCC (Mil) CON2 again read back *"...*[F-15 (A) C/S] *not below 3 6 0."* A second ac – F-15 (B) – was also handed over by CON15. The pilot of F-15 (A) contacted CON2 at 1031:20, and confirmed *"...checking in FL360."* Initially CON2 replied on the incorrect frequency and a second F15 (F-15 (B)) contacted CON2. CON2 identified F-15 (**B**) and then, at 1031:45, transmitted to F-15 (**A**) *"...identified, FL360, Radar Control."* The next transmission from CON2 at 1031:52 was a repeat of the previous transmission to F-15 (**B**) since there had been no readback from the pilot - "[F-15 (**B**) C/S]*...identified FL300 Radar Control"*, but still without a reply. F-15 (**A**) then made a radio check with CON2 and the next second CON2 opened the TYNE Sector landline and asked the Tyne controller (TY) to standby. At 1032:29, CON2 again transmitted to "[F-15 (**B**) C/S]*...identified, FL300, Radar Control"*, whereupon at 1032:33, the pilot of F-15 (**A**) incorrectly responded *"*[F-15 (**A**) C/S] *out of 360 for 300"* to which CON2 immediately replied "[F-15 (**A**) C/S] *maintain FL360 at the moment."* The UT's workload became very high as CON2 made contact with MONTROSE SC and tried to confirm that F-15 (**B**) was maintaining FL300, but because of broken and unreadable transmissions from F-15 (**B**) this was not achieved until 1033:20. The CON2 Mentor transmitted to F-15 (**A**) at 1032:48, *"... confirm you're maintaining 3-6-0, there is co-ordinated traffic right, 1 o'clock, 3 miles, similar heading at Flight Level 3-4-0"*. But this went unanswered until F-15 (**B**) enquired at 1032:59, *"SCOTTISH,* [F-15 (**B**) C/S] *level FL 3-0-0, confirm you want us to stay where we are and [F-15 (**A**) C/S] up at 3-3-0"?* Whereupon at 1033:06, the CON2 Mentor advised "[F-15 (**B**) C/S] *affirm maintain three hundred"*. The UT controller had made further RT calls to F-15 (**A**) and had been unable to ascertain that F-15 (**A**) was maintaining FL360 until at 1033:28, the CON2 Mentor queried *"*[F-15 (**A**) C/S] *confirm you-re maintaining 3 6 0 over"*. In response 6 sec later, F-15 (**A**) requested the transmission be repeated but at 1033:37, CON2 transmitted *"*[F-15 (**A**) C/S] *avoiding action, turn hard left, left heading 270, you've descended on top of civil traffic, right one o'clock, 1 mile."* At 1033:48, CON2 transmitted *"*[F-15 (**A**) C/S] *...do you copy?"* There is an unintelligible transmission and then at 1033:52, F-15 (**A**) replied *"...climbing 360 and coming left.."* It was not until 1034:30, that the pilot of F-15 (**A**) confirmed that his ac was tracking 270° and level at FL360.

Analysis of the Great Dun Fell radar recording shows F-15 (A) E of Teesside indicating level at FL360 on a NW'ly track converging gradually with the EMB145, which is 3·9nm to the N maintaining FL340. On the radar sweep timed at 1032:57 – some 22sec after the pilot of F-15 (A) reported leaving FL360 for FL300, the ac is seen to commence descent and indicates FL359 as the EMB145 indicates a descent through FL336. Throughout the encounter the EMB145 maintains a steady rate of descent with the F15 indicating a faster rate of descent, though frequent loss of Mode C on F-15 (A) makes judging the rate of descent difficult. Just before F-15 (A) takes up the avoiding action turn given by CON2 the ac are 0·7nm apart with F-15 (A) indicating FL338 some 1300ft above the EMB145 indicating FL325. F-15 (A) then indicates NMC as the ac close to 0·5nm, which is the point of minimum horizontal separation as the EMB145 indicates FL323. At 1034:00, F-15 (A) is seen to turn hard L and the tracks diverge as the Mode C returns on F-15 (A) indicating FL345 whilst the EMB145 indicates FL319.

Since F-15 (A) was not RVSM compliant above FL290, co-ordination required 2000ft of vertical separation from the EMB145 according to JSP552 235.155.2, and this was correctly applied in the agreement reached by CON15 with MONTROSE. Furthermore, CON15 correctly handed over both the ac and the co-ordination and CON2 correctly accepted them. Whilst the initial transmission to F-15 (A) from CON2 was on the incorrect frequency this did not contribute to the incident since everything was repeated on the correct frequency. CON2's RT workload was very high due to both F15 speaking units having trouble understanding the RT in addition to the landline. Once F-15 (A) had taken F-15 (B)'s initial identification transmission as a descent instruction, CON2 continued to work hard to resolve the situation, giving effective avoiding action and attempting further co-ordination with MONTROSE until standard separation had been restored.

HQ 3AF comments that poor RT with CON2 resulted in the crew of F-15 (A) believing that they had been instructed to descend from FL360 to FL300; however, uncertainty was introduced by F-15 (B)'s transmission to CON2 at 1032:59 "*Scottish* [F-15 (B) C/S] *level FL300 confirm you want us to stay where we are and* [F-15 (A) C/S] *up at 330?"* to which CON2 Mentor replied at 1033:06, "[F-15 (B) C/S] *affirm maintain three hundred"* and hearing that, F-15 (A) planned to stop their gradual descent at FL330. RT exchanges made confirmation of the new level impossible until CON2 called F-15 (A) 22sec later. The transcript makes it clear that CON2 and his mentor were working hard and that F-15 (A) was receiving only some of their transmissions and those only in part. Under such circumstances, the fact that the callsigns of both F-15s ended in the same digit could have added to the misunderstanding. As it was, prompt reactions from both military and civil controllers, together with the TCAS RA, resolved the situation. It is of note that the crew of F-15 (A) did not experience communications problems with any other unit or frequency on that day. Moreover, the Weapons Systems Officer of F-15 (A) opined that weak or broken transmissions from ScATCC (Mil) when in the Newcastle area were not unusual.

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.

CAT pilot Members opined that from the EMB145 pilot's perspective, he had complied with the ATC instructions to descend to FL260 given by ScACC MONTROSE who had earlier accepted the co-ordination correctly established by LATCC (Mil) CON15 and passed on to ScATCC (Mil) CON2. The EMB145 pilot had then spotted the descending F-15 (A) visually – prompted by the TCAS TA - just as the observant MONTROSE controller spotted the jet's descending Mode C indication, above the EMB145 1nm away, and issued the avoiding action turn onto 060°. The Board accepted that, fundamentally, it was this unauthorised descent by the crew of F-15 (A) from their assigned cruising level in contravention of the agreed co-ordination that was the catalyst to this Airprox. This led the Board to discuss why the crew of F-15 (A) descended their ac. The comprehensive Mil ATC Ops report had laid out the bare facts of the RT communication between the controller and the crews but the HQ 3AF Advisor made it plain to the Board that the crew of F-15 (A) were absolutely convinced that they had been told to descend by the ScATCC (Mil) controller. The RT transcript had revealed that this was not the case and no specific instruction by CON2 was addressed to the crew of F-15 (A) to descend to FL330 nor apparently read-back by the crew themselves. Given the reported RT difficulties it might be that the RT transcript was not potentially as complete a record of all that was said by the crew concerned over this frequency but it was certainly a complete record of what was received by CON2. It was evident to the Board that the F-15 (A) crews mistake occurred following the second message at 1032:29, transmitted to F-15 (B) by CON2 "*..identified, FL300, Radar Control"*, whereupon at 1032:33, the pilot of F-15 (A) incorrectly responded "*…out of 360 for 300".* It was plain that this was not an instruction to F-15 (A) to descend at all, but this was evidently misinterpreted as such and to which CON2 immediately replied "[F-15 (A) C/S] *maintain FL360 at the moment."* However, the comments from HQ 3AF had revealed that the crews were experiencing significant difficulties over the RT communications from CON2, not just to F-15 (A) but also apparently to F-15 (B). Moreover, it was not until the transmission cited by HQ 3AF from F-15 (B) and addressed to CON2 at 1032:59, "*…level FL300 confirm you want us to stay where we are and* [F-15 (A) C/S] *up at 330?"* that any uncertainty was introduced into the minds of the crew of F-15 (A) and upon hearing this, they planned to stop their gradual descent at FL330. Although the reportedly broken transmissions might have affected them getting confirmation from the controller, the crew was apparently in no doubt so did not check with CON2 beforehand. Members were perplexed that this apparently highly experienced crew could make such an error. Irrespective of any RT exchanges between F-15 (B) and CON2, in some Members' view there was no reason for the crew of F-15 (A) to have initiated a descent from their assigned level without a descent instruction that was addressed specifically to them. With only one digit of the actual callsign the same between F-15s A & B this did not appear to be an issue either but the HQ 3AF Advisor reiterated that the crew of F-15 (A) had no doubt in their minds as to what they were supposed to do until the transmission by the crew of F-15 (B). The lesson from this Airprox whilst not a new one was startling in its clarity: – in the normal course do not change level in CAS without explicit instructions to do so and make sure those instructions are addressed to you; readback the instruction clearly and be prepared to promptly question anything that is apparently not 'clear as crystal'. This lesson was also of benefit to controllers because the reply given to F-15 (B) by the CON2 Mentor "*..affirm maintain three hundred"* at 1033:06, to *".. confirm you want us to stay where we are and* [F-15 (A) C/S] *up at 330?"* was indeed potentially misleading, as it did not separate the reply into the distinct answers, which the two questions warranted. However, the Board recognised that this was all said with the blinding clarity of hindsight. The RT difficulties were discussed further at length and whilst it was known that there had been problems concerning the

NATS multi-legged transmitters (RICE) operating on the same frequency [invariably encountered when communicating with LATCC (Mil)/ScATCC (Mil)] and radios fitted to these ac in the past, the problems described by the WSO about 'broken' transmissions from ScATCC (Mil) when in the Newcastle area had not been raised with the ATCRU themselves. Indeed, before the assessment of this Airprox enquiries by UKAB Inspectors related to this topic had revealed no known history of RT problems at ScATCC (Mil) in this locale. That was not to say that the Board questioned the veracity of the report from the pilot of F-15 (A) at all, for it had apparently been a factor here and was thus considered by the Members to be part of the cause. On a slightly different tack, a military controller Member questioned whether the transmitter location of the frequency allocated to CON2 was appropriate given the geographical location of the traffic under service. The Mil ATC Ops Advisor briefed the Board that there was nothing to suggest that this was a factor but she elected to research this point and provide a response after the meeting. Following a comprehensive discussion, the Board agreed unanimously that the cause of this Airprox was that during a period of poor RT reception, the crew of F-15 (A) misinterpreted a transmission intended for F-15 (B) and descended into conflict with the EMB145.

Turning to the risk inherent in this encounter, the Mil ATC Ops report had shown that CON2 had continued to work hard to resolve the situation when it became apparent that F-15 (A) had descended toward the EMB145. The response to the avoiding action L turn onto W and traffic information warning the crew of F-15 (A) about the presence of the EMB145 below them initially transmitted by the CON2 mentor at 1033:37, was at first unheeded. It was not until a further transmission repeating the instruction was issued that the crew of F-15 (A) gave the first indication that they had received the instruction and it was not until 1033:52 that it became clear that they were climbing back to FL360 and turning L. The Great Dun Fell radar recording showed that this was just at the point of minimum horizontal separation of 0·5nm, but the minimum vertical separation was not so clear-cut. A civilian controller Member pointed out that this level was not shown on the ScACC Radar recording which evinced several iterations of NMC from the subject F-15 (A). The Great Dun Fell Radar recording suggested that F-15 (A) had descended to about FL338 before evincing a climb suggesting that minimum vertical separation was in the order of 1300ft and occurred on the sweep just before the closest point between the two ac horizontally. However, the pilot of F-15 (A) had reported that he descended no lower that FL334 according to his ac's recording equipment albeit that no time was given with that level. However, it was also clear there were small discrepancies between the timing of the initiation of the L turn onto W quoted at FL356 and occurring at 1034:05 from the ac's equipment. When compared to the Great Dun Fell, this showed that F-15 (A) was 1100ft below this level still passing FL345 and still turning L at 1034:08. However, in the worst case if F-15 (A) had achieved FL334 at the point of minimum horizontal separation then vertical separation could well have been some 1100ft above the EMB145, which indicated FL323 at that point, but some 200ft less than the Great Dun Fell showed earlier. Nevertheless, Members recognised that this still suggested that over 1000ft of vertical separation existed at the point of minimum horizontal separation. This coupled with both crews awareness of each other's ac by that stage, with the crew of F-15 (A) turning away from the EMB145 whose own crew had visual contact with the fighter and who themselves were complying with the avoiding action proffered by MONTROSE and the commended TCAS descent, convinced the Board that no risk of a collision had existed in these circumstances.

[Post Meeting Note: The Mil ATC Ops advisor confirmed with ScATCC (Mil) that CON2 was operating on a suitable UHF frequency for the area within which the F15s were flying.]

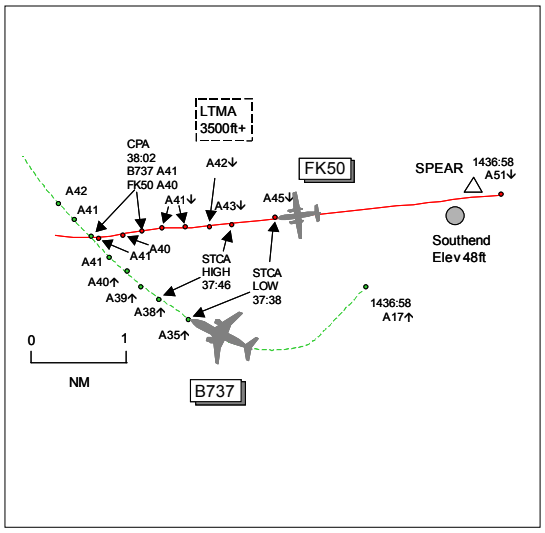
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: During a period of poor RT reception, the crew of F-15 (A) misinterpreted a transmission intended for F-15 (B) and descended into conflict with the EMB145.

Degree of Risk: C.

AIRPROX REPORT NO 216/05

Date/Time:	15 Dec 1438	
Position:	5134N 00036E (3nm W Southend - elev 48ft)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-800	FK50
Operator:	CAT	CAT
Alt/FL:	↑4000ft (QNH)	4000ft (QNH)
Weather	VMC NR	VMC NR
Visibility:	NR	NR
Reported Separation:	not seen	nil V/1000m H
Recorded Separation:	100ft V/0·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports climbing to 4000ft outbound from Southend IFR and in receipt of an ATS from Southend then London on 118·82MHz squawking 4344 with Mode C. Following a CPT1 departure turning onto heading 340° at 190kt climbing through 3500ft QNH, a TCAS RA 'maintain vertical speed' was received. They maintained v/s in accordance with the RA guidance until reaching 4000ft when the RA ceased. They informed ATC of the manoeuvre and that they would be filing a report and ATC told them that there had been an ATC mistake. The other ac was not seen visually but TCAS indicated that it passed about 1200m to their R and then behind, slightly below and he assessed the risk as high.

UKAB Note (1): The LTCC RT transcript shows the NE Deps SC asking the B737 crew *"B737 c/s did you see that traffic on departure"*. The B737 crew replies *"er we watched the (unintelligible word) traffic go by..."*.

THE FK50 PILOT reports inbound to London/City and in receipt of an ATS from Thames Radar on 132·7MHZ squawking 7347 with Mode C. After passing SPEAR heading 270° at 224kt and 4000ft QNH, first a TA then an RA 'descend' was received. The RA guidance was followed which lasted about 10sec, resulting in a descent of 100ft. The other ac was in their 10-11 o'clock, a white coloured B737, range 1000m on a similar heading/course also at 4000ft. They informed ATC of the visual sighting and that it was not a relevant factor and he assessed the risk as low.

THE LTCC BIG/TIMBA SC reports that when the FK50 was E of Southend at 5000ft altitude he noticed a London/City departure on a DVR SID at 3000ft. He contacted Thames Radar to coordinate the FK50 on a heading of 270° to pass N of the City departure routeing SE and to descend the FK50 to 4000ft – this was agreed. He descended the FK50 to 4000ft and transferred the flight to Thames. Several seconds later, he noticed the subject B737 from Southend at 4000ft so he telephoned Southend to get them to descend the B737 but they told him that it had already been transferred. He then telephoned Thames who told him that they were visual. Prior to these events, the S Coordinator had cleared the B737 to 4000ft which he, the SC, had agreed to. He concluded that the error was purely his, as he had not taken in the B737's details that had been presented to him.

THE LTCC S COORDINATOR reports the B737 was given a release towards EVNAS climbing to 4000ft and to call NE Deps. The fps was given to the SE Low SC who acknowledged the coordination and placed it underneath the fps of the conflicting traffic, the FK50, to highlight the confliction. Also, the TI on the Southend departure (the B737) was given to Thames Radar as a matter of courtesy.

THE THAMES RADAR CONTROLLER reports the SE Low controller had face-to-face coordinated a N'bound Southend departure whilst the FK50 was approaching SPEAR. The SE Low controller telephoned to advise that the FK50 would be heading 270° from SPEAR. He then saw a Southend outbound climbing to the SW of the FK50

and turning N so he issued 'avoiding action' to the FK50 flight. The FK50 crew reported 'I have the traffic in sight it is not a factor' and did not turn. The FK50 was then vectored for a successful landing onto RW28 at London/City.

THE LTCC NE DEPS CONTROLLER reports that traffic was light after he had just taken over the sector. Amongst the traffic was a pending plan on the B737 released via EVNAS climbing to 4000ft. He observed a flashing red STCA over Southend with 2 garbling labels and as the 2 ac started to separate the B737 flight called on frequency level at 4000ft. He immediately gave the B737 flight avoiding action to increase separation on what he could now see to be the FK50 at 4000ft inbound to London/City.

THE LTCC N COORDINATOR reports acting as NE/NW Coordinator when the SE Coordinator telephoned for a Southend release on the B737. As there were no conflictions he released the B737 to 4000ft routeing to EVNAS and he then placed the fps in the BPK bay of the NE controller's fps display.

ATSI reports that SC had been operating the bandboxed BIG/TIMBA (SE Low) sectors for about 15min. He described his workload as light at the time of the Airprox. Another controller had been available if it had been considered necessary to split the sector. He mentioned that an inexperienced trainee was 'plugged in' with him at the time. The trainee was just listening and was not taking any active part in the operation. Although the SC was involved in explaining the traffic situation, he did not consider that the presence of the trainee presented a major distraction from his operational task.

At 1431, Southend ATC telephoned the TC SE Coordinator to request a release for the B737 on a Compton (CPT) 1 Standard Departure Route (SDR), for an estimated departure time of 1436. This routeing is via EVNAS to join CAS on track to LAM-BPK-HEN-CPT via Airway L9. Clearance is to cross EVNAS at altitude 3000ft and when established inbound to LAM, on Radial 086, to climb to altitude 4000ft. (The base of CAS in the vicinity of Southend is 3500ft.) In accordance with LTCC MATS Part 2 procedures for departures via EVNAS, the SE Coordinator obtained prior approval of the TC NE Coordinator for the flight before informing Southend, at 1433, that the B737 was released climbing to 4000ft and the contact frequency would be 118·825 (i.e. NE Departures). Southend reported that the B737 would depart off the W'ly RW at 1435. The SC confirmed that the SE Coordinator had informed him about the B737's departure from Southend and had pointed out that it would be climbing to 4000ft i.e. above the initial SDR altitude of 3000ft. He had placed its fps in his display, under the same designator as that of the FK50.

The FK50 flight established communication with the BIG/TIMBA sector at 1434, after prompting by the SC. At the time, the flight was tracking SW, approximately 12nm NE of Southend Airport and was instructed to descend from FL70 to 6000ft. Shortly afterwards, the FK50 was cleared to descend to 5000ft. The SC said that he observed traffic outbound from London City on a DVR SID which was under the control of Thames Radar. In order to deconflict the 2 flights he contacted Thames Radar to coordinate a plan of action. It was agreed that the FK50 would be routed W, descending to 4000ft, whilst the outbound would be turned to track SE. Accordingly, at 1436:20, the SC instructed the FK50 to turn R heading 270°. About 30sec later, after it had completed the turn, the FK50 was cleared to descend to 4000ft. Following an acknowledgement of this instruction by the pilot, the flight was transferred to Thames Radar at 1437. At the time, the FK50 was 1nm to the NE of Southend Airport, passing 5100ft. The B737 is visible on the radar recording, just airborne from Southend, showing a 4434 squawk, and passing 1700ft. (Code/callsign conversion did not activate until approximately 40sec later.) The SC admitted that he had overlooked the imminent departure of the B737, when instructing the FK50 to descend to 4000ft.

Having transferred the FK50 to Thames Radar, the SC said that he turned his attention to the traffic situation elsewhere in the sector. He added that he became aware of the potential conflict with the B737 when STCA activated with a high severity alert at 1437:46. (Radar recordings indicate that a low severity alert was generated at 1437:38.) At the time, the subject ac were on conflicting tracks, 1nm horizontally and 500ft vertically apart. He immediately telephoned Southend to instruct them to descend the B737. However, the flight had already been transferred to TC NE (1437:10). Southend ATC is not equipped with SSR and, consequently, would have had no knowledge of the FK50's level from their radar display. The SC then contacted Thames Radar but by this time the Thames Radar Controller had already issued an 'avoiding action' L turn heading 180°. The pilot reported visual with the traffic and did not alter course. Meanwhile the NE DEPS SC had observed a high severity STCA alert between overlapping SSR labels in the vicinity of Southend. As the labels separated the B737 made its initial call on the frequency. Although the tracks of the subject ac were now diverging, the NE SC issued the B737 an 'avoiding action' R turn heading 360° to ensure that standard separation was restored as soon as possible. The radar recording of the event shows the minimum separation occurring at 1438:02, as the B737 passes through the

12 o'clock of the FK50, 0·5nm away. The vertical separation, at the time, was 100ft, the B737 was maintaining 4100ft and the FK50 4000ft.

Since this Airprox a Temporary Operating Instruction (TOI 175/05) has been issued by TC Operations. The purpose was to ensure, pending further analysis of the ATC procedures in the Southend area, that the TC SE Low SC is fully aware of Southend departures to the N and E. To this end two additions to the procedure were introduced. When Southend requests a departure release from the SE Coordinator, he will agree a Departure Release with the SE Low SC and will issue the appropriate **SE** frequency. However, it is considered that these changes, although welcome, may not have affected the outcome of this Airprox. By the time the B737 had contacted the allocated TC frequency, the two ac had already passed. Additionally, the SC confirmed that he was fully aware of the Southend departure via EVNAS and its clearance into CAS at 4000ft. He had even discussed with the trainee how he would handle the situation with the subject ac i.e. leaving the FK50 at 5000ft until the two ac had crossed. It was suggested at a later date that this discussion, whereby the problem was 'apparently resolved', may have contributed in some way to him overlooking the presence of the B737 when clearing the FK50 to descend to 4000ft. He added that, in his opinion, whilst recognising the importance of allowing early access to CAS, it would be better if Southend departures to the N and E, were not released above 3000ft, allowing the 1000ft buffer against traffic already in CAS. However, on this occasion he had not challenged the Departure Release, as he was entitled to, and had accepted departure to 4000ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI Advisor informed Members that the Southend procedure had been revised so that an initial altitude of 3000ft is now given on the release clearance for Southend departures.

Members highly commended the frank and honest report from the BIG/TIMBA SC who had not taken the B737 into account when he descended the FK50: this had caused the Airprox. Although the SC did not believe that the presence of a trainee had distracted him, this was a possibility as he had spent some time discussing the Sector traffic situation. ATCO Members felt that when talking through his plan the SC had mentally resolved the potential confliction which could have easily led him then to overlook the B737.

Turning to risk, the Thames Radar controller had seen the confliction and issued an avoiding action L turn to the FK50 crew whilst the B737 crew made their initial call to the NE Deps SC only after the subject ac had passed. The B737 crew had received an RA warning and continued their climb whilst following the guidance, seeing the FK50 passing clear to their R and behind. The FK50 crew had received a 'heads-up' from TCAS with a TA which was quickly followed by an RA 'descend'. The B737 was seen visually in their 10-11 o'clock on a similar course at 4000ft as the RA guidance was followed which resulted in an altitude deviation of 100ft. The NATS Advisor showed Members a TCAS simulation report for the incident. This indicated that the B737 and FK50 crews would have received coordinated RAs to 'maintain vertical speed, crossing', the B737 to climb and the FK50 to descend because TCAS calculated a better resolution of the conflict would be achieved by the ac crossing vertical paths. Noteworthy was that, at the CPA, the separation distances achieved were less than what would have been expected. This led Members to believe that one or perhaps both crews may have reduced their vertical speeds and levelled-off rather than maintaining their flight paths as advised by TCAS – this was borne out from the report, with 'clear of conflict' being generated after the subject ac had crossed laterally. However, both crews had seen each other and were always in a position to manoeuvre further if necessary (the FK50 crew declined the offered L turn) which was enough to persuade the Board that safety had been assured during the encounter.

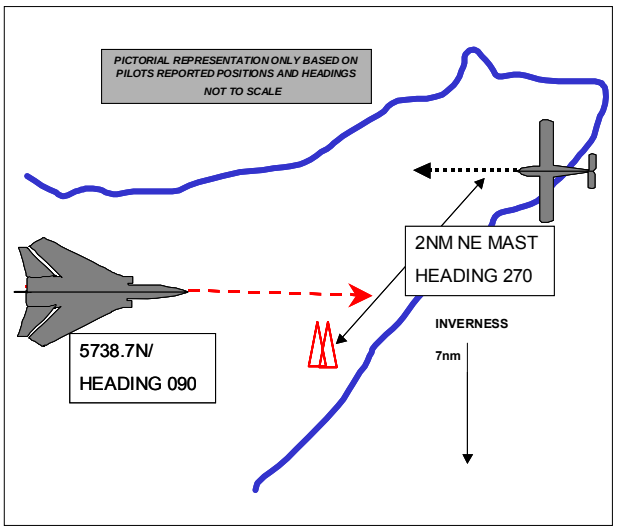
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC BIG/TIMBA SC did not take the B737 into account when descending the FK50.

Degree of Risk: C.

AIRPROX REPORT NO 217/05

Date/Time:	19 Dec 1125	
Position:	5739N 00405W(2nm NE Rosemarkie)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA38	Tornado
Operator:	Civ Trg	HQ STC
Alt/FL:	800ft	500ft agl
	(QNH 1016 mb)	(N/K)
Weather	VMC CLBC	VMC CAVOK
Visibility:	10km	40km
Reported Separation:		
	0ft V/1nm H	100ft V/1.5nm H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA38 PILOT reports flying a training flight in a white and blue ac with all lights switched on in receipt of a FIS from Inverness Tower and squawking 7000 but Mode C was not fitted. He was conducting a practise forced landing in an area 7nm to the N of Inverness which had been reported to Inverness. He was informed by ATC of a low flying aircraft shortly to enter the area and a Tornado ac came onto the frequency so he reiterated his position and height to the controller. The controller then asked the Tornado if he had received his position report to which he replied '*Affirm*'. About 2min later while in the descent at about 500ft agl [~950ft amsl], heading 270°, he spotted a fast jet in his 12 o'clock, 2nm away flying straight towards them, he carried out an evasive, sharp climbing turn towards the right, in order to avoid a head on impact. After a few seconds he rolled wings level in order to see the jet, which was at this point abeam his position and about 100' below. As the jet passed heading E it was seen to 'waggle its wings'. The jet crew then checked off frequency. He then informed ATC that the Tornado had passed through their area and he intended to file an Airprox. The student who he was demonstrating to did not see the Tornado until it had passed them. He estimated the time from initial sighting until clear of the Tornado to be about 10 seconds.

THE TORNADO PILOT reports flying a passenger sortie in a grey ac with all lights switched on and at the time of the incident he was recovering to Lossiemouth at 420kt and 500ft agl, squawking 7001 with Mode C. Prior to recovery he had contacted Inverness ATC when 15nm to their SW, passed a position report and requested traffic information. Amongst others they advised him of the presence of a Tomahawk at the N end of Black Isle. He saw the ac at 5nm and his track of 090° was taking him clear by 1.5nm so he took no further avoiding action but signalled his presence [by waggling his wings] and called visual on the radio before transferring to Lossiemouth. At all times he had the Tomahawk in sight and the ac track was selected to pass well to the South of it. There was never any risk of collision and he considered that a miss-distance of over a mile was reasonable.

UKAB Note (1): At a closing speed of 500kt (estimated) the ac would pass one another in just under 15sec.

UKAB Note (2): The incident occurred below the base of recorded radar cover.

UKAB Note (3): The Tornado pilot reported his position as a Lat and Long to 1 place of decimals taken after the event from the mission data recorder. About 30 sec prior to the incident (1124:30) the transcript of the Inverness RT frequency shows the PA38 reported

''Roger er just currently er PFL practice to the NorthEast of Rosemarkie mast at two miles down to er 200ft agl"

This was the most accurate position of the PA38 available. Since the PA38 reported heading 270° and the Tornado reported heading 090° their lateral separation measured from OS sheet 21 as being 1.4nm would not have

changed in the time leading up to the PA38 pilot becoming visual with the Tornado and conducting his evasive manoeuvre to the right. It would then have increased and if the turn was through say 45° of heading change in the 15 sec calculated at Note (1) above, this would have generated an additional 0.16nm (300m) separation giving a total of 1.56nm. These figures are only theoretical but are based on the best information available to the UKAB.

THE TORNADO STATION comments that this was an excellent example of the 'See & Avoid' principle working. All procedures were followed correctly and the crew maintained a good lookout in good weather ensuring that there was no confliction.

THE INVERNESS ATC report and the transcript of the RT frequency confirmed the facts as presented by both pilots.

ATSI had nothing to add.

HQ STC comments that there seems to be a difference of perception of this incident in the two cockpits. The PA38 pilot was clearly concerned by the proximity of the fast moving Tornado. However, the Tornado pilot was content with his avoidance margin.

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.

Clearly in this incident there was a difference of perception between the two instructors as to what constitutes safe avoidance. The Tornado pilot estimated the horizontal separation as having been 1.5nm and the PA38 pilot 1nm. The Board considered that, since both pilots were very familiar with the local area of the incident, the geographical positions of the ac reported by both pilots were most likely correct. That being the case, it was probable from plotting their positions accurately on an OS map that the lateral separation had been of the order of 1.6nm.

Some Members considered that it was likely that the PA38 instructor had been startled by the Tornado and it therefore followed that the Tornado had flown close enough to the PA38 to cause its pilot concern. However, even accepting the smaller of the two estimates of the separation (i.e. 1nm as reported by the PA38 pilot), the majority of Members considered this to be sufficient to ensure safe avoidance at low level in Class G airspace when the two ac are passing abeam one another on parallel – albeit opposing - tracks.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 218/05

Date/Time:	16 Dec 1135	
Position:	5202N 00215W (3nm SW Tewkesbury)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	Tornado GR4
Operator:	Civ Trg	HQ STC
Alt/FL:	2200ft	2070ft
	(QNH 1013 mb)	(RPS)
Weather	VMC CLBC	VMC CLBC
Visibility:	30km	10km
Reported Separation:		
	0ft V/<20m H	20ft V/10m H
Recorded Separation:		
	NR v/Contacts Merge H	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports flying a training flight with a student pilot in a white and blue ac with all lights on. He was PIC/Instructor, sitting in the RH seat with a student in the LH seat and another student in the back. He was squawking 7000 but Mode C was not fitted and he was listening out on Gloster APP. The ac had been set up in the cruise heading 030°, height 2200' [QNH] at 95kt IAS for 3–4min. Without any warning there was a huge jolt to the ac, accompanied by the cockpit "lighting up" which they thought was caused by the external lighting of the other ac. The occupants were extremely distressed as it felt as if their ac had had some kind of airframe or structural failure. The PA28 pilot then looked to his 4 o'clock position and had his first sighting of a Tornado ac 4-500m away and going away. It seemed as if it had come from below and was just levelling off on a heading of approx 130° before turning to L and descending to low level to pass L to R beneath their nose. The PA28 pilot checked to make sure he still had controllability of ac and intensified his lookout for possible other ac in formation.

He and his passengers were extremely shaken therefore it was difficult to describe the incident accurately.

THE TORNADO GR4 PILOT reports flying a singleton low level training sortie in a grey ac with HISLs and nav lights selected on squawking 7001 with Mode C. While heading 175° at 450kt near the Welsh border, his navigator spotted first one, then a second Chinook in their R, 2 o'clock position at a range of about 3nm. On looking forward again, he spotted a Squirrel helicopter in his 11 o'clock at the same level so he initiated a climb in order to avoid it. During the manoeuvre his attention and that of his navigator was on maintaining contact with the Squirrel in order to ensure that they avoided it by a reasonable margin. Once clear of it he levelled the ac and having cleared his flight-path ahead descended back to low level.

Subsequent analysis of the HUD video revealed a light ac in their 12.30 which was unseen by both crew members at the time. It passed about 30ft down their RHS and slightly above just as they were levelling off. The voice track from the video confirms both he and his navigator were looking L at the Squirrel at the time.

HQ STC comments that this was extremely close and happened, unfortunately, at the same time as other contacts were being spotted and avoided by the crew. The crew were looking towards the Squirrel and did not see the PA28 that would have been in a constant relative position to them.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar video recording, transcripts of the relevant RT frequencies, some stills from the HUD camera and a report from the Tornado operating authority.

The Board viewed this as a straightforward but most serious incident. The PA28 had been operating sensibly above 2000ft, above the height band generally used by military ac. The Tornado, to avoid other ac in the immediate locality, was forced to climb above that height band. Due to its speed and position the PA28 pilot would have been exceptionally poorly placed to acquire the Tornado visually as it climbed from low in his 11 o'clock.

The crew of the Tornado were equally poorly placed since they had been concentrating on the conflicting helicopters operating at low level and therefore would understandably have been looking in that direction. Expert opinion however was that perhaps the Tornado crew could have split their concentration into more than one area which might have revealed the PA28, above them and closing rapidly on an almost constant bearing.

Neither crew had seen the opposing ac; it was therefore only by good fortune that their flightpaths had not actually been on a collision course.

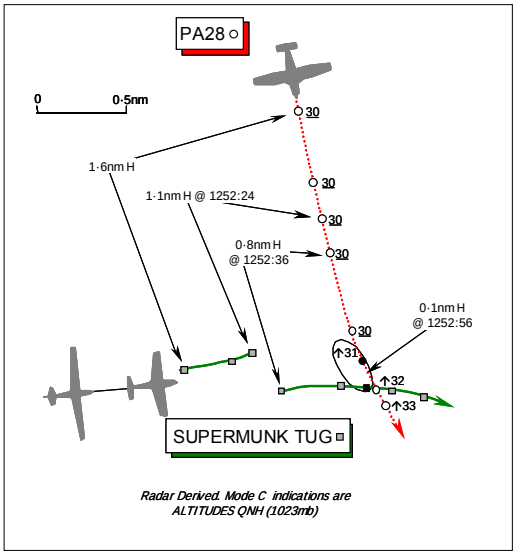
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by both crews.

Degree of Risk: A.

AIRPROX REPORT NO 219/05

Date/Time:	18 Dec 1252 (Sunday)	
Position:	5047N 00109W (2½nm SE of Lee-On-Solent - elev 32ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Ask 21 Glider	PA28
Operator:	Civ Club	Civ Trng
Alt/FL:	3000ft (QFE)	3000ft (QNH 1024mb)
Weather	VMC CAVOK	VMC CLOC
Visibility:	>10km	40km+
Reported Separation:	200ft V/0·3nm H	Nil V/150m H
Recorded Separation:	Not recorded v Glider 0·1nm H v tug	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 21 GLIDER PILOT reports that he was occupying the rear seat as the PNF with the P2 in the front seat as the PF. They had climbed out from Lee-on-Solent [L-o-S] on an aerotow from a DH Supermunk tug ac and were just off-shore heading 135° at 65kt being towed parallel to the coast, climbing through 3000ft L-o-S QFE in CAVOK conditions. Some 1½nm SSE of L-o-S aerodrome he [the PNF] spotted another ac – the PA28 - about ½nm away in their 10 o'clock in straight and level flight. After watching it for a couple of seconds, he realised that the lack of any relative movement meant that their paths would cross unacceptably close so he took control of the glider, released from the tug and took avoiding action by rolling 90° to the R into a spiral descent and turning through 180°. He estimated that the PA28 was 200ft above his ac at the closest point with a minimum horizontal separation of 0·3nm. After the avoiding action manoeuvre, he carefully turned back to the L and saw that the other ac was maintaining what looked to be the same course and altitude, with their tug now on the far side of the other ac following from behind and below. He assessed the risk as "high" and added that when he took avoiding action, he lost sight of the other ac.

THE DE HAVILLAND SUPERMUNK TUG PILOT also helpfully provided an account reporting that he was the PF with another pilot whilst the glider flown by the reporting pilot was under tow. Eastbound at 60kt, climbing through 3000ft QFE the PNF drew his attention to the conflicting ac which was approaching from the N in their 9 o'clock about 50m away and appeared to be on a southerly collision course. The glider pilot saw the other ac at the last moment and released from his tug and dived to avoid the PA28, which then climbed steeply at a late stage narrowly missing the glider. The reported ac's registration was obtained visually as the PA28 flew on towards Ryde. He added that the PA28 pilot's course was heading into the bright sun.

THE PA28 PILOT, an instructor, helpfully provided a very detailed and laudably frank account, reporting that he was departing from Southampton for a routine instrument training flight on an IFR departure clearance from Solent RADAR. The student - in the LHS - was wearing instrument training foggles so his look out was obscured: thus the instructor pilot in the RHS was responsible for the look out during the flight outside CAS. They had received a standard clearance to depart CAS towards the 'IW' NDB at Bembridge climbing to an altitude of 3000ft Southampton QNH (1024mb) squawking A3667 with Mode C selected to carry out some NDB holding and then to return to Southampton via Petersfield. The ac is equipped with high intensity white wing tip strobes and navigation lights, both of which were selected on during the entire flight. Whilst under a RCS within the Solent CTA, Solent RADAR provides the traffic separation and so, in his view, there is minimal need for looking out the window for other traffic. At the time of the Airprox they had just exited the Solent CTA [2500ft ALT - FL55], heading 160° at 100kt and been advised by Solent RADAR that the RCS had been terminated, to select a squawk of A7000 and free call their en-route agency. Thus heads were inside the cockpit changing transponder codes etc. The student was then having a bit of trouble working out the NDB track and so the instructor pilot was 'head-in' the cockpit giving guidance to his student on tracing the NDB needle. As the PA28 instructor pilot looked out to maintain his look out scan he spotted a glider tug – the DH Supermunk - in his 2 o'clock moving from R - L at about the same level. At the same time he noticed the glider, which had been previously obscured by the edge of the windscreen and door pillar, in a descending turn. He immediately took control of his ac from the student and carried out an avoiding action climbing turn to the L, away from the glider, which was on his starboard side and also to clear the tug ac which had maintained its course and altitude SE bound.

The PA28 instructor pilot assessed the risk as *"high"* and concluded frankly that from his perspective there were a number of factors that contributed to this Airprox: ultimately himself having his head in the cockpit, having to deal with the student and failing to spot the glider beforehand. He opined that there is a severe lack of ATS within the whole of the UK airspace structure. Why, he postulated, as a base operator at a UK airfield on an IFR departure clearance, should the ATC service be terminated as soon as the edge of their airspace is crossed. Furthermore, at no time were they given any hint of any possible aerial activity along their route by Solent RADAR, adding that the only LARS units near them are Farnborough and Bournemouth and so where they were flying they would have been beneath both of these ATSUs radar coverage areas and so unable to obtain a RIS as he liked. He believes that ATSUs don't want the *"hassle or responsibility of dealing with ac outside their airspace"* and whilst he is fully aware that ultimate responsibility lies solely with the commander of the ac, *"a little friendly help"* from ATC would not go amiss.

He also suggested that the tug and glider pilot might well have spotted the PA28 sooner, but under the 'Rules of the Air' in this situation it is he in the PA28 that was required to 'give way' to the glider or tug and glider combination whilst they maintained their course and speed. This might have contributed to the Airprox insofar as the tug and glider pilot might have believed quite rightly that they had the 'Right of Way' and expected that he was going to turn R and avoid them by flying behind them.

As a result of this Airprox he has already put into practice a policy of not departing direct on track towards the 'IW' NDB from Southampton, as the required 155° track does take them over Lee-on-Solent. Instead he has instructed their school's flight instructors to depart towards the E before turning S on a track toward the 'IW' NDB, thereby avoiding the Lee-on-Solent area.

UKAB Note (1): The Pease Pottage radar recording does not illustrate this Airprox clearly as the glider is not readily apparent. The PA28 is shown exiting the Solent CTA at 1250:38, and maintains a steady course level at 3000ft QNH (1023mb) above the Fleetlands ATZ. A primary radar contact is shown eastbound from 1252:06, which would accord with the reported track of the tug/glider combination. At 1252:24, the primary contact - the tug/glider combination - skips about 0·33nm to the S and is then shown at 1252:36, in the PA28's R 1 o'clock at a range of 0·8nm. This track - the Supermunk tug – continues on an easterly course as the PA28 closes and is shown climbing through 3100ft 0·1nm (200yd) N of the tug as the latter crosses ahead of the PA28 from R – L.

The glider is not shown at all as the PA28 passes astern of the tug indicating 3200ft QNH, probably just as the Airprox occurred some 2½nm SE of Lee-on-Solent just off the coast. The PA28 climbs steadily to 3300ft as the tug opens to the E as reported.

ATSI reports that the PA28 departed Southampton on an IFR training flight. At 1248:00, the pilot contacted the Solent RADAR controller and reported passing 2200ft in the climb for 3000ft. The controller acknowledged this and instructed the pilot to *"maintain altitude 3000 continue radar heading 140°"*. At this time the PA28 was 3½nm SE of Southampton Airport. The flight left the Class D CTA at 1250:50, whereupon the controller informed the PA28 pilot of this, *"you've left controlled airspace now your position is 1nm north of Lee-on-Solent resume own navigation"*. This was acknowledged and the controller then instructed the PA28 pilot before 1251:30, to squawk A7000 and free-call his en-route frequency. The pilot acknowledged this and did not request any further service from Solent RADAR. At this point the Pease Pottage radar recording does not show any traffic near to the PA28, however, Lee-on-Solent is notified in the UK AIP at ENR 5-5-1-3 as being an active glider launch site [UKAB Note (2): promulgated active during daylight hours for winch launches that may attain a height of 2000ft above the site elevation of 32ft amsl and aerotows.] sunrise to sunset. The Solent controller did not reiterate this, probably in the belief that as the PA28 was locally based the instructor would be fully aware of Lee-on-Solent's position and the status of the activity. The Airprox took place at about 1252:55, but the pilot made no mention of the incident to the Solent RADAR controller.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The BGA Member opined that the intent here was to climb up on a high-tow to enable the glider pilot to conduct general handling or maybe aerobatics so he explained to the Board that the Supermunk tug does not climb very well with 2 persons on board. It was pointed out that the pilot of the Supermunk tug was the pilot-in-command of the tug/glider combination and in accord with the 'Rules of the Air' had 'right-of-way' over the PA28 – as the PA28 instructor had himself noted. The established protocols of the 'Rules of the Air' can however only work if pilots have spotted the other ac beforehand and in sufficient time to apply the rules appropriately. Here it was evident from the comprehensive reports submitted that it was the glider pilot who had spotted the conflicting PA28 first of all about ½nm away; realised that the PA28 pilot was not manoeuvring at that late stage to remain clear as was required of him and had wisely released from the tug to take his own somewhat robust avoiding action. The gliding Member explained that if the tug pilot had seen the PA28 earlier he might have given a 'wave-off' to the glider – a mandatory instruction to the glider pilot to release from the tow. 'In extremis' the tug pilot could release the tow entirely himself so that he could manoeuvre out of the way if that proved necessary but that would also have the added danger of letting go of the tow-rope - quite a desperate action of last resort. As it was the Supermunk pilot probably spotted the PA28 at the same time as the latter's instructor pilot had seen the tug - and then the glider – and just before the PA28 pilot took control of his ac from the student and carried out his vigorous avoiding action climbing turn to the L. This was seen by the Supermunk pilot who said that the PA28 climbed steeply at a late stage and narrowly missing the glider. In the gliding Member's view, the tug pilot should have been able to spot the confliction beforehand in the reportedly CAVOK conditions and taken appropriate action before the three ac involved flew into close quarters. But it seemed to the Members that the Supermunk pilot did not see the PA28 in sufficient time to affect the outcome and, therefore, this was effectively a non-sighting by the tug pilot and, in the Board's view, part of the cause. From the PA28 instructor pilot's perspective, he was acting as the 'safety pilot' whilst operating VFR in the see and avoid environment of the Class G airspace S of the CTA whilst his student was practising instrument flying (and was thus unable to contribute to the overall lookout). The PA28 instructor pilot's commendably candid report had suggested that with his 'head-in' the cockpit dealing with the student's difficulties he had not spotted the tug/glider combination in sufficient time to give a wider berth. But it was evident that when he saw the tug and then subsequently the glider he had taken positive and robust action to resolve the confliction. The Board agreed unanimously that the very late sighting by the PA28 instructor was the other part of the cause.

The PA28 pilot had also opined that there is a severe lack of ATS within the whole of the UK airspace structure and that *"a little friendly help"* from ATC would not go amiss. It was suggested that as a locally based operator he should be well aware of the nature of the activities conducted in the vicinity such that when Solent RADAR terminated the RCS at the CTA boundary, he could have made a request for a further radar service outside CAS - the key here is to ask for the service in the first instance. The Board was advised that it is common practise for

Solent controllers to warn pilots of other observed traffic but it would appear that the tug/glider did not paint satisfactorily on the Southampton SRE or possibly the controller might have been dealing with higher priority inbound or departing traffic. It seemed to Members that the PA28 instructor had considerable confidence in Southampton ATC to the point he opined that when operating within the Class D CTA/CTR there was minimal need for looking out the window for other traffic as Solent RADAR provides the traffic separation. The Board was concerned to correct this view and cautioned that a positive lookout regime and scan for other traffic was imperative all the time, irrespective of the nature of the ATS. Moreover, controller Members were concerned to point out that in general when flying in Class D CAS, separation is only the responsibility of the controller between IFR and other IFR traffic and traffic avoidance will only be provided to IFR ac on other VFR traffic at the pilot's request. When GAT is flying under VFR inside Class D CAS - even when in receipt of a RCS - only traffic information would be provided by the controller to the VFR flight on IFR traffic such that the pilot of the VFR flight is responsible for sighting and affording appropriate visual separation over other IFR or VFR traffic that he has been told about. Nevertheless, it was clear from the PA28 pilot's report that he had taken appropriate action to alert his colleagues to the pitfalls revealed by the investigation of this Airprox which the Board viewed as a wise decision and an eminently sensible precaution.

Turning to risk, the radar recording did not show the ASK21 glider flown by the reporting pilot: consequently the relative geometry could not be determined against this ac independently. Nonetheless, the PA28 and the tug were readily apparent (albeit at the base of radar coverage from the Pease Pottage Radar hence the 'skip' of the contacts a controller Member observed) and the PA28 was shown in the climb through 3100ft QNH at the closest point between these two aeroplanes when they were only 0·1nm apart. The late sighting of the PA28 by the glider pilot – when only ½nm away in their 10 o'clock in straight and level flight, he reported – was evidently in sufficient time for him to assess the situation; to realise that it was getting too close; to release from the tug and manoeuvre his glider robustly out of the way. But the glider pilot was only placed in this situation by the very late sighting by the PA28 pilot who did not give way to the tug/glider combination in accord with the 'Rules of the Air'. Fortuitously, the PA28 instructor had spotted the glider just in time to turn in the opposite direction to avoid it and also to climb to avoid the tug which was crossing ahead. In the Board's opinion, the combined actions of the pilots of the glider and PA28 ensured that any actual risk of a collision was effectively forestalled. However, the lateness of the sightings by the crews of all three ac involved at these close quarters, coupled with the necessity of the glider pilot to release from the tug and the subsequent robust avoiding action manoeuvres, convinced the Board that the safety of the ac involved here had not been assured by any means.

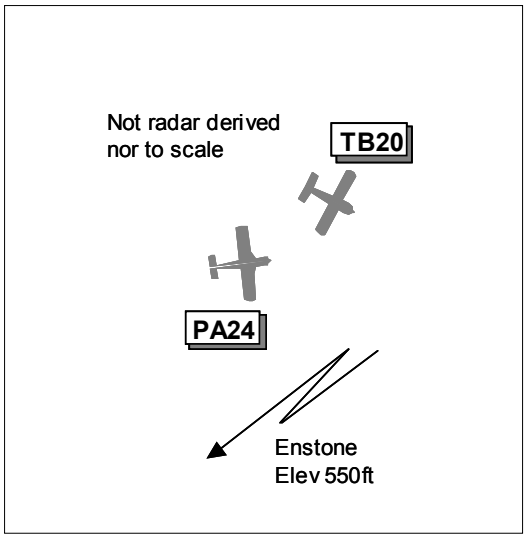
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A very late sighting by the PA28 instructor and effectively, a non-sighting by the Supermunk tug pilot.

Degree of Risk: B.

AIRPROX REPORT NO 220/05

Date/Time:	20 Dec 1320	
Position:	5157N 00125W (1nm NE Enstone - elev 550ft)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	TB20	PA24
Operator:	Civ Pte	Civ Pte
Alt/FL:	1300ft (QNH 1029mb)	1000ft (agl)
Weather	VMC CLBC	VMC CLBC
Visibility:	>10km	10km
Reported Separation:	50-75ft V/100ft H	200ft V/150m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TB20 PILOT reports inbound to Enstone VFR squawking 7000 with Mode C and he was making transmissions to 'Enstone Traffic' on 129·87MHz as the A/G station was not operating. The visibility was >10km 3000ft below cloud in VMC and the ac was coloured blue/white with the strobe, nav and landing lights all switched on. Whilst approaching from the Brize area descending to cct height, he heard other ac on frequency including a Motor Glider taxying, a Jodel inbound and a Microlight in the cct. He joined crosswind and reported downwind for RW26 at 1300ft QNH. Just as he was turning R base at 90kt, his front seat passenger spotted another ac, coloured white and blue and believed to be a PA28R [actually a PA24], 200ft away to their R flying downwind straight and level and slightly above. His natural reaction was to dive his ac and although it happened so quickly he believed the other ac passed 50-75ft above as he turned and <100ft away to the R. It was then seen to turn onto a parallel course to them, out to their L on R base, about 300ft away and, noticing its registration, he called the ac's pilot repeatedly, asking if he was on frequency and what his intentions were. Nothing was heard and after turning onto finals he elected to carry out a low go-around since he had lost sight of the other ac. All he knew was it was behind him and he had no way of knowing the pilot's intentions. He performed a go-around, seeing a Motor Glider at the 'Echo' holding point, and the PA24 then did a 'touch and go', he thought, and once again he lost sight of it. He called the Motor Glider pilot and asked if he had seen the PA24 to which the reply was 'only when he went past'. Subsequently he landed, by which time the Jodel was short final for the S side grass also landing. He assessed the risk as high but later opined that probably there had been no real risk of collision although the PA24 was way too close to him in the cct. He had operated at Enstone on parallel RWs for several years with pilots acting responsibly by broadcasting their positions and intentions when A/G was off the air.

THE PA24 PILOT reports inbound to Enstone VFR squawking 7000 with Mode C. It was his first time for landing at Enstone: he had received prior permission and a briefing from the owner/operator of the N-side maintenance facility at the airfield. The visibility was 10km 1000ft below cloud in VMC and the ac was coloured white/blue with strobe and landing lights switched on. He joined overhead at 1500ft and deducted the QFE, descending to establish downwind RW26. On the downwind leg heading 080° he saw a low wing single engine ac 200m ahead to his L on R base which he assumed to be descending. He manoeuvred to pass 150m clear behind and 200ft above before establishing on a base leg outside of the other ac's cct. He continuously had the other ac in sight which was seen to execute a go-around whilst he flew a low pass at 100ft and 75kt looking at the landing strip followed by another cct to land. He thought that there was absolutely no risk of collision.

UKAB Note (1). During a subsequent telephone conversation with the UKAB Secretariat, the PA24 pilot said that the Enstone frequency was set on the radio but after landing he had found that the ac had an unusual frequency selector in the cockpit.

UKAB Note (2): The UK AIP does not promulgate any information for Enstone. Pooleys Flight Guide contains airfield information, a summary of pertinent data is:-

Enstone is an unlicensed aerodrome with PPR. Two RWs 08/26 of asphalt and grass are in use.

Enstone Radio A/G operations 129·87MHz are managed by Oxfordshire Sport Flying Club.

Circuits: powered ac to the N of the airfield. Group A ac at 800ft aal, Motor Gliders and Microlights at 600ft aal.

Warnings: 6ft high post and wire fence on the northern edge of the asphalt runway.

The 'Northside Grass Strip' RW08/26 is a separate operation, operated by 'The Maintenance Facility'; additional landing information available from a published telephone number. No landing fees but all movements at pilot's risk. All approaches to Northside Grass must be straight, no curved approaches permitted. Advise 'Landing Northside Grass' on 129·87MHz.

UKAB Note (3): The Airprox occurs outside of recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available was reports from the pilots of both ac.

The PA24 pilot had obtained an airfield briefing prior to the flight but in the event had not used the published A/G frequency and had joined the cct non-radio. Although it is generally recommended that pilots make RT calls – thus enabling all parties to build a mental picture of the traffic situation on and within the aerodrome environs – such calls are not mandatory. Therefore it should not be assumed that information received in this way is representative of the whole traffic situation. A good lookout should therefore be maintained at all times, particularly when flying close to an aerodrome, for possible non-radio ac already in, joining or leaving the cct pattern. In summary, it should not be assumed that if no RT calls are heard then another ac cannot be there! - a salutary lesson for any pilot.

In this Airprox, the TB20 pilot was somewhat 'shocked' when the PA24, which had joined the cct unannounced and had positioned downwind, was seen for the first time to his R as he turned onto base-leg. This had caused him to react instantly by diving his ac as the PA24 quickly passed slightly behind and above, he thought too close, before it was seen to position out to his L onto R base. Unbeknown to him, the PA24 pilot had seen the TB20 and manoeuvred to 'give way', he thought by an adequate margin, before positioning behind it onto R base and then onto final for the Northside grass RW. Without the benefit of a radar recording, Members could only assess this incident on the information proffered by the two pilots who were there at the time and know exactly how close they passed. Previous experience has shown that distances are very hard to judge accurately 'in the heat of the moment', particularly where a pilot sees another ac close by and only briefly. This was enough to persuade the Board that this incident had been no more than a sighting report and that safety had not been compromised during the encounter.

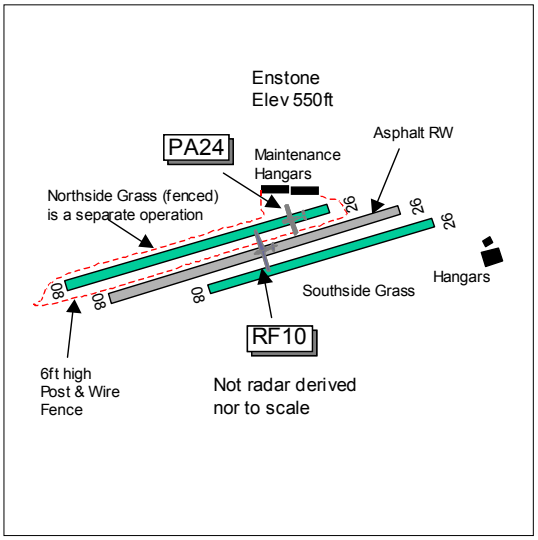
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 221/05

Date/Time:	20 Dec 1330	
Position:	5156N 00126W (RW26 Enstone - elev 550ft)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	RF10 M/Glider	PA24
Operator:	Civ Pte	Civ Pte
Alt/FL:	20ft↑ (QFE 1012mb)	NR↓ (agl)
Weather	VMC CLBC	VMC CLBC
Visibility:	>10km	10km
Reported Separation:	50ft V/<30m H	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RF10 PILOT reports that he had taxied to the holding point at 'E' for 'RW26 asphalt' at Enstone and was in communication with Enstone Traffic on 129·87MHz, the A/G station was not operating. The visibility was >10km 3000ft below cloud in VMC and the ac was coloured white/red with an underside strobe light switched on. Two ac, a TB20 and another ac were on finals, the TB20 pilot had broadcast his intention to land on RW26 asphalt with the other ac agreeing to land on RW26 S side grass. After both ac had touched down, he broadcast that he would line up and wait on RW26 asphalt. The TB20 vacated RW26 asphalt at 'B' and he called the other ac's pilot to check that it was going to stay on the grass and not cross the asphalt RW. He then announced his departure and took-off. Climbing through 20ft agl heading 260° at 55kt and about halfway down the RW, a pilot called him to warn him of an ac overhead (O/H). Being unsure if there was sufficient RW ahead to land and stop, he flew parallel to the ground and then, on looking above and behind to his R, he saw the subject PA24 about 30m away and slightly above approaching to land on the N side grass at a faster speed than his. He did not know if the PA24 was directly O/H at any time or to the N of and parallel to the asphalt RW at all times; the PA24's previous line of approach to the N side grass, before it aborted its first landing at about 20ft, had crossed the approach to the RW26 asphalt as the PA24 was seen to be on the LHS of a TB20's previous approach path before it too had made a go-around. At no time did the PA24 pilot make any calls on frequency. He spoke to the PA24 pilot after landing who said that the ac was fitted only with a 360-channel radio, not 720, and therefore could not use the Enstone frequency, he thought.

THE PA24 PILOT reports inbound to Enstone VFR squawking 7000 with Mode C. He carried out a fairly long final approach to the N side grass RW26 with strobe, beacon and landing lights on. Heading 260° at 70kt he believed he saw a Motor Glider either lining-up or lined-up on the 'hard' RW26 but had then concentrated on his landing. At no time did he consider that any activity on the 26 'hard' RW presented any reason to abort the landing and there was never any element of a risk of collision.

UKAB Note (1): The incident was witnessed by a previously-landed TB20 pilot who reported that during the wait at the hold whilst the Motor Glider took-off, the PA24 was seen to be approaching for the N side grass. Another pilot flying a Jodel ac that had just landed called a warning to the Motor Glider pilot and the PA24 was seen to pass abeam and above the Motor Glider as it rotated.

UKAB Note (2): During a subsequent telephone conversation with the UKAB Secretariat, the PA24 pilot had said that the Enstone frequency was set on the radio but after landing he had found that the ac had an unusual frequency selector in the cockpit.

UKAB Note (3): The UK AIP does not promulgate any information for Enstone. Pooleys Flight Guide contains airfield information, a summary of pertinent data is:-

AIRPROX REPORT No 221/05

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Enstone Radio A/G operations 129·87MHz are managed by Oxfordshire Sport Flying Club.

Circuits: powered ac to the N of the airfield. Group A ac at 800ft aal, Motor Gliders and Microlights at 600ft aal.

Warnings: 6ft high post and wire fence on the northern edge of the asphalt runway.

The 'Northside Grass Strip' RW08/26 is a separate operation, operated by 'The Maintenance Facility'; additional landing information available from a published telephone number. No landing fees but all movements at pilot's risk. All approaches to Northside Grass must be straight, no curved approaches permitted. Advise 'Landing Northside Grass' on 129·87MHz.

UKAB Note (4): The Airprox occurs outside of recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available was reports from the pilots of both ac.

Pilot Members thought that the RF10 pilot's situational awareness had been built up by paying too much attention to RT calls, which information should supplement lookout. Perhaps the RF10 pilot thereby acted on incomplete information, lining up and departing without ensuring that the approach path was clear of landing traffic. The RF10 pilot had previously lined up on the asphalt RW whilst he awaited a previously landed TB20 to vacate and for the Jodel pilot to report that he was remaining clear to the S of the asphalt RW. It appears that the RF10 pilot then became concerned once airborne when the pilot of a Jodel, which had landed on the RW26 Southside grass, reported on the RT that the PA24 was passing O/H his ac whilst landing. The PA24 pilot was in fact approaching the RW26 Northside grass, which was separated from the asphalt RW by a 6ft post and wire fence, and was carrying out a second non-radio cct having previously flown along the Northside grass RW. The RF10 pilot had levelled-off shortly after taking-off and then seen the PA24 to his R slightly above as it then overtook his ac during its landing phase. The PA24 pilot had seen the RF10 on the RW and was content that his landing on the Northside grass was sufficiently separated from the RW26 asphalt. Members agreed and had no hesitation in assessing this incident as a sighting report where safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.